



SUPPLEMENT

TO THE

NEW ZEALAND GAZETTE

OF

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*Rules for Examinations of Masters and Mates.*

Marine Department,  
Wellington, 29th September, 1927.

IN pursuance and exercise of the powers vested in me by section 23 of the Shipping and Seamen Act, 1908, I do hereby make the following rules for the conduct of examinations of masters and mates, and as to the qualifications of applicants; and I do direct that the fees specified therein shall be paid to the Superintendents of Mercantile Marine at the ports where the applications to be examined are made. These rules (except where provision to the contrary is specifically made) shall come into force on the 1st day of November, 1927, and shall then supersede any rules or regulations heretofore existing and affecting such examinations, qualifications, and fees.

G. JAS. ANDERSON, Minister of Marine.

**PRELIMINARY AND GENERAL.**

**1. Masters and Mates must have Certificates.**—In accordance with the provisions of section 21 of the Shipping and Seamen Act, 1908, every British ship when going to sea or plying from any place in New Zealand, and every foreign ship when plying as a home-trade ship,\* shall be provided with deck officers duly certificated under this Act according to the following scale:—

- a. In any case, with a duly certificated master.
- b. If the ship is a home-trade sailing-ship of 100 tons register or upwards, or a home-trade steamship of 60 tons register

\* By a "home-trade ship" is meant one which is employed in trading or going between any ports or places in New Zealand, or plying on any navigable waters in New Zealand, or going to sea from any port or place in New Zealand, and returning to New Zealand without going more than 50 miles from the coast thereof, but not to or from the Cook Islands, Kermadec Islands, the Chatham Islands, the Auckland Islands, Campbell Island, Antipodes Island, or Bounty Island. By a "foreign-going ship" is meant every ship not included in the term "home-trade ship."

or upwards, then with at least one officer besides the master, such officer holding a certificate not lower than that of mate (home-trade) or second mate (foreign-going): Provided that any such ship of 100 tons register or upwards running more than 300 miles between terminal ports shall carry a second mate holding a certificate not lower than that of second mate of a home-trade ship or of master of a cargo-vessel under 25 tons register: Provided also that the Secretary of the Marine Department may, if and subject to such conditions as he thinks fit, exempt any ship from the requirements of the preceding proviso in respect of any particular voyage if it is proved to his satisfaction that to comply with those requirements would unduly delay that ship.

- c. If the ship is a foreign-going ship, then with at least a first and a second mate duly certificated.
- d. If the ship is a steamship authorized to ply within river limits or extended river limits only, then with a master holding a certificate as master of a river steamer.
- e. If the ship is a home-trade cargo-ship only of over 5 tons or up to 25 tons (inclusive) net register, then with a duly certificated master whose certificate shall be of a grade not lower than that prescribed for that class of ship by the next succeeding section.
- f. If the ship is a home-trade ship over 25 and up to 100 tons net register, and not included in the foregoing provisions, then with a duly certificated master whose certificate shall be of a grade not lower than that of a master of a home-trade ship.
- g. If the ship is a sailing-ship, or a ship propelled by any mechanical power other than steam, plying on a river or in a harbour, or within other restricted limits, then with a duly certificated master whose certificate shall be of a grade prescribed by the Minister.
- h. If the ship is a fishing-boat over 10 tons register exclusively employed in fishing on the coast of New Zealand, whether seagoing or running within river or extended river limits, then with a duly certificated master whose certificate shall be of a grade prescribed by the Minister.

An officer is not duly certificated unless he is the holder for the time being of a valid certificate of competency (or service) under the Shipping and Seamen Act of a grade appropriate to his station in the ship or of a higher grade.

If any person having been engaged as one of the above-mentioned officers goes to sea as such officer without being duly certificated, or if any person employs a person as an officer in contravention of this section without ascertaining that the person so serving is duly certificated, that person shall be liable for each offence to a fine not exceeding £50.

A certificate for a sailing-ship shall entitle the holder to serve in a steamship, or ship propelled by mechanical power other than steam, in the capacity mentioned in the certificate.

**2. Certificates granted to Persons who pass Examinations.**—Certificates of competency will be granted to those persons, being British subjects, who pass the requisite examination and otherwise comply with the requisite conditions. For this purpose Examiners have been appointed, and arrangements have been made for holding examinations.

**3. Birth or Naturalization.**—A British subject is one who is a British subject by birth or by naturalization in New Zealand.

**4. Nationality, Proof of.**—Every candidate for a certificate of competency of any grade will be required to produce proof of nationality.

Proof of British nationality will, in ordinary circumstances, involve the production of a birth-certificate or of a certificate of naturalization. If an applicant for examination cannot produce such a certificate he shall furnish such documentary evidence of nationality, or of birth

and nationality of parents, as he may be able to obtain, and such a case shall be referred to the Principal Examiner.

**5. Foreigners must know English.**—Foreigners must prove to the satisfaction of the Examiners that they can speak and write the English language sufficiently well to perform the duties required of them on board a British vessel. If a candidate fails for ignorance of the English language he will not be re-examined until after a lapse of six months.

**6. Examinations : Where and when held.**—The times and places at which examinations are held are shown in Appendix A, page 2995.

**7. Examination, How to apply for.**—1. Candidates for examination must fill up a form of application (Form Exn. 2) at a Mercantile Marine Office. The form, properly filled in, together with the candidate's testimonials in duplicate, and discharges, &c., must be lodged with the Superintendent of Mercantile Marine, for transmission to the Examiner, not later than seven days before the date of examination, and the candidate must conform to any regulations in this respect which may be laid down by the Marine Department.

2. The Examiner must be particularly careful to ascertain that any gaps in the candidate's service are properly accounted for, that his testimonials and discharges have been verified where such has been necessary, and that he has conformed to the requirements of these regulations, before he is allowed to sit for examination. In the absence of any necessary verification the candidate must not be examined.

3. A candidate who has failed in his examination and desires to again sit for examination, provided examinations are to be held during the next succeeding week, and provided he is eligible to sit, may make immediate application for such in the manner required by this regulation, notwithstanding a lesser period of seven days may elapse before the date of examination.

4. In cases where the services of a candidate require verification, or where he is in doubt whether his service complies with the regulations, and wishes to submit his case for special consideration, all certificates, discharges, and testimonials, together with the form of application (Form Exn. 2, which can be obtained at any Mercantile Marine Office), properly filled in (see para. 33), must be submitted to the Examiner of Masters and Mates or to the Superintendent of Mercantile Marine. If necessary, the officer will, after seeing that all the required information is clearly set forth in the papers, forward them, with his observations, to the Principal Examiner.

5. All other inquiries regarding examinations should be made and dealt with in the same way. The point on which information is sought should be clearly stated, and certificates, discharges, testimonials, &c., should be forwarded when they are material to the inquiry.

**8. Application : Particulars of Sea Service.**—1. A candidate's eligibility for examination will depend (amongst other things) upon the amount of sea service which he has performed, and upon the ranks which he has held on board the various vessels in which he has been employed. It is therefore most important that the particulars which the candidate inserts in Division H of the application form (Exn. 2) should be accurately stated.

2. Candidates who represent themselves as having served in a higher capacity than that actually held in the ship render themselves liable to prosecution under section 32 of the Shipping and Seamen Act, 1908. (See para. 16.) In this connection Examiners should remember that it is a common practice for ships to carry additional or auxiliary officers in one or more ranks, for instance, a ship may carry both a "chief" officer and a "first" officer; another may carry both a senior and a junior second mate; and so on. The method of assessing the service in such cases is explained in paragraph 112. The Examiner should be particularly careful, when checking an applicant's watch-keeping service, to ascertain the actual rank he held as a watch-keeping officer on board each of the ships in which he served.

3. All candidates for certificates of competency and for the voluntary examinations must submit all existing certificates held by them,

whether of master, mate, or engineer, issued under the various Shipping and Seamen and Navigation Acts, as such certificates are required by the Marine Department either for endorsement or cancellation purposes. All such certificates must be described by the candidate in section (b) of his application form (Exn. 2).

**9. Minimum Service.**—It must be clearly understood that the amount of service prescribed by the regulations for each grade of certificate of competency is the absolute minimum that can be accepted, and unless a candidate is able to show at least the full amount he must in no case be allowed up for examination.

**10. Age.**—Should any doubt exist as to the age of a candidate he will be required to produce a certificate of birth or other evidence of age.

**11. Sight Tests.**—Every candidate for a certificate of competency must pass the prescribed sight tests before a certificate of competency of any grade can be issued to him.

**12. First Aid to the Injured.**—Every candidate for a certificate of any class or grade, other than a master of a river steamer and a master of a harbour or river sailing-ship, must submit a certificate to the effect that he has passed examination in first aid to the injured.

**13. Lifeboatman, Certificate of Efficiency as.**—Every candidate for a foreign-going or a home-trade certificate will be required to produce a valid Board of Trade or an equivalent certificate of efficiency as lifeboatman on every occasion on which he presents himself for examination for his *first* certificate of competency.

**14. Wireless Qualifications for Home-trade Ships.**—Every candidate for a home-trade certificate of competency will require to produce a valid certificate as "wireless signaller," or a wireless certificate of a higher class than "wireless signaller," on every occasion on which he presents himself for examination for his first certificate of competency. (See Appendix E, page 2998.)

**15. Testimonials required.**—In addition to the necessary certificates of discharge submitted for proof of sea service, a certificate of character must be produced in respect of any lengthy intervals or gap embraced by or subsequent to the period of qualifying service; and every candidate will be required to produce testimonials (to be submitted in duplicate) to character, including sobriety, and to experience and ability on board ship, for at least the twelve months of sea service immediately preceding the date of application to be examined, and without producing these no person will be examined. The duplicates of such testimonials will be retained by the Marine Department.

**16. False Representation.**—It is provided by section 32 of the Shipping and Seamen Act, 1908, that any person who makes, assists in making, or procures to be made any false representation for the purpose of procuring, either for himself or for any other person, a certificate of competency or service, or the grant of any such certificate, shall in respect of each offence be guilty of a crime the punishment for which is imprisonment for a term not exceeding two years or a fine not exceeding £100.

**17. Desertion and Gross Misconduct, Penalty for.**—Candidates who have neglected to join their vessels after having signed articles, or who have deserted their vessels after having joined, or who have been found guilty of gross misconduct on board, will be required to produce satisfactory proofs of a period of two years' subsequent service and good conduct at sea, unless the Marine Department, after having investigated the matter, should see fit to reduce such period.

**18. Deafness and other Physical and Mental Disabilities.**—If during the progress of the examination the Examiner finds that a candidate is afflicted with deafness, with an impediment in his speech, or with some other physical or mental infirmity, and he is satisfied upon further investigation that the degree of deafness or of the impediment or other infirmity is such as to render the candidate incompetent to fully discharge the ordinary duties of a mate or master at sea, he shall not allow the candidate to complete his examination, and the candidate shall have his examination fee returned to him; but every case in which this action is taken must be reported to the Marine Department.

If the candidate subsequently produces a medical certificate to the effect that his hearing, speech, or physical or mental condition has improved or is normal, the Marine Department will take into consideration the question of allowing the candidate to sit again for examination.

**19. Certificate, Issue of.**—If the Examiner considers the candidate to have passed he will provide him with a form (Form Exn. 16) authorizing the Superintendent of Mercantile Marine to whom it is addressed to issue the certificate. The certificate will not be issued until the Principal Examiner, after his investigation of the candidate's examination-papers, decides he is to be credited with having passed. The certificate will then be issued and the candidate's testimonials and other papers returned to him simultaneously.

Should the Principal Examiner after his investigation decide the candidate has failed and should not be credited with having passed, the certificate will not be issued, and the candidate will be called upon to return the Form Exn. 16 for cancellation, following the candidate's compliance with which his testimonials and other papers will be returned to him.

The Examiner must see that the port at which the certificate is to be issued is the same on both Forms Exn. 16 and Exn. 2. If the candidate desires to alter the port at which his certificate is to be issued the Examiner must see the alteration is made on both forms.

**20. Lost Certificate, Copy of.**—Any master or mate who proves to the satisfaction of the Marine Department that he has lost or been deprived of a certificate already granted to him by the Marine Department may make application to the Marine Department for a certified copy to be issued to him. The applicant must make a declaration before a Stipendiary Magistrate in New Zealand, on Form Exn. 17 (obtainable at a Mercantile Marine Office) and submit the declaration and such evidence of loss or deprivation as he may be able to furnish, together with a fee of 10s., to a Superintendent of Mercantile Marine for transmission to the Marine Department. The onus of proof of loss or deprivation will rest entirely with the applicant, and he must state the means he has taken to trace and recover the certificate. The fee will be returned to the applicant if he is able to prove the loss of his certificate was caused by shipwreck or by fire.

**21. Certificates : Old Pattern may be exchanged for New Pattern.**—Any holder of an old-pattern certificate in sheet form may, by making application, and on payment of a fee of 2s. 6d., to a Superintendent of Mercantile Marine, exchange it for a new-pattern certificate in book form. In such cases the old-pattern certificate, which must accompany the application, will be retained by the Marine Department.

**22. Service found to be Insufficient, &c.**—If during the progress of or after the candidate has passed the examination it is discovered on further investigation that a discrepancy exists in any of his credentials, or that his services are insufficient to entitle him to receive a certificate for the grade for which he has passed, the certificate will not be granted; but if the Marine Department is satisfied the discrepancy or the error in calculating the candidate's services did not occur through any wilful fault or wilful misrepresentation on his part, he may elect to either have the examination fee returned to him or have it placed to his credit. Should his services entitle him to a certificate of a lower grade it may be granted to him, and the difference, if any, between the fee paid by him for the superior certificate and the fee payable for the inferior certificate may similarly be returned to him or placed to his credit. The superior certificate will not be granted until the candidate has performed the amount of service in which he was deficient, and has been re-examined in all the subjects prescribed for such superior certificate, unless the Marine Department sees fit to dispense with the re-examination.

If, however, the discrepancy or the error in calculation has been caused by the candidate's wilful fault or wilful misrepresentation on his part the certificate for which he has passed will not be granted.

**23. Failure : Candidates may be examined for a Lower-grade Certificate.**—1. Any candidate having failed in his examination for a foreign-going certificate, other than that as extra master, may, if he so desires, and provided the subjects in which he has failed are not included in the syllabus prescribed for a foreign-going certificate of a lower grade, be examined for such lower-grade certificate.

2. Any candidate having failed in his examination for a certificate as extra master may, if he so desires, proceed with the examination for a certificate as master.

3. In all such cases of failure and subsequent examination for a lower-grade certificate, candidates will be required to complete the whole of the work prescribed for the lower-grade certificate. The subsequent examination may be held during the current week, or on the occasion of the next succeeding regular examination date, as shall be directed by the Examiner.

4. Candidates will not be required to make further formal application or further payment of fee in respect of any such subsequent examination; and no part of the fee already paid by a candidate for the examination in which he has failed will be returned to him.

**24. Failure to pass the Sight Tests.**—Any candidate for examination who fails to pass the prescribed sight tests shall not be allowed to proceed further with the examination for a certificate of competency of any grade. If the circumstances render it necessary for any candidate to proceed with the examination in navigation and seamanship before undergoing examination in the sight tests, he must be clearly informed that the examination in navigation and seamanship will be cancelled in the event of his failure to pass either of the sight tests.

**25. Failure in Examination.**—In every case of failure the candidate, if eligible and if desiring to again sit for examination for a certificate of competency of the same grade as that for which he failed, or for any other grade, must be examined anew.

**26. Failure in Navigation.**—Any candidate having failed in navigation three times within a period of three months will not be eligible to sit for re-examination for the certificate for which he last failed, or for any higher certificate, until a period of three months since the date of his last failure has elapsed, notwithstanding that any or all of such failures may have occurred outside this Dominion.

**27. Failure in Seamanship.**—Any candidate having failed in seamanship will not be eligible for examination until a period of six months since the date of his failure has elapsed. Whether the whole or part of this period shall be served at sea will depend upon the subjects in seamanship in which the candidate failed; but the amount of further sea service to be required will be left to the discretion of the Examiner.

Failure due merely to inability to repeat verbatim the articles of the Regulations for Preventing Collisions at Sea will not be considered as failure in seamanship if the candidate understands the practical application of those regulations; but such inability will entail the same penalties as failure in navigation.

The Examiner in making his report on Form Exn. 14 shall state what amount, if any, of further sea service the candidate must perform; and he shall also insert this information on the candidate's Form Exn. 2.

**28. Failure in Seamanship for an Ordinary Certificate.**—Any candidate who during his examination for an "ordinary" certificate of any grade fails in seamanship so far as regards the management of square-rigged sailing-vessels may, if he so desires, and without further formal application or further payment of fee, proceed with the examination for a certificate of competency for foreign-going steamships, or for for-and-aft-rigged vessels. Similarly, if a candidate fails in seamanship during his examination for a certificate as extra master, he may proceed with the examination for a certificate as extra master, steamships.

**29. Failure in Examination for Extra Master.**—A candidate who has failed in his examination for a certificate as extra master will not be allowed to present himself for examination for that grade of certificate more than three times within a period of twelve months.

**30. Failure in Voluntary Examinations.**—A candidate for the voluntary examination in compass-deviation, in steam, or in signalling will not be allowed to present himself for examination in respect of each of those subjects more than three times within a period of twelve months.

**31. Fee in Case of Failure.**—If a candidate fails to pass the examination in navigation or seamanship, no part of the fee will be returned to him.

**32. Fee in Case of Failure in Sight Tests.**—The fee paid for examination for a certificate of competency includes the fee of 2s. 6d. for examination in the sight tests, and if the candidate fails to pass those tests this fee will, with the exception of 2s. 6d. be returned to him.

**33. Fee always paid first.**—Candidates for examination, and any persons inquiring as to their eligibility for such, in making their application on Form Exn. 2, will be required to pay the examination fee before any step is taken in the way of inquiring into their services or testing their qualifications. If the candidate or person is found to be ineligible the fee will, as he may elect, either be returned to him or placed to his credit until he is eligible.

**34. Fee : Where to pay.**—The fee for examination must be paid to the Superintendent of the Mercantile Marine Office. If a candidate offers a gratuity to any officer of the Department he will be regarded as having committed an act of misconduct, and will be rejected, and not allowed to be examined, either at the port where the offence was committed or at any other port, until a period of twelve months has elapsed.

**35. Fees, Table of.**—The fees are as follows:—

FOR FOREIGN-GOING SHIPS.		£	s.	d.
Second mate .. .. .		1	0	0
First or only mate—				
If previously possessing an inferior foreign-going certificate granted by the Board of Trade or by the Government of a British Dominion, colony, or possession under Order in Council .. .. .		0	10	0
If not .. .. .		1	0	0
Master .. .. .		2	0	0
Where a candidate is the holder of a certificate for fore-and-aft-rigged vessels, and requires an ordinary certificate of the same grade ; or where a candidate is the holder of a steamship certificate, and requires an ordinary or a fore-and-aft certificate of the same grade .. .	Half the usual fees.			
Where a candidate is in possession of a colonial certificate for foreign-going ships not granted under the Imperial Order in Council recognizing colonial certificates ; or of a provisional certificate of qualification obtained after examination on board one of His Majesty's ships : For a Marine Department's certificate of same grade—				
For first attempt .. .. .	No fee.			
Every subsequent attempt .. .. .	Usual fee.			

NOTE.—No abatement will be made in the fee charged to a candidate for a certificate for foreign-going ships in consequence of his possessing a master's, mate's, or second mate's certificate for home-trade ships.

FOR HOME-TRADE SHIPS.		£	s.	d.
Second mate .. .. .		0	10	0
Mate .. .. .		0	10	0
Master .. .. .		1	0	0
Master of a cargo-vessel under 25 tons register .. .		0	10	0
Master of a fishing-boat .. .. .		0	10	0

FOR RESTRICTED-LIMITS SHIPS.		£	s.	d.
Master of a river steamer .. .. .		1	0	0
Master of a harbour sailing-ship .. .. .		0	10	0

VOLUNTARY EXAMINATIONS.		£	s.	d.
Extra master—				
If holding a master's certificate of competency .. .		1	0	0
If not .. .. .		2	0	0
Voluntary examination in steam .. .. .		1	0	0
Voluntary examination in compass-deviation .. .		1	0	0
Voluntary examination in signalling—				
If taken at the same time as the examination for a certificate of competency .. .. .	No fee.			
If taken at any other time .. .. .		1	0	0

## FOR YACHTS.

	£	s.	d.
Master, ordinary .. .. .	2	0	0
Extra Master—			
If possessing a master's certificate .. .. .	1	0	0
If not .. .. .	2	0	0
Master in New Zealand waters .. .. .	1	0	0

CERTIFICATE OF EFFICIENCY FOR OFFICERS OF THE  
R.N.V.R.

Ordinary .. .. .	2	0	0
Extra—			
If holding an ordinary certificate .. .. .	1	0	0
If not .. .. .	2	0	0

## SIGHT TESTS.

Examination in the sight tests only .. .. .	0	2	6
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## EXCHANGE OF CERTIFICATE.

Exchange of old for a new pattern certificate in book-form	0	2	6
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**FIRST AID TO THE INJURED.**

NOTE.—A list of the names and addresses of the local secretaries of the St. John Ambulance Association is given in Appendix C, page 2996.

36. 1. The certificate required to be submitted by a candidate must be a certificate issued by the St. John Ambulance Association, the St. Andrew's Ambulance Association, the St. Patrick's Ambulance Association, the British Red Cross Society, the London County Council, the Glamorgan County Council, the Leith Nautical College, or other approved body, or by a medical officer of one of His Majesty's ships to the effect that he has passed examination in first aid to the injured.

2. The certificate must be an adult certificate—i.e., obtained by the candidate when sixteen years of age or more—and the examination for it must have been passed not more than three years before the date of the examination for the certificate of competency. Certificates issued by the St. John Ambulance Association more than three years before the examination for a certificate of competency will, however, be accepted, provided that at the expiration of three years since its issue the certificate has attached to it the "voucher" or "label" of the association certifying that the holder has passed re-examination in first aid.

3. If a candidate does not possess such a certificate of proficiency in first aid he should apply, some time before he wishes to sit for examination for a certificate as master or mate, to the local secretary of an approved association, or other approved body, who will inform him of the available facilities for the instruction and examination of candidates in first aid.

4. Besides the courses of instruction which are provided on shore at the ports at which examinations for certificates as master and mate are held in the United Kingdom, New Zealand, &c., courses of instruction given by qualified surgeons on board merchant vessels will be accepted by the St. John Ambulance Association as qualifying the candidate for examination for their certificate of proficiency in first aid, provided the surgeon certifies that he has followed the syllabus of instruction laid down by the association.

5. The St. Andrew's Ambulance Association also will accept instruction by a ship's surgeon on board ship as qualifying a candidate for examination for their certificate of proficiency in first aid, provided their syllabus is followed. In this case the candidate must previously have enrolled and obtained an attendance card from the local secretary of the association or the head office at 176 West Regent Street, Glasgow.

6. It will not be necessary for the candidate for a certificate as master or mate in all cases to produce the formal certificate of proficiency in first aid issued by the associations. In order to prevent delay in proceeding with the examination for the certificate as master or mate and in the issue of the certificate to successful candidates, the special mercantile marine linen certificate issued by the St. John Ambulance Association and duly signed by the lecturer, the surgeon examiner, and the association's local representative, or, in Scotland, a



certificate signed by the local examiner of the St. Andrew's Ambulance Association, to the effect that the candidate has passed the examination for a certificate of proficiency, may be accepted as showing that the candidate possesses the required knowledge of first aid.

### SIGHT TESTS.

(NOTE.—Detailed information concerning the prescribed sight tests, the conduct of the examination, and the standards required is contained in Appendix G, page 3000.)

37. 1. Any holder of a certificate of competency being a candidate for examination for a certificate of a higher or of a different grade shall not be examined in the lantern test.

2. **Letter Test.**—Every candidate for a certificate must pass the letter test. If he obtained a certificate of competency before the 1st January, 1914, he will only be required to possess half normal vision using both eyes together; otherwise he must pass a higher standard—viz., normal vision using both eyes or either eye separately.

Any candidate who has obtained his first certificate under these conditions may obtain his higher certificates provided that he has normal vision using both eyes or either eye separately.

A candidate who fails to pass the letter test may present himself for re-examination at intervals of three months.

3. **Lantern Test.**—Every candidate must undergo the lantern test on every occasion on which he presents himself for examination for his first certificate of competency; but if he then passes he will not be required by the Marine Department to undergo the lantern test on any subsequent occasion.

A candidate who fails to pass the lantern test shall not be re-examined within the Dominion without authority of the Principal Examiner.

4. **Special Examination : Referred Cases.**—In some cases it may be necessary for the Examiner, on the instructions of the Principal Examiner, to refer a candidate for special examination at another port before a decision is given as to his passing or failure in the sight tests. No additional fee will be charged for the special examination in such a case, and the Marine Department will repay, at a rate which will be notified to him, the travelling-expenses of any such candidate in attending the special examination. A candidate who has been so referred for special examination shall not be re-examined by the same Examiner.

5. **Special Examination : Appeal Cases.**—A candidate who fails to pass the local lantern test may appeal for a special examination at Wellington on payment of a fee of two guineas, which will be returned to him in the event of his passing the special examination. The Marine Department will not make any payment whatever towards the expenses of a candidate who, upon his own application, is examined by the Special Examiners, unless the candidate passes the special examination or unless, in the event of failure, the Marine Department considers that the particular circumstances of the case justify such payment.

6. When a candidate fails to pass the local lantern test the Examiner will point out to him the conditions under which he may appeal. Appeals must be made through the Examiner, and forwarded to the Principal Examiner with the Examiner's remarks.

7. **Special Examination, Time and Place of.**—Candidates who are referred, and candidates who on appeal from the result of the local tests are granted a special examination, will be notified by the Principal Examiner of the time and place at which they should attend for the special examination; and they shall inform the Principal Examiner whether or not they will be able to attend at that time. Any candidate who, after informing the Principal Examiner that he will attend, fails to appear at the time and place appointed will be liable to have his examination postponed indefinitely; also, if an appeal candidate, will forfeit the appeal fee of two guineas, and will be required to deposit a further fee of the same amount before further arrangements can be made for his special examination.

8. **Failure in Special Examination.**—Where, during the course of a special examination, a candidate is found to have a permanent defect in his eye-sight such as to render him unfit for a sea career he will be finally rejected, and will not be allowed to be examined

again in the sight tests on any future occasion. However, if the candidate is still dissatisfied, he may, if he so desires, and on payment of a fee of six guineas, present himself for a second special examination, provided that he brings with him an approved friend to witness the examination. This second special examination will form no part of the Marine Department's examination for a certificate of competency; it will be entirely voluntary, and the Department will not make any payment whatever towards the expenses incurred by such a candidate. The Department will, however, give consideration to the result of such examination in determining whether a certificate shall be granted.

9. In cases in which the Marine Department repay any expenses incurred by a candidate in attending a special examination, the scale and extent of the amount to be repaid will be communicated to the candidate after the time and place at which the special examination has been decided upon and the candidate has signified his agreement to attend.

10. **Examinations in the Sight Tests only.**—The sight-tests are open to all persons serving or intending to serve in the mercantile marine or in fishing-vessels, and all such persons are recommended to take the earliest opportunity of ascertaining whether their vision is such as to qualify them for service in that profession. Any such person, if desirous of undergoing the tests, must make application to the Superintendent of Mercantile Marine Office on the Form Exn. 2B, and must pay a fee of 2s. 6d. This fee will be payable on each occasion on which a candidate is examined.

#### QUALIFICATIONS REQUIRED AND EXAMINATION SYLLABUS FOR THE VARIOUS CLASSES AND GRADES.

##### CERTIFICATES FOR FOREIGN-GOING SHIPS.

38. **Ordinary Certificates Minimum Square-rigged Service required.**—A candidate for an ordinary certificate of any grade who has not previously held an ordinary certificate of a lower grade must prove that he has served in a square-rigged sailing-vessel not less than one year in the foreign trade or one year and a half in the home trade.

39. **Value of Ordinary Certificate.**—Ordinary certificates will entitle the holders to go to sea as mates or masters of any sailing-ship or steamship.

40. **Steamship Certificates : No Square-rigged Service required.**—Certificates applying only to steamships are issued to candidates who are either unable to comply with the regulation which requires them to have served one year in square-rigged or fore-and-aft-rigged sailing vessels, or prove in course of examination they are ignorant of the management of these classes of sailing-vessels. There will be no distinction in these certificates between fore-and-aft-rigged steamships and square-rigged steamships.

41. **Value of Steamship Certificate.**—Steamship certificates will entitle the holders to go to sea as masters or mates of foreign-going steamships, but will not entitle them to go to sea as masters or mates of foreign-going sailing-ships.

42. **Steamship Certificates, how changed.**—A candidate possessing a certificate for foreign-going steamships and desiring to be examined for an ordinary certificate must prove that he has served at sea for at least one year in a square-rigged sailing-vessel, unless he has previously held an ordinary certificate of a lower grade.

43. **Steamship Certificates : Age and Service.**—The qualifications as to age and service for steamship certificates are the same as for ordinary certificates, excepting that the whole of the qualifying service may have been performed in steamships, and that no service in sailing-vessels is required.

44. **Steamship Certificates : Examination in Navigation.**—The examination in navigation for steamship certificates will be identical with that prescribed for ordinary certificates.

45. **Fore-and-aft Certificates.**—Certificates for the grades of second mate, only mate, first mate, and master of fore-and-aft-rigged vessels will be issued to candidates who have served at least one year in fore-and-aft-rigged or partly in fore-and-aft-rigged and partly in square-rigged sailing-vessels, or who, although having the required

service in square-rigged sailing-vessels, prove in course of examination that they are ignorant of the management of square-rigged ships. In other respects the qualifications for examination for such certificates are the same as for ordinary certificates.

The examinations for the grades of second mate, only mate, first mate, and master of fore-and-aft-rigged vessels will be precisely the same as for the ordinary certificates, excepting that in seamanship a knowledge of the management of square-rigged vessels is not required.

A certificate for fore-and-aft-rigged vessels will not entitle the possessor to act in any case in which a certificate for square-rigged vessels is required.

A candidate possessing a certificate for fore-and-aft-rigged vessels and desiring to be examined for an ordinary certificate must prove that he has served at sea at least one year in a square-rigged sailing-vessel, unless he has previously held an ordinary certificate of a lower grade.

**46. Square-rigged Vessels defined.**—Amongst square-rigged vessels are classed full-rigged ships, barques, brigs, barquentines, and brigantines.

#### CANDIDATE'S MINIMUM AGE AND SERVICE.

(NOTE.—*Sea-service qualifications are shown in tabular form in Appendix K, page 3026.*)

**47. Second Mate.**—Not less than eighteen years of age, and have served four years at sea in foreign-going ships, or the equivalent, six years, in home-trade ships.

**48. Only Mate.**—Not less than nineteen years, and have served five years at sea in foreign-going ships, or the equivalent, seven years and a half, in home-trade ships.

**49. First Mate.**—Not less than nineteen years of age, and have served five years at sea in foreign-going ships, or the equivalent, seven years and a half, in home-trade ships (see paras. 106 and 108). This period of sea service must include *either*—

- a. One year in a capacity not lower than that of third mate of a foreign-going ship whilst holding a certificate as second mate of a foreign-going ship; or
- b. One year and a half in a capacity not lower than that of only mate in the home trade whilst holding a certificate as second mate of a foreign-going ship or as mate of a home-trade ship (see also para. 106).

**50. Master.**—Not less than twenty-one years of age, and have served six years at sea in foreign-going ships, or the equivalent, nine years, in the home trade (see paras. 106 and 108). This period of service must include *either*—

- a. One year in a capacity not lower than only mate of a foreign-going ship whilst holding a certificate of grade not lower than that of only mate of a foreign-going ship; if during this service the candidate did not hold a certificate as first mate of a foreign-going ship he will be required, in addition, to prove the officer's service prescribed for that grade (see para. 49); or
- b. One year and a half in a capacity not lower than that of only mate in the home trade whilst holding a certificate of grade not lower than that of only mate of a foreign-going ship; if during this service the candidate did not hold a certificate as first mate of a foreign-going ship he will be required, in addition, to prove the officer's service prescribed for that grade (see para. 49); or
- c. One year in a capacity not lower than that of second mate, or two years in a capacity not lower than that of third mate (he must prove that he had not more than two watch-keeping officers over him besides the master) of a foreign-going ship whilst holding a certificate as first mate of a foreign-going ship, and one year and a half in a capacity not lower than that of third mate of a foreign-going ship whilst holding a certificate of grade not lower than that of second mate of a foreign-going ship; or
- d. Service performed wholly in the home trade as follows:—
  - i. Three years as master whilst holding a certificate as master, home trade; or

ii. One year as master duly certificated as aforesaid, and in addition three years in a capacity not lower than mate, at least one year of which must have been served whilst holding a certificate not lower than that of second mate of a foreign-going ship.

(NOTE.—For interpretation of the phrase “service as first mate, second mate, &c.,” for the purposes of these regulations see para. 112.)

## SYLLABUS OF EXAMINATION IN NAVIGATION AND SEAMANSHIP.

### SECOND MATE.

**51. Navigation.**—Diagrams and explanations to be given. Candidates for foreign-going certificates as master or as mate of any grade must give a written explanation of any of the terms and definitions used in navigation and nautical astronomy that may be asked, and they must give a diagram and an explanation for each of the problems worked by them.

- a. Write a legible hand and spell correctly. For the purpose of testing his ability the candidate will be required to write a short essay on some suitable subject.
- b. Show a competent knowledge of the first five rules of arithmetic and the use of logarithms.
- c. Answer questions on elementary plane trigonometry.
- d. Work a day's work complete, correcting the courses for leeway, deviation, and variation.
- e. Find the latitude by meridian altitude of the sun.
- f. Work any practical problem in parallel sailing.
- g. Find the true course and distance from one given position to another by Mercator's method; also the compass course, the variation and deviation being given.
- h. Find the true amplitude of the sun, and the error of the compass therefrom; also the deviation, the variation being given.
- i. Find the longitude by chronometer from an altitude of the sun by the usual methods, computing the daily rate of a chronometer from errors observed when such is required; also find the true azimuth of the sun, and the compass error and deviation; the variation being given.
- j. Find the true azimuth of the sun by the Time Azimuth Tables, the compass error, and the deviation; the variation being given.
- k. Find on a chart or plan the course or courses to steer and the distance or distances from one given position to another.

Find the ship's position, together with the set and drift (if any), on the chart or plan from cross-bearings of two objects.

Find the ship's position from two bearings of the same or different objects, the course and distance run between taking the bearings being given, making due allowance for a given tidal stream or current; also, the distance of the ship from the object or any given position at the time of taking the second bearing.

Find on a chart or plan the course to steer by compass in order to counteract the effect of a given tidal stream or current, and the distance the ship will make good towards a given point in a given time.

Fix a ship's position on a chart or plan by horizontal sextant angles, using a station-pointer.

Work out practically the correction to apply to soundings taken at a given time and place to compare with the depth marked on the chart; and give a method of finding approximately the time of high water at any given place without the aid of the Admiralty or other Tide Tables.

The candidate will be examined orally in the following subjects:—

1. Morse and British movable semaphore alphabets; International Code of Signals; and the Allied Signal Manual. He will be required to attain a minimum speed of 10 words per minute in semaphore, 6 words per minute in Morse lamp-flashing, and 5 words per minute in Morse flag-waving. (See Appendix D, page 2996.)

- m. Use and adjustments of the sextant; read *off* and *on* the arc; and the mode of finding the index error by both horizon and sun.
  - n. Construction, use, and principle of the barometer, thermometer, and hydrometer; also the use and care of a chronometer.
  - o. Weights and measures (English and metric system).
  - p. Markings, signs, and abbreviations on Admiralty charts and plans.
  - q. General Notices published in the Board of Trade Summary of Notices to Mariners.
  - r. Elementary questions on the main parts of a ship's construction.
- 52. Seamanship.**—The candidate must understand and be able to give satisfactory answers on the following subjects in so far as those subjects relate to steamships:—
- a. Standing and running rigging.
  - b. Bending, unbending, setting, reefing, taking in, and furling sail.
  - c. Sending masts and yards up and down, &c.
  - d. Management of ships' boats in heavy weather.
  - e. Care and usage of mechanical logs and sounding-machines.
  - f. Marking and use of the ordinary lead and log lines.
  - g. Dunnaging and stowing cargo, &c.
  - h. Construction, use, and action of the sluices and of the water-ballast tanks.
  - i. Engine-room and other telegraphs used on board ship, and deck appliances generally.
  - j. Seeing everything in readiness and clear for getting under way, and the precautions to be then observed with regard to steering-gear and connections, engines, propeller, &c.

Also he must have a thorough knowledge of—

- k. Rule of the road as regards both steamers and sailing-vessels, their regulation lights, and fog and sound signals.
- l. Signals of distress, and signals to be made by ships wanting a pilot, and the liabilities and penalties incurred by the misuse of these signals.
- m. Use and management of the rocket apparatus in the event of a vessel being stranded.
- n. Any questions appertaining to the duties of the second mate of a steamship which the Examiner may think necessary to ask.

**53. Additional Seamanship for a Candidate for an Ordinary Certificate.**—A candidate for an ordinary certificate must, in addition to the foregoing requirements for a steamships certificate, understand and give satisfactory answers to the subjects in seamanship enumerated in subparagraphs *a* to *h* inclusive in so far as all those subjects relate to both wooden and steel sailing-ships, and to the following subjects:—

- o. Management of a sailing-ship under canvas.
- p. Any questions appertaining to the duties of the second mate of a sailing-ship which the Examiner may think necessary to ask.

#### ONLY MATE, AND FIRST MATE.

(The syllabus of examination for either certificate is identical.)

**54. Navigation.**—In addition to the following requirements the candidate will be examined in the navigation and seamanship prescribed for the grade of second mate.

- a. Answer questions on right-angled spherical trigonometry.
- b. Compute the time at which a given star will be on the observer's meridian.
- c. Determine what bright stars will be within a certain hour-angle from the observer's meridian, above the Pole and above the horizon, at any given time; also the hour-angle, east or west, of each of the stars, and whether they are to the north or south of the observer's zenith when passing the meridian.
- d. Compute the approximate meridian altitude of a star for setting the sextant.
- e. Find the latitude by meridian altitude of a star.
- f. Find the longitude by chronometer by an altitude of a star.
- g. Find the true azimuth of a star by the Time Azimuth Tables, and deduce the deviation therefrom.

- h.* Find the latitude by ex-meridian altitude of the sun or a star.
- i.* Find the line of position and the true bearing of the sun, and the ship's position. (Candidates will, unless it is otherwise stated in the problem, be allowed to solve this problem by any method they may choose, provided it is correct in principle; but occasionally they will be required to solve it by Sumner's method or by the Marc St. Hilaire method of position lines.)

*j.* Answer certain questions on meteorology.

Candidates will be examined orally in the following subjects :—

- k.* Keeping a ship's log-book.
- l.* Calculating the capacity of a given bunker or hold.
- m.* Calculating a freight and its commissions.
- n.* Measurement and equipment of ship's lifeboats, and the number of persons allowed to be carried in each class of boat.
- o.* Testing of lifebuoys and life-jackets.
- p.* Screening of ship's side lights.
- q.* More advanced questions on the main part of a ship's construction and general use.
- r.* Elementary questions on stability.

**55. Seamanship.**—The candidate will be required to show a knowledge of the following subjects in so far as those subjects relate to steamships :—

- a.* Shifting large spars, rigging sheers, taking lower masts in and out.
- b.* Mooring and unmooring ship; keeping a clear anchor; carrying out an anchor.
- c.* Management of a ship in stormy weather.
- d.* Obtaining a cast of the deep-sea lead in heavy weather.
- e.* Rigging purchases for getting heavy weights, anchors, machinery, &c., in and out.
- f.* Ventilation of holds and stowage of explosives.
- g.* Stowage of grain cargoes.
- h.* Disposing various kinds of cargo and weights in a stiff and in a tender vessel.
- i.* Rigging a sea-anchor, and what means to employ to keep a ship disabled or unmanageable out of the trough of the sea, and to lessen her lee drift.
- j.* Effects of the screw-race upon the rudder; and the effect produced on the direction of the head of the ship by going ahead (astern) with a right- (left-) handed screw when the rudder is ported (starboarded); also, the effect of twin screws under the same conditions, and when going ahead with one and reversing the other, &c.
- k.* How to turn a steamship short round.
- l.* Any other questions appertaining to the duties of a first mate of a steamship which the Examiner may think necessary to ask.

**56. Additional Seamanship for a Candidate for an Ordinary Certificate.**—A candidate for an ordinary certificate must, in addition to the foregoing requirements for a steamships certificate, understand and give satisfactory answers to the subjects in seamanship enumerated in subparagraphs (*a*) to (*i*) inclusive in so far as all those subjects relate to both wooden and steel sailing-ships, and to the following subjects :—

- m.* Casting a sailing-ship on a lee shore.
- n.* Securing masts of a sailing-ship in the event of accident to bowsprit.
- o.* Accidents on a sailing-ship and how to deal with them.
- p.* Any questions appertaining to the duties of the first mate of a sailing-ship which the Examiner may think necessary to ask.

#### MASTER.

**57. Navigation.**—In addition to the following requirements the candidate will be examined in the navigation and seamanship prescribed for the grades of both second mate and first mate.

- a.* Write an essay on a technical subject.
- b.* Find the latitude by an altitude of the Pole star at any time.
- c.* Find the latitude by meridian altitude of the moon.

- d.* Determine the initial Great Circle course, and the distance from one given position to another, the latitude and longitude of vertex, the longitude from vertex, and the latitudes and longitudes through which the Great Circle will pass; laying the track, composite or otherwise, down on a Mercator's chart, and explaining briefly how the course and distance from one point to another on this track is then found.

This problem may, subject to the decision of the Examiner, be solved either by calculation, or by any tables, graphic method, or Great Circle chart known to and preferred by the candidate, and it will usually be set so as to leave the choice of method to the candidate.

- e.* Find the magnetic bearing of any fixed object when at sea or at anchor from bearings of the object taken with the ship's head on equidistant compass-points, and compute the deviation therefrom.

Construct a deviation-curve upon a Napier's diagram which will be furnished by the Examiner, and show that he understands its practical application.

Give satisfactory written and oral answers to certain practical questions as to the effect of a ship's iron upon the compasses, and the method of determining the deviation; and show how to compensate the deviation by magnets and soft iron by the aid of Beall's compass deviascope.

- f.* Questions on ship-construction, naval architecture, and stability;

He will be examined orally on the following subjects:—

- g.* Law as to the engagement, discharge, and management of the crew, and the entries to be made in an official log-book.  
*h.* How to prevent and check an outbreak of scurvy on board ship.  
*i.* Law as to load-line marks, and the entries and reports to be made respecting them.  
*j.* Invoices, charter-party, bills of lading, Lloyd's agent, nature of bottomry, bills of exchange, surveys, averages, &c.  
*k.* Prevailing winds and currents of the globe.  
*l.* Trade routes.  
*m.* Tides.

**58. Seamanship.**—The candidate will be required to show a knowledge of the following subjects in so far as those subjects relate to steamships:—

- a.* Construction of rafts and jury-rudders.  
*b.* Resources for the preservation of the ship's crew in the event of wreck.  
*c.* Management of a ship in heavy weather.  
*d.* Rescuing the crew of a disabled ship.  
*e.* Steps to be taken when a vessel is on her beam-ends, or in any danger or difficulty, or disabled or unmanageable and on a lee shore.  
*f.* How to proceed when placing a ship in dry dock and directing repairs, and when putting into port in distress with damage to cargo and ship; and the procedure attendant thereto.  
*g.* How to use steam appliances in the event of fire.  
*h.* Economy in coal-consumption.  
*i.* Best arrangement for towing vessels under different circumstances.  
*j.* Any questions appertaining to the management of a steamship which the Examiner may think necessary to ask.

**59. Additional Seamanship for a Candidate for an Ordinary Certificate.**—A candidate for an ordinary certificate must, in addition to the foregoing requirements for a steamships certificate, understand and give satisfactory answers to the subjects in seamanship enumerated in subparagraphs (*a*) to (*f*) inclusive in so far as all those subjects relate to both wooden and steel sailing-ships, and to the following subjects:—

- k.* Heaving a keel out.  
*l.* Any questions appertaining to the management of a wooden or steel sailing-ship which the Examiner may think necessary to ask.

## CERTIFICATES FOR HOME-TRADE SHIPS.

## CANDIDATES' MINIMUM AGE AND SERVICE, ETC.

(NOTE.—*Sea service qualifications are shown in tabular form in Appendix K, page 3026.*)

**60. Second Mate.**—Not less than eighteen years of age, and have served three years at sea, or one year at sea and two years in extended river limits.

**61. Mate.**—Not less than nineteen years of age, and have served four years at sea, or two years at sea and two years in extended river limits.

**62. Master.**—Not less than twenty-one years of age, and have served five years at sea, or three years at sea and two years in extended river limits, of which—

- a. One year must have been in a capacity not lower than that of only mate in the home trade whilst holding a home-trade mate's certificate or a foreign-going second mate's certificate; or
- b. Two years and a half must have been in a capacity not lower than second mate in the home trade in charge of a watch whilst holding a home-trade mate's certificate or a foreign-going second mate's certificate (see para. 116); or
- c. One year and a half must, whilst holding a home-trade mate's certificate have been in a capacity not lower than that of second mate in a home-trade ship which is required by law to carry a certificated second mate; or
- d. One year must have been as master of a cargo-vessel plying in the home trade whilst holding a certificate of competency as master of a cargo-vessel under 25 tons register; or
- e. One year must have been as master of a vessel of 50 tons register or upwards plying in the home trade whilst holding a certificate of service as master of a vessel of 50 tons register or upwards; or
- f. One year and a half must have been as master of a vessel plying in the home trade whilst holding a certificate of service as master of a vessel under 50 tons register.

**63. Master of a Cargo-vessel under 25 Tons Register.**—Not less than twenty-one years of age, and have served—

- a. Four years at sea; or
- b. Two years at sea and two years in extended river limits.

In each case not less than one year must have been served in the same class of vessel as that for which the certificate is desired.

**64. Master of a Fishing-boat.**—The minimum age and service and the syllabus of examination for a certificate as master of a fishing-boat are identical with those prescribed for master of a cargo-vessel under 25 tons register, excepting that not less than one year of the four years required must have been served in a fishing-boat.

**65. Master of River-steamer.**—Not less than twenty-one years of age, and have served at least two years at sea or as deck hand under a duly certificated master on a vessel plying within extended river limits.

## SYLLABUS OF EXAMINATION IN NAVIGATION AND SEAMANSHIP.

## SECOND MATE.

**66. Navigation :—**

- a. Read, write a legible hand from dictation, and spell correctly.
- b. Understand the first five rules of arithmetic, both simple and compound.
- c. Attain a minimum speed of 10 words a minute in semaphore, 6 words a minute in Morse lamp-flashing, and 5 words a minute in Morse flag-waving; and to have a good working knowledge of the International Code of Signals and the Allied Signal Manual.
- d. Possess a knowledge of the tide, bar, harbour, and storm signals as used within New Zealand, and of the method of finding the time of high and low water at any place for which time differences are given in the "New Zealand Nautical Almanac."



- e. Take a bearing by compass, and find the distance from a point or light by the methods shown in the "New Zealand Nautical Almanac" of 1925, on pages 105 to 108, or on pages 135 to 138 of Tables for Azimuth, Great-circle Sailing, &c., published by the Marine Department.
- f. Explain orally the marking, signs, and abbreviations on Admiralty charts and plans.
- g. Read an aneroid barometer and a thermometer and understand their use.

**67. Seamanship.**—A candidate must understand and give satisfactory answers on the following subjects:—

- a. Bending, unbending, setting, reefing, taking in, and furling sail.
- b. Management of ship's boats in heavy weather.
- c. Dunning and stowing cargo, &c.
- d. Rule of the road as regards both steamers and sailing-vessels, their regulation lights, and fog and sound signals.
- e. Signals of distress, and the signals to be made by ships wanting a pilot, and the liabilities and penalties incurred by the misuse of these signals.
- f. Marking and use of the lead and log lines.
- g. Use and management of the rocket apparatus in the event of his vessel being stranded, and to have a knowledge of the ports in New Zealand where rocket apparatus for saving life is maintained.
- h. Standing and running rigging of steamships.
- i. Construction, use, and action of the sluices and of the water-ballast tanks.
- j. Engine-room telegraph, &c.
- k. Any questions appertaining to the duties of the second mate of a home-trade ship which the Examiner may think necessary to ask.

#### MATE.

In addition to the following requirements the candidate will be examined in the navigation and seamanship subjects prescribed for the grade of second mate.

#### 68. Navigation:—

- a. Find the latitude by meridian altitude of the sun.
- b. Find the true amplitude of the sun and the compass error and deviation therefrom, the variation being given.
- c. Understand the use of a Mercator's chart, and be able to find on a chart or plan the course or courses to steer and the distance or distances from one given position to another.
- d. Find the ship's position, together with the set and drift (if any), on a chart or plan from cross-bearings of two objects.
- e. Find the ship's position from two bearings of the same or different objects, the course and distance run between taking the bearings being given, making due allowance for a given tidal stream or current; also the distance of the ship from the object or any given position at the time of taking the second bearing.
- f. Find on a chart or plan the course to steer by compass in order to counteract the effect of a given tidal stream or current, and to find the distance the ship will make good towards a given point in a certain time.
- g. Work out practically the correction to apply to soundings taken at a given time and place to compare with the depths marked on the chart.
- h. Fix the ship's position by horizontal sextant angles, using a station-pointer for plotting it on the chart or plan, &c.
- i. Give a method of finding approximately the time of high water at any given place without the aid of the Admiralty or other Tide Tables.
- j. Explain orally the markings, signs, and abbreviations on Admiralty charts and plans.
- k. Use of the sextant; to be able to observe with it, to read off on the arc, and to find the index error by the horizon.

**69. Seamanship.**—A candidate will be required to show a knowledge of the following subjects:—

- a. Mooring and unmooring a vessel, keeping a clear anchor, and carrying out an anchor.

- b. Ventilation of holds and the stowage of explosives.
- c. Rigging a sea-anchor, and what means to employ to keep a vessel disabled or unmanageable out of the trough of the sea and lessen her lee drift.
- d. Rigging purchases for getting heavy weights, anchors, machinery, &c., in or out.
- e. Any questions appertaining to the duties of the mate of a home-trade ship which the Examiner may think necessary to ask.

#### MASTER.

In addition to the following requirements the candidate will be examined in the navigation and seamanship subjects prescribed for the grades of both second mate and first mate.

#### 70. Navigation :—

- a. Find the latitude by meridian altitude of a star.
- b. Find the true azimuth of the sun or a star by Time Azimuth Tables, and deduce the compass-deviation therefrom, the variation being given.
- c. Find the longitude by chronometer from an altitude of the sun by the usual methods, computing the daily rate of a chronometer from errors observed when such is required.
- d. Find the position of the ship by two stars at twilight, or by one star combined with the bearing of a distant mountain, headland, or sounding, by the aid of Azimuth and Reduction Tables.
- e. Supply written answers to certain practical questions on the subject of compass-deviation.
- f. Understand the use of a mercurial barometer.

**71. Seamanship.**—A candidate will be required to show a knowledge of the following subjects :—

- a. How to act in the event of a fire breaking out in the ship.
- b. Rescuing the crew of a disabled ship.
- c. Management of steamships in heavy weather.
- d. Construction of rafts and jury-rudders suitable for screw-steamships.
- e. Preservation of the ship's crew and passengers in the event of wreck.
- f. Best arrangement for towing vessels under different circumstances.
- g. Law as to the engagement, discharge, and management of the crew, and the entries to be made in the official log-book.
- h. How to get a cast of the lead in heavy weather, &c.
- i. How to rig a sea-anchor.
- j. Any questions appertaining to the duties of the master of a home-trade ship which the Examiner may think necessary to ask.

#### MASTER OF A CARGO-VESSEL UNDER 25 TONS REGISTER.

In addition to the following requirements the candidate will be examined in the navigation subjects *a* to *f* inclusive, and in the seamanship subjects *a* to *g* inclusive, contained in the syllabus of examination for second mate, home trade.

#### 72. Navigation.

- A candidate must be able to—
- a. Understand the use of a Mercator's chart, and be able to find on it the course to steer and the distance from one given position to another.
- b. Find the ship's position on the chart from cross-bearings of two objects, and from two bearings of the same or different objects, the course and distance run between taking the bearings being given, also the distance of the ship from the object at the time of taking the second bearing.
- c. Find the compass deviation and error by bearings of two objects in transit.
- d. Find the times of high and low water at any place for which time differences are given in the "New Zealand Nautical Almanac."

**73. Seamanship.**—A candidate must possess a thorough knowledge of—

- a. How to act for the safety of the vessel if caught in a sudden squall.

- b. What action to take if a man falls overboard or if spars or sails carry away.
- c. Any questions of a like nature appertaining to the duties of the master of this class of vessel.

MASTER OF A FISHING-BOAT.

**74. Examination.**—The examination for a certificate as master of a fishing-boat is identical with that for master of a cargo-vessel under 25 tons register, excepting that in seamanship the candidate will be examined appertaining to the duties of the master of a fishing-boat.

MASTER OF A RIVER STEAMER.

**75. Examination.**—The candidate will be examined in the following subjects:—

- a. Reading; writing from dictation; the first five rules of arithmetic, both simple and compound.
- b. Boxing the compass by quarter-points, and taking a bearing.
- c. The use of two fixed objects in line, and how such objects indicate the effect of a stream on the course of a vessel.
- d. Explain orally the marking, signs, and abbreviations on Admiralty charts and plans.
- e. General Harbour Regulations; colonial bar and tidal signals; and the Dominion system of buoyage.
- f. Rule of the road as regards both steamers and sailing-vessels, their regulation lights and fog and sound signals, and the International Code of Signals.
- g. Sounding with the hand lead-line.
- h. Methods of towing in slack water and in a tideway.

Also, any questions appertaining to the duties of the master of a steamer employed within river limits and extended river limits.

EXTRA CERTIFICATES.

*Certificates as Extra Master.*

**76. Extra Master.**—An extra master's certificate will entitle the holder to go to sea as master of any vessel, sailing or steam.

The examination is voluntary, and intended for such persons as wish to prove their superior qualifications and are desirous of having certificates of the highest grade granted by the Marine Department.

The extra examination may take place when the applicant is qualified to go up for examination for an ordinary master's certificate, or at any time subsequent to his having passed the examination for that certificate.

**77. Navigation.**—In addition to the work for an ordinary master's certificate the candidate must be prepared to be examined in any of the following subjects, showing the construction of all the problems:—

- a. Find the latitude or position from double altitudes of the sun or of a star.
- b. Determine, from simultaneous observations of two different stars, the position of the ship and the true bearing of the stars. The candidate may either determine the four longitudes from two assumed latitudes, or solve the question in any other way he may choose.
- c. Find the error of a chronometer from an altitude of the sun or of a star, observed with an artificial or with the natural horizon.
- d. Explain clearly in writing the principles of (1) great-circle sailing; (2) windward great-circle sailing; (3) composite great-circle sailing; and their advantages and disadvantages.
- e. Show approximately on a terrestrial globe the great-circle track, and the distance from one given point to another; also the latitude and longitude of vertex, and the longitude from vertex; and explain how the track can then be transferred to a Mercator's chart. Occasionally the candidate will be required to lay the track down on a chart.
- f. Determine the initial great-circle course, and the distance from one given position to another, the latitude and longitude of vertex, the longitude from vertex, and the latitudes and longitudes through which the great circle will pass; laying the track, composite or otherwise, down on a Mercator's chart, and explaining briefly how the course and distance

from one point to another on this track is then found. This problem may, subject to the decision of the Examiner, be solved either by calculation, or by any tables, graphic method, or great-circle chart known to and preferred by the candidate, and it will usually be set so as to leave the choice of method to the candidate.

- g. Elementary mensuration, up to and including the measurement of ship-shaped bodies; plane geometry, up to and including the properties of the circle in relation to rectilinear figures; plane and spherical trigonometry, up to and including the solution of oblique-angled spherical triangles.
- h. Magnetism as relating to the compass.
- i. Construct a plan or chart on Mercator's principle and solve a given problem thereon.
- j. Naval architecture, including ship construction and stability.
- k. General knowledge, including shipping business, imports and exports, astronomy, and general elementary science (except chemistry).

He will be examined orally on the following subjects:—

- l. Leading principles of the construction of the sextant and vernier, mechanical logs, and sounding-machines.
- m. Civil duties of a shipmaster, in which he will be expected to show a more extensive knowledge than a candidate for an ordinary master's certificate.

In signalling he will be required to attain a minimum speed of 12 words a minute in semaphore, 10 words a minute in Morse lamp-flashing, and 6 words a minute in Morse flag-waving.

The construction of the problems mentioned above, and of the compass problems, must be shown as follows:—

- i. A circle must be drawn representing the stereographic projection of the celestial concave on the plane of the earth's rational horizon—unless the problem can be better shown otherwise—and a correct figure drawn in it, the magnitude of the sides and angles being estimated approximately by eye.
- ii. The sides and angles used in solving the problem must be marked by distinguishing letters in the figure, and the candidate must, over each fresh computation, write down clearly what is given and what he is required to find, together with the formula which he proposes to use.
- iii. Opposite each quantity in the computation he must put the letters denoting the part of the triangle which it represents, writing "comp." before the letters when the quantity is the complement of that part of the triangle.

Candidates will not be required to enter into the mathematical investigation of the rules and formulæ used in the solution of problems involving oblique-angled spherical triangles, but credit will be given to any candidate showing such knowledge. When, however, a problem or part of a problem is solved by right-angled spherical trigonometry the simple process of deducing the formula from the figure by Napier's rules for circular parts or other method must be shown.

Where a problem is solved by right-angled plane trigonometry the simple process of deducing the formula from the figure for each of the computations in it must be shown.

The rule for finding the latitude by meridian altitude must be proved by the figure.

All sketches and drawings required in the paper on naval architecture should be neatly done on paper supplied by the Examiner.

**78. Seamanship.**—In addition to the qualifications required of an ordinary master, an extra master will be expected to give satisfactory answers to any questions in practical seamanship that the Examiner may ask.

#### EXTRA CERTIFICATES, STEAMSHIPS.

**79. Extra Certificates, Steamships.**—Extra certificates for steamships will also be issued, subject to the examination described below, to officers who can show the necessary service in steamships. The certificates will be marked "*For steamships only,*" and will only entitle the holders to go to sea as masters of steamships.

The examination is open to all who are qualified to sit for a certificate as master of a foreign-going steamship, or who have already obtained that certificate. It is open also to candidates who have failed, in the examination for an extra master's certificate, to show the requisite knowledge of the management of square-rigged sailing-vessels. (See para. 23.)

**80. Navigation.**—The examination in navigation for an extra master's certificate for steamships will be precisely the same as that prescribed for an extra master's certificate.

**81. Seamanship.**—In addition to the qualifications required of a master of a foreign-going steamship, the extra master will be expected to give satisfactory answers to any questions appertaining to the management of a steamship that the Examiner may ask.

#### CERTIFICATES FOR PLEASURE-YACHTS.

**82. Yacht Certificates.**—The examination for these certificates is purely voluntary, and is confined to persons who command their own British seagoing pleasure-yachts. A master of a yacht who is not also the sole owner, or who is under twenty-one years of age, is not eligible for examination.

*Description.*—Only one description of certificate will be issued, whether the yacht is home-trade or foreign-going.

The certificate will not entitle the holder to command any vessel except the pleasure yacht or yachts of which he is at the time the sole registered owner.

*Sea Service.*—Candidates are not required to have served any specified time afloat, as it is believed that their sea-knowledge will be sufficiently tested by the examination they will have to pass in seamanship.

*Statutory Declaration.*—Testimonials of service need not be shown but a candidate for examination will be required to produce a statutory declaration to the effect (1) that he is sole owner of the yacht; (2) that the yacht is seagoing; (3) that it is not to be used for trading purposes. He will also be required to fill up the form of application (Form Exn. 2), and pay the fee of £2 at a mercantile marine office, as prescribed in para. 35.

In all other respects, except that the candidate will not be required to produce a first-aid certificate, the regulations relating to examinations of masters of foreign-going ships will apply.

Testimonials as to character, including sobriety for at least twelve months preceding the date of application to be examined, will be required of all candidates.

#### *Yacht-master.*

**83. Navigation.**—The examination in navigation for yacht-master's certificate will be precisely the same as that prescribed for an ordinary master's certificate, except that in the civil duties of a shipmaster the master of a yacht will only be expected to possess a knowledge of what he is required to do under the Shipping and Seamen Act.

**84. Seamanship.**—He must give satisfactory answers as to his knowledge of making and taking in sail, and as to the management of a yacht under canvas in moderate and in stormy weather.

He must have a thorough knowledge of the rule of the road at sea as regards both steamers and sailing-vessels, their regulation lights, and fog and sound signals; and be able to describe the signals of distress and the signals to be made by ships wanting a pilot, and the liabilities and penalties incurred by the misuse of these signals.

He must also understand the use and management of the rocket apparatus in the event of his vessel being stranded.

He must be able to mark and use the lead and log lines; to cast a vessel on a lee shore; to moor and unmoor a yacht; to keep a clear anchor, and to carry out an anchor.

He must know how to keep his vessel out of the trough of the sea in the event of accident; how to rig rafts and jury-rudders, &c.; and what steps to take if his vessel is disabled or unmanageable and drifting towards a lee shore.

He will also be examined as to his resources for the preservation of the crew in the event of wreck. He must also possess a knowledge of the measures he should adopt for preventing and checking an outbreak of scurvy on board; and be prepared to answer any other questions relating to the management of a yacht, either steam or sailing, which the Examiner may ask.

#### *Extra Master, Yachts.*

**85. Yacht, Extra Master of.**—An extra certificate will be issued to the owner of a yacht who either holds or is qualified to be examined for a yacht-master's certificate, subject to his passing the following examination.

**86. Navigation.**—The examination in navigation will be precisely the same as that prescribed for an extra master's certificate. (See para. 77).

**87. Seamanship.**—The subjects of examination in seamanship will be the same as those prescribed for a yacht-master's certificate, but the candidate for an extra certificate will be expected to show a more extensive practical knowledge than is required of a candidate for the yacht-master's certificate.

#### CERTIFICATES FOR PLEASURE-YACHTS IN NEW ZEALAND WATERS.

**88. Age, Requirements, &c.**—A candidate must be not less than eighteen years of age.

The examination for these certificates is purely voluntary, and is confined to those who own or part own pleasure-yachts in New Zealand waters. The certificate will not entitle the holder to command any vessel except a pleasure-yacht in New Zealand waters.

Candidates are not required to have served any specified time afloat, as it is believed that their sea-knowledge will be sufficiently tested by the examination they will have to pass in seamanship.

Testimonials as to character, including sobriety for at least twelve months preceding the date of application to be examined, will be required of all candidates.

A candidate will be required to produce a statutory declaration to the effect (1) that he is the sole or part owner of a yacht; (2) that the yacht is seagoing; (3) that it is not to be used for trading purposes. He will also be required to fill up the form of application (Form Exn. 2), and pay the fee of £2 at a mercantile marine office, as prescribed in para. 35. In all other respects, except that the candidate will not be required to produce a first-aid certificate, the regulations relating to the examinations of masters of foreign-going ships will apply in these cases.

#### *Yacht-master in New Zealand Waters.*

**89. Navigation.**—A candidate will be required to—

- a. Write a legible hand from dictation, and spell correctly.
- b. Work a day's work complete, correcting the courses for leeway, deviation, and variation.
- c. Find the latitude by meridian altitude of the sun.
- d. Find the true courses and distance from one given position to another by Mercator's method; also the compass course, the variation and deviation being given.
- e. Find the time and height of high water at a given port.
- f. Find the true amplitude of the sun, and the error of the compass therefrom; also the deviation, the variation being given.
- g. Find the longitude by chronometer from an altitude of the sun, computing the daily rate of chronometer from errors observed when such is required.
- h. Find the true azimuth of the sun by Time Azimuth Tables; the error of the compass; also the deviation, the variation being given.
- i. Find from tables the time at which a given star will be on the observer's meridian above the Pole.
- j. Compute the approximate meridian altitude of a star, for setting the sextant.
- k. Find the latitude by meridian altitude of a star.
- l. Find the approximate altitudes and bearings of stars within the limits of Star Reduction and Azimuth Tables which would be suitable for observations to quickly obtain position of ship.
- m. Find the position of ship by two stars at twilight, or by one star combined with the bearing of a distant mountain, headland, or sounding, by aid of tables, or any other method which candidate may prefer.
- n. Examination in chart and correction of soundings as required for home-trade master.

#### HONORARY CERTIFICATES OF EFFICIENCY IN NAVIGATION AND SEAMANSHIP FOR MEMBERS OF THE ROYAL NAVAL VOLUNTEER RESERVE.

**90. Requirements, &c.**—Officers belonging to the Royal Naval Volunteer Reserve may be examined for either the ordinary or extra certificate of efficiency in navigation and seamanship.

Candidates for commissions in the Royal Naval Volunteer Reserve may also be examined for the ordinary certificate of efficiency, but not for the extra certificate.

The examinations are in all respects similar to those passed by owners of pleasure-yachts to obtain the ordinary or extra certificate as master of their own yachts.

These certificates of efficiency are purely honorary, and are not available under the Merchant Shipping Acts for use in any capacity whatever on board a ship which is required to carry a certificated officer.

The name of each officer or candidate for a commission who may desire to be examined must first be submitted to the Marine Department by the Commanding Officer of his division, together with the name of the port at which he wishes the examination to be held.

If the application is approved the candidate must attend personally at a Mercantile Marine Office to fill up the form of application (Exn. 2) and pay the required fee.

#### VOLUNTARY EXAMINATION IN COMPASS-DEVIATION.

**91. Compass-deviation.**—Any person holding a certificate as master or mate of any grade in the foreign trade, or as master or first mate, home trade, or as master of his own pleasure-yacht, who wishes to pass a voluntary examination in compass-deviation, can be examined at any port where examinations are held, upon filling up the form of application (Exn. 2) and paying the fee of £1.

If the candidate passes, the fact, with the date and place of passing, will be recorded upon his certificate.

#### VOLUNTARY EXAMINATION IN SIGNALLING.

**92. Signalling.**—The examination in signalling as prescribed for candidates for the extra master's certificate is open as a voluntary examination to all persons who hold, or have passed for, or are candidates for, a certificate of competency of any grade, and to any yacht certificate-holder.

Candidates may be examined at any port where examinations are held, upon filling up the form of application (Exn. 2) and paying the fee of £1. No fee, however, will be charged for this examination if it is taken at the same time as that at which a candidate is examined for any certificate of competency.

If the candidate passes, the fact, with the date and place of passing, will be recorded upon his certificate.

#### VOLUNTARY EXAMINATION FOR WIRELESS SIGNALLER.

**93. 1.** Any person being the holder of a foreign-going or a home-trade certificate of competency as mate of any grade, or as master, desiring to become qualified as a wireless signaller should make personal application for this purpose to a District Telegraph Engineer, whereupon, on production of his certificate of competency, arrangements will be made for the examination to be held. If the applicant passes the examination he will be provided with a certificate in the form of an Examiner's authority, which will show that he has passed examination for wireless signaller, and that on application for such being made by him to the Secretary for Marine he is entitled to have his certificate of competency endorsed to that effect.

**2.** The candidate must deliver his Examiner's authority, together with his certificate of competency, to a Superintendent of Mercantile Marine for transmission to the Secretary for Marine, who will endorse the certificate of competency, "Passed voluntary examination for wireless signaller at \_\_\_\_\_ on \_\_\_\_\_, 19 \_\_\_\_."

Fee: The fee prescribed by the Minister of Telegraphs to be paid by each candidate for each examination on each occasion when he presents himself for examination for a certificate as wireless signaller is 5s.

#### VOLUNTARY EXAMINATION IN STEAM.

**94. Examination.**—These examinations are provided for the purpose of giving masters and mates who are possessed of certificates of competency an opportunity of undergoing a voluntary examination as to their practical knowledge of the use and working of the steam-engine. They are conducted by the Examiners of Engineers appointed by the Marine Department. Full particulars of the examination are given in Appendix F.

**95. Persons eligible.**—The examination is open to any person who holds a certificate of any grade in the foreign or home trade, or as master of his own pleasure-yacht.

**96. How to apply.**—Candidates must fill up the form of application (Form Exn. 2) at a Mercantile Marine Office, pay the fee of £1, and deposit their certificates and testimonials with the Superintendent, who will inform the applicant when and where to attend to be examined.

**97. Result of Examination.**—If he passes, the report (Exn. 14) will be sent to the Marine Department with the certificate of competency, together with the Form Exn. 2; and the words "Certified to have passed in steam," with the date and place of examination, will then be recorded upon the certificate and its duplicate, and the certificate will be sent to the Superintendent of the Mercantile Marine Office of the port named in the Form Exn. 2, and be delivered to the candidate in the usual manner.

The endorsement of a certificate for "steam" does not, however, imply a qualification to perform the duties of an engineer.

**98. Failure.**—If he fails to pass, his certificate will be at once returned to him, and he may not present himself for re-examination until the expiration of three months from the date of failure.

#### CERTIFICATES OF SERVICE.

**99. Persons qualified.**—A person who has attained the rank of lieutenant in H.M. Royal Navy or in H.M. Indian Marine Service may apply for a certificate of service as master of a foreign-going ship without examination.

**100. Form of Application.**—Applications for certificates of service must be made on the proper printed form, to be obtained free of charge from the Superintendent of any Mercantile Marine Office.

**101. How to apply.**—Applications for certificates of service by officers of the Royal Navy on the Active List must be made through their Commanding Officers, and applications from officers who have retired from the Royal Navy or who are on half-pay must be made to the Secretary of the Admiralty, who in either case will forward the application to the Marine Department.

#### AMBULANCE CERTIFICATES AND GOVERNMENT AWARDS.

**102. Endorsement on Certificates.**—An officer in the mercantile marine who holds a certificate of proficiency in first aid to the injured from the St. John or St. Andrew's Ambulance Association, or some equivalent certificate, can have the fact endorsed on his certificate of competency, provided the latter was issued before the 1st January, 1909, if the two certificates are forwarded to the Secretary, Marine Department, either directly or through the Superintendent of a Mercantile Marine Office.

Recipients of Government awards can also have the fact stamped on their certificates of competency if they submit evidence of the award, together with their certificate, in a similar manner.

#### SEA SERVICE, RULES FOR ESTIMATING.

**103. Sea Service.**—1. In these regulations sea service is reckoned from commencement to termination of a voyage. Certificates of discharge will generally be accepted as proof of sea service. Examiners will be careful to see that certificates of discharge have not in any way been tampered with, and will report any suspicious cases to the Marine Department.

2. For all certificates of competency as master or mate in the Mercantile Marine the qualifying service usually required is service performed in ordinary trading-vessels. While the regulations provide for the acceptance in part of certain kinds of non-trading service (*e.g.*, that performed in fishing-boats, yachts, pilot-vessels, &c.), non-trading service not specially provided for in the regulations cannot be accepted as qualifying service unless it has been submitted to and sanctioned by the Marine Department.

3. In cases in which these regulations require a candidate to have served a prescribed period at sea in foreign-going ships, or the equivalent period (50 per cent. greater) in the home trade, the total period served may comprise the maximum period in either case,



or it may be made up of a portion of each—that is, partly in foreign-going ships and partly in the home trade—provided both portions together, after assessing the relative value of the inferior service, constitute not less than the period required to have been served in foreign-going ships.

4. Similarly, in cases in which service in alternate grades or capacities is prescribed, such service may be made up of portions of each or any of them, provided the required minimum service has been performed.

**104. Sea Service for Foreign-going Certificates.**—For foreign-going certificates the term “sea service” means, unless otherwise stated, service performed in foreign-going vessels.

**105. Home Trade, Definition of.**—For the purpose of these regulations, where qualifying service for a home-trade certificate is prescribed, service in the home trade means service performed on a home-trade ship employed trading on the coasts of New Zealand; and where qualifying service for a foreign-going certificate is prescribed it includes also service performed in any home trade beyond New Zealand; but service in the home trade does not in any case include service performed on a ship employed trading within either river limits or extended and partially-smooth-water limits.

**106. Home-trade Service.**—For home-trade certificates service in the home trade is regarded as equivalent to service in the foreign trade; but for foreign-going certificates service in the home trade is regarded as equivalent to two-thirds of the time served in the foreign trade.

The amount of service as master, first mate, or only mate in the home-trade which will qualify a candidate for examination for a certificate as master or first mate (foreign-going) is shown in paras. 49 and 50.

In addition the Marine Department will be prepared to consider on its merits any application by a candidate for a first mate's foreign-going certificate for the acceptance of time served as second mate of a home-trade ship which is required by law to carry a certificated second mate. The acceptance of such service will be subject to the following general considerations:—

- a. The service must have been performed while in the possession of a certificate as second mate (foreign-going).
- b. An adequate proportion of the time must have been spent in actual service at sea.
- c. The service must have involved real responsibility, and an adequate proportion of it must have been spent in sole charge of a watch at sea.

The proportion of the time which will be accepted will depend upon the particular circumstances of each case, but in no case will time spent in the home trade be accepted as equivalent to more than two-thirds of the same period of time spent in the foreign trade. Every case in which a candidate claims such services as qualifying must be referred to the Principal Examiner.

Service as second mate in the home trade will not be accepted as qualifying for examination for a master's certificate (foreign-going).

Service in a lower grade than second mate in the home trade will not be recognized as officer's service towards qualifying a candidate for examination for a foreign-going certificate unless the candidate can produce a testimonial certifying that the service was merely a preliminary to or the finish of a foreign-going voyage in the same ship, and that he served on the foreign voyage in a capacity not lower than the capacity in which he served on the home-trade articles.

**107. Restricted-limits Ships, Service in.**—For restricted-limits certificates service in the foreign trade or in the home trade is equivalent to service in river limits or extended river limits; but time served in ships employed trading within river limits and extended river limits does not count as service at sea for the purpose of obtaining a certificate for a seagoing ship, with the exception that service in extended river limits will, proportionally or wholly, as is prescribed in these regulations, count as qualifying service for home-trade and other New Zealand local certificates.

**108. Ships Trading Abroad, Service in.**—Service in ships trading entirely abroad will be accepted as equivalent to service in foreign-going ships, provided that the distance between the extreme ports visited during the course of the voyage is at least 500 miles. If the distance is less than 500 miles the service will only be accepted as equivalent to service in the home trade.

**109. Certificate, Meaning of.**—By the word “certificate” is meant a certificate of competency granted by the Board of Trade under the Merchant Shipping Acts, or by the Government of a British self-governing dominion, colony, or possession under an Order in Council issued in pursuance of the Merchant Shipping Acts, and under the Shipping and Seamen Act, 1908. (See Appendix N.)

**110. Certificates, Colonial Local.**—The holder of a colonial local certificate for foreign-going ships *not* granted under the Merchant Shipping Acts who desires to be examined for an Imperial certificate of the same grade must prove that he has performed the amount of service required by these regulations to entitle him to hold such a certificate. Also, he must comply with the requirements of para. 15.

**111. Certificates, Foreign-going.**—Where a foreign-going certificate is required in order to qualify a candidate for examination the certificate may be either an ordinary certificate, or a certificate for fore-and-aft-rigged vessels, or a certificate for foreign-going steamships.

**112. Officer's Service.**—For the purposes of these regulations service as first mate means service as the senior of the three watch-keeping officers on board a ship; service as second mate means service as the next in seniority; and so on. For instance, service as junior or auxiliary first mate, or as first mate under a “chief officer,” will count as first mate's service if the chief officer did not keep a watch, but otherwise will count as second mate's service. Similarly, service as junior or auxiliary second mate, or as second mate below an auxiliary first mate, will count as second mate's service if there were only one watch-keeping officer above him, but otherwise will count as third mate's service. The facts in each case must be clearly established by the candidate's testimonials.

For the definition of “watch-keeping service” see para. 116.

**113. Officer's Service in Possession of Certificate.**—Officers' service, to be recognized as qualifying for purposes of examination, must be performed with the requisite certificate (Appendix K).

Officer's service performed by men who have been duly promoted during the course of a voyage (see para. 117), or who, in consequence of serving in vessels plying between ports abroad, have been unable to obtain the necessary certificates, may, however, be recognized, provided that such service is in all other respects satisfactory.

**114. Nature of Service determined by Actual Position on Board Ship.**—Sea service in the foreign or home trade cannot be regarded as qualifying for examination for certificates of competency unless it can be verified by reference to the articles of the ship on which it was performed—*e.g.*, service claimed by testimonial or otherwise to have been as mate when the actual rating as shown by the articles was only that of boatswain or other petty officer will not be accepted where officer's service is required.

**115. Foreign Vessels, Evidence as to Service in.**—The testimonials of service of British officers and seamen serving in foreign vessels, which cannot be verified by the Marine Department, must be confirmed either by the Consul of the country to which those foreign vessels belonged, or by some other recognized official authority of that country, or by the testimony of some credible person on the spot having personal knowledge of the facts required to be established. The production, however, of such proofs will not of necessity be deemed sufficient. Each case will be decided on its own merits, and if the sufficiency of the proofs given appears to be at all doubtful it must be referred to the Principal Examiner.

**116. In Charge of a Watch : First Mate.**—When service in charge of a watch in either the foreign or coasting trade is specified in the regulations, candidates for certificates of competency as first mate must be able to prove that during eight months at least of their service they have kept full regular watch during the whole voyage—*i.e.*, from port to port—which, if in the foreign trade, must amount to not less than eight hours of each twenty-four hours' service. Where a candidate can prove eight months of such full service, service performed in cases where watches were doubled at any time during the voyage will be accepted as equivalent to half the same period of full watch-keeping service. No amount of occasional service will, by itself, be accepted as qualifying service.

**Master.**—Candidates for certificates of competency as master will be required to have served during the whole of the time specified by the regulations in full charge of a watch, and no service performed

under the system of double watches, except as the senior officer, will be accepted as qualifying service for a certificate of this grade.

Great care must be exercised by the Examiners and others in regard to such service; and unless a candidate produces a clear and satisfactory certificate, specially setting forth the above facts, from the master or owner of the vessel in which the service was performed, it must not be accepted.

**117. Promotion during Voyage.**—Whenever from any cause a man has been regularly promoted on the occurrence of a vacancy in the course of the voyage, from the rank in which he first shipped, and such promotion, with the ground on which it has been made, is properly entered in the articles and in the official log-book, he will receive credit for his service in the higher grade for the period subsequent to his promotion.

**118. Auxiliary-screw Ships.**—Service in vessels having auxiliary steam or motor power, which use their propelling machinery only in calms or during light winds, is considered as service performed in sailing-vessels.

**119. Excursion Steamers.**—In the case of excursion steamers only such service as can be proved to have been performed at sea will be accepted.

**120. Carpenter, Sailmaker, Cook, Steward, &c., Service as.**—Candidates whose service has been performed in capacities other than apprentice, midshipman, cadet, ordinary seaman, able seaman, or, in the case of restricted-limits ships, as deck hand—*e.g.*, men who have served as carpenter, or sailmaker, or as cook in small vessels where cooking is only part of a man's duty—will be required to satisfy the Examiner or the Marine Department that they have during the whole time claimed performed deck duties in addition to their own particular work, and have a good knowledge of seamanship.

These facts must be proved by production of satisfactory certificates from the masters with whom they have served. Such service may be accepted as equivalent to two-thirds of the time served as ordinary deck hand. Failing satisfactory evidence the applicant will be required to perform additional service in the required capacity. Service as cook (under conditions other than the above), or as steward, purser, &c., will not be accepted.

When discharges for "boy's" service are produced, the Examiner must satisfy himself that such service was service performed in a qualifying capacity.

**121. Wireless Operator, Service as.**—If a candidate has been engaged on articles of agreement as seaman, or in any seaman rating, and has served both as a seaman and as a wireless operator, two-thirds of such service may be counted as qualifying service; but he must prove that during the whole period claimed he performed deck duties in addition to the duties of a wireless operator.

If a candidate has been engaged on articles of agreement as a wireless operator, and has served as such, one-quarter of such service up to a maximum of twelve months may be counted as qualifying service.

**122. Fishing or Pilot Vessels, Service in.**—Service performed exclusively in trawlers and in other deep-sea fishing-vessels or in pilot-vessels will not qualify a candidate for examination. He must, in addition, prove the following service:—

- a. For a foreign-going certificate, service for at least eighteen months in an ordinary trading-vessel in the foreign trade, or the equivalent period, twenty-seven months, in the home trade.
- b. For a home-trade certificate, service for at least twelve months in an ordinary trading-vessel in the foreign or home trade.

**123. Yachts, Service in.**—Service in pleasure-yachts will be accepted as qualifying service under the following conditions:—

- a. It must in all cases be verified by satisfactory proofs, which must set forth clearly and in detail the nature and duration of the service claimed; and it must distinctly be understood that actual sea service only will be accepted, and that service performed in a harbour or port is inadmissible.
- b. Service in foreign-going yachts will be accepted in full, and service performed within home-trade limits in sailing-yachts of not less than 50 tons net register, or in steam-yachts of not less than 80 tons gross register, will be

accepted in the proportion stated in para. 106; but candidates must show also—(1) For a foreign-going certificate, service for at least eighteen months in an ordinary trading-vessel in the foreign trade, or for the equivalent period, twenty-seven months, in an ordinary trading-vessel in the home trade; (2) for a home-trade certificate, service for at least twelve months in an ordinary trading-vessel in the foreign or home trade.

- c. Service within home-trade limits in sailing-yachts of not less than 20 tons net register, or in steam-yachts of not less than 40 tons gross register, will be accepted towards qualifying a candidate for a foreign-going certificate as equivalent to half the time served in the foreign trade; but no amount of such service shall count as more than two years' service in the foreign trade, and no such service shall count as officers' service to qualify candidates for foreign-going certificates.
- d. Service within home-trade limits in sailing-yachts of not less than 20 tons net register, or in steam-yachts of not less than 40 tons gross register, will be accepted at the ordinary rate as qualifying service for home-trade certificates; but candidates must prove that they have, in addition, served for at least twelve months in an ordinary trading-vessel in the foreign or home trade.
- e. Service within home-trade limits in sailing-yachts of less than 20 tons net register, or in steam-yachts of less than 40 tons gross register, will not be accepted as qualifying service for any class of certificate.

**124. Tugs, War Department Vessels, &c.**—Service performed in tugs and in War Department vessels employed outside extended and partially smooth-water limits may be accepted as sea service for the purpose of qualifying a candidate for a second mate's, mate's, or master's certificate for home-trade ships.

This service cannot be accepted towards qualifying a candidate for a foreign-going certificate unless there should be some very exceptional circumstances, when the case, together with all the candidate's papers, should be submitted to the Principal Examiner for consideration.

**125. Dredgers.**—Service in steam hopper-barges may, subject to the provisions of para. 128, be allowed to count towards qualifying a candidate for a second mate's or mate's certificate of competency for home-trade ships, provided the candidate can prove at least two years' service in an ordinary trading-vessel in either the home or foreign trade. Service in these steam-hoppers will not be accepted as officer's service towards qualifying a candidate for a master's certificate for home-trade ships.

**126. Lightships, or Engine-room.**—Service in lightships, or in an engine-room, will not be accepted as sea service.

**127. Lighthouse Tenders.**—Service performed in the seagoing steam-vessels of Trinity House, of the Commissioners of Northern Lighthouses, or of the Commissioners of Irish Lights, or in Scotch and Irish Fishery cruisers, will be accepted as sea service for the purpose of qualifying a candidate for examination for a home-trade certificate; but for a foreign-going certificate a candidate must show in addition to this service, calculated in accordance with para. 106, at least twelve months in an ordinary trading-vessel. In order to qualify a candidate for an ordinary certificate this twelve months must have been performed in a square-rigged sailing-vessel.

**128. Rivers.**—Service performed on rivers, no matter of what size, and service performed within extended river limits will not be accepted, with the exception mentioned in para. 107.

Where any doubt whatever exists on this point the candidate will be required to produce a certificate from the master or owner of the vessel in which the service was performed before the service can be considered.

**129. Cable-ships.**—A candidate a part of whose qualifying service has been performed in cable-ships will be required to produce, in addition to the usual evidence of sea service, a statement or certificate from the owners of the vessel showing the amount of time actually spent at sea. If the time so spent constitutes or exceeds two-thirds of the total time on articles, this total time may be accepted in full as qualifying service, but in the event of the actual

sea service falling below this proportion the deficiency must be made up by additional service at sea before the total time on articles can be accepted in full as qualifying service.

**130. Harbour Training-ships.**—Time served on board a training-ship will be allowed to count (subject to the condition in para. 132) as equivalent to one-half the same time spent in service at sea, up to a limit of two years (*i.e.*, no length of service will be allowed to count as more than one year at sea), provided that the candidate can produce a certificate from the committee or Captain Superintendent that he has conducted himself creditably, and passed a good examination in seamanship so far as it is practised in the training-ship, as well as in other matters down to the time of his leaving the ship. Harbour training-ship service will not be regarded as equivalent to service in square-rigged vessels.

A similar concession is allowed in the case of time spent at the Nautical College, Pangbourne.

**131. Shore School for Nautical Training.**—Time spent at a school for nautical training conducted on premises ashore may be allowed to count, subject to the age-limit laid down in para. 132, in some proportion, not exceeding one-half, as service at sea, provided that—

- a. The school is recognized under the appropriate regulations, by the Board of Education, or by the Scottish Education Department, as the case may be ;
- b. After an inspection by one of their officers the Board of Trade is satisfied that the school gives a training that justifies time spent there being reckoned as part of the necessary qualifying-time for a certificate of competency ; and
- c. The candidate produces a satisfactory certificate as regards conduct and proficiency from the authorities of the school on leaving it.

The schools to which these arrangements may apply are of three kinds—

- i. Schools at which a boy resides and receives training for a period of years. The maximum remission of sea service that will be allowed in respect of attendance at such a school will be fixed at the time of approval ; it will never exceed twelve months.
- ii. Courses in navigation and seamanship at junior technical schools or similar non-residential institutions which boys attend before going to sea. The maximum remission of sea service in these cases will be fixed at the time of approval ; it will never exceed six months.
- iii. Senior courses in navigation at technical or other similar non-residential schools which candidates attend after completing the whole or the larger part of the service required to qualify for examination for a second mate's certificate. The maximum remission of sea service in these cases will be fixed at the time of approval ; it will never exceed three months.

In the case of schools of classes ii and iii the certificate which the candidate produces (para. c above) must in addition testify to the candidate's continuous and regular attendance at all the approved classes, and also, in the case of schools of class iii, must state the total number of hours during which he has attended the school.

A candidate who at different times has attended two or more approved schools of nautical training will be allowed a remission of sea service in respect of attendance at each of them, subject to the condition that the total remission of sea service in respect of attendance at approved schools will not in any event exceed twelve months.

Time spent at approved schools will not be accepted in lieu of any part of the officer's service required to qualify a candidate for examination for a certificate as first mate or master ; or in lieu of sea service required in consequence of failure in seamanship (see para. 27).

A list of approved schools of nautical training is given in Appendix L.

**132. Training Ships and Schools : Age-limit.**—No allowance will be made in respect of time spent on board training-ships or at schools of nautical training after the 1st January, 1925, by boys younger than fourteen. Time so spent before the 1st January, 1925, will not be affected by this alteration, regardless of the date at which the candidates present themselves for examination.

**133. Apprentices.**—The whole of the time claimed under indentures of apprenticeship will be accepted as actual sea service to qualify under para. 47 for a second mate's certificate, provided—(a) that the indentures have not been cancelled through some fault of the candidate, but are endorsed by the owner or master to whom he was bound to the effect that he has performed his service faithfully during the time he remained as apprentice; and (b) that the candidate had served at sea four-fifths of the time claimed—that is to say, has not spent more than one-fifth of the time in home ports.

In the case of cable-ships the time may be counted in full if two-thirds of this period of four-fifths—that is, eight-fifteenths of the whole time under indentures—has been spent in service aboard the ship out of the United Kingdom and away from the ship's base port (see para. 129).

In cases where an apprentice is qualified for examination before the expiration of his indentures—*e.g.*, where he has had training-ship or other sea service prior to being bound, which, together with his actual time as apprentice, makes up the required four years, or where his indentures are for a period of more than four years—a letter from the owner or master will be accepted in place of the endorsement referred to above.

In the event of the candidate being short of the required four-fifths of the time claimed as apprentice he will be required to show sufficient additional sea service to make up the four-fifths of the time claimed.

The above-stated general concession to apprentices cannot, however, be taken to cover a case in which, during a large proportion of the period of apprenticeship, the vessel on which the apprentice is serving has been laid up in a foreign port. The proportion of the period of apprenticeship which can be accepted as qualifying service in such a case is dependent on the actual circumstances, and each case will be considered on its merits. The Marine Department is prepared to make as generous an allowance for such service as it properly can, but it is unable to forego the essential condition that candidates for certificates of competency must have sufficient experience of actual sea service.

**134. Midshipmen and Cadets.**—The whole of the time served as midshipman or cadet under indentures will also be accepted, subject to the same conditions as those laid down for apprentices; and the same will be the case even when not bound by indentures, provided that the service as midshipman or cadet has been continuous, and that on the date of the termination of the period of service claimed in this capacity the candidate was on articles of agreement, and that he is able to comply with the requirements laid down in the matter of serving or making up the four-fifths period at sea during the time claimed.

SPECIAL REGULATIONS RELATING TO AN APPRENTICESHIP SERVED IN AN APPROVED SEAGOING TRAINING-SHIP WITH A VIEW TO PROMOTION IN THE SERVICE OF THE SAME EMPLOY.

**135. 1. Recognition of Service on the Training-ship as qualifying for Examination for a Certificate as Second Mate.**—The training-ship must be a seagoing, cargo-carrying, square-rigged, sailing-vessel, and the course of study and practical training which the cadet receives must be approved by the Board of Trade or the Marine Department.

At the end of four years' service in the training-ship the cadet will be qualified for examination for a certificate as second mate, provided (i) he can produce a testimonial to the effect that both his conduct and his ability have given satisfaction during the whole period, and (ii) that he has served *at sea* for not less than four-fifths of the time—that is to say, has not spent more than one-fifth of the time in home ports (see para. 134).

If the cadet has served previously for two years in either the "Conway," "Worcester," or "Amokura" training-ships, this time will be allowed to count as one year's qualifying service (see para. 130), and he will be required to serve for three years only in the company's training-ship before he can be allowed up for examination for a certificate as second mate.

**2. Recognition of Service as Junior Officer as qualifying for Examination for a Certificate as First Mate.**—A candidate who

has served for four (or three) years on the training-ship may be allowed up for examination for a certificate as first mate (ordinary) when he has served, whilst holding a certificate as second mate, for two years as junior bridge-keeping officer of the watch upon vessels of the company satisfying certain requirements. (See subpara. 4.)

The words "junior bridge-keeping officer" must be interpreted as meaning the junior of two bridge-keeping officers. Where three officers are on the bridge together the service of the third does not fall within the scope of these special regulations, and his service cannot be accepted as qualifying. All cases where cadets to whom these special regulations apply subsequently present themselves for examination for first mate or master must be referred to the Secretary of the Marine Department, so that their real position on board vessels of the company satisfying the requirements of this paragraph may be verified by reference to the official logs before they are accepted as eligible for examination.

**3. Recognition of Service (a) as Senior Officer, and (b) as Senior of the Junior Officers, as qualifying for Examination for a Certificate as Master.**—A candidate who has obtained a certificate as first mate in the above way may be allowed up for examination for a certificate as master (ordinary) when he has served for eighteen months, whilst holding the certificate as first mate, as a senior watch-keeping officer upon vessels of the company satisfying the same requirements. (See subpara. 4.)

If the candidate has served for eighteen months as senior of the junior officers—i.e., the officer next below the junior of the officers in full charge of the watch—whilst holding the certificate as first mate, he may be allowed up for examination for a certificate as master (ordinary) on the understanding that the certificate as master would not be issued to him until he had completed twelve months' service as a senior watch-keeping officer, the service in both cases to be performed on vessels satisfying the same requirements. (See subpara. 4.)

**4. Limits of Application of Subparas. 2 and 3.**—The special regulations (paras. 2 and 3) in regard to the acceptance of service as qualifying for the examinations for certificates as first mate and master shall apply only when the service is performed in the specified capacities upon ocean-going steamers of not less than 8,000 tons gross, making an average speed of not less than 15 knots, and carrying a crew of not less than 130 men, including as least five deck officers besides the master.

**136. Special Regulation applying only where a Candidate has served continuously with the same Company as Apprentice and Junior Officer.**—A candidate who has served continuously in one company as apprentice and junior officer may be allowed to present himself for examination for a certificate as first mate on completion of the service described in para. 135 (2), provided that the whole of his service has been performed upon vessels of the class described in para. 135 (4); but if he passes the examination the certificate will not be issued to him until he produces proof of eight months' sea service in full charge of a watch (see para. 116) in addition to the two years' service as junior bridge watch-keeping officer described in para. 135 (2).

**137. H.M. Royal Navy.**—Officers of H.M. Royal Navy are at liberty to apply for certificates of service and to be examined for certificates of competency in the Mercantile marine, but the Lords Commissioners of the Admiralty have directed that the applications of officers on the Active List should be made through their commanding officers, and that the applications of officers on half-pay should be made to the Secretary of the Admiralty. (See para. 99.)

**138. H.M. Royal Navy and Indian Marine Officers.**—Officers of the Royal Navy or of the Royal Indian Marine who wish to be examined for certificates of competency in the mercantile marine will be required to prove the following service at sea; and if an officer wishes to obtain the ordinary certificate for foreign-going ships he must prove that at least twelve months of this required period was served under sail alone:—

- a. For second mate: Four years.
- b. Only mate: Five years.
- c. First mate or master: The officer must prove that he has attained the rank of lieutenant in the Royal Navy, or in the Royal Indian Marine.

**139. Naval Training Colleges.**—Time spent at the Naval College at Dartmouth will, subject to the conditions laid down in para. 131, be permitted to count as equivalent to one-half the same time spent in service at sea, and a similar allowance will be made in respect of time spent on courses on shore after promotion to acting sub-lieutenant, subject to the condition that the total remission of sea service in respect of all time spent on shore shall not exceed twelve months. Time spent in shore training will not be accepted in lieu of watch-keeping service.

**140. Royal Naval Reserve.**—Lieutenants, sub-lieutenants, and acting sub-lieutenants of the Royal Naval Reserve who perform sea service on board H.M. ships will, if accompanied by a good report, be allowed to count such service as if it had been performed in foreign-going merchant ships, and the service will rank according to the certificate of competency held by the candidate at the time.

The time spent in periodical training in the Royal Naval Reserve on board seagoing vessels of H.M. Royal Navy, if accompanied by a good report, will be accepted in full, but in the case of midshipmen will not count as officers' service. In the case of service in harbour ships and shore establishments of H.M. Royal or Dominion Navies, only half such time will be accepted as sea service, and no such service must amount to more than one-fourth of the time required for the particular grade of certificate applied for.

**141. Admiralty Service.**—All service afloat in H.M. ships or in auxiliary supply-ships, or any other ships in attendance on the Fleet between the 4th August, 1914, and the 31st December, 1920 (inclusive), will be accepted in full (subject to the ordinary conditions as laid down in these regulations) as qualifying sea service for the purpose of the Marine Department's examinations of masters and mates.

The Marine Department cannot undertake to accept the whole or any definite proportion of service in the Royal Naval Reserve which is *not* qualifying service in accordance with these regulations, but they will be prepared to consider sympathetically an application for examination from a candidate who has been prevented by his service in the Royal Naval Reserve between the 4th August, 1914, and the 31st December, 1920 (inclusive), from complying fully with the requirements of these regulations.

**142. Army Service.**—The Marine Department is anxious that, so far as it is reasonably possible, seamen or apprentices who served in the Army between the 4th August, 1914, and the 31st December, 1920, inclusive, should not be hindered in their ordinary profession; and it is prepared to consider sympathetically any application to be examined by a candidate who has been prevented from complying fully with the regulations owing to his service in the Army.

**143. Interned Officers and Seamen.**—A portion of the time spent by officers and seamen interned abroad between the 4th August, 1914, and the 31st December, 1920, inclusive, will be accepted in lieu of a portion of the qualifying sea service required to qualify them for examination for a certificate of competency. The amount of such time so allowed will be decided by the Principal Examiner to whom all such cases must be referred.

#### CONDUCT OF THE EXAMINATIONS.

**144. Examinations, Conduct of.**—The examinations will begin at 10 a.m. on each day. A luncheon interval of at least one hour will be given on each day at a suitable time. The order in which papers are given may be varied; the *viva voce* and practical parts of the examination being taken at such times as may be convenient.

The time allotted for each written part of the examination for each grade of certificate will be as follows:—

#### FOREIGN-GOING CERTIFICATES.

*Second Mate.*—Paper on—Navigation and nautical astronomy, 3 hours; Nautical astronomy and trigonometry, 2 hours; Chart, 3 hours; Essay, 1 hour.

*First Mate.*—Paper on—Navigation and nautical astronomy, 3 hours; Nautical astronomy and trigonometry, 2 hours; Chart, 3 hours; Position-line problem, 2 hours; Meteorology, 1½ hours.



*Master.*—Paper on—Navigation and nautical astronomy, 3 hours; Nautical astronomy and trigonometry, 2 hours; Chart, 3 hours; Compass-deviation, 1½ hours; Naval architecture, 1½ hours; \*Great circle sailing, 2 hours; \*Meteorology, 1½ hours; \*Essay, 2 hours.

*Extra Master.*—Paper on—Navigation and nautical astronomy, 3 hours; General mathematics, 3 hours; Chart-construction, 3 hours; Chart, 2 hours; Naval architecture and stability, 3 hours; Magnetism, 2 hours; General knowledge, 2 hours; Essay on meteorology or other subject as the Examiner may select, 2 hours.

## HOME-TRADE CERTIFICATES.

*Second Mate.*—Arithmetic and navigation, 2 hours.

*Mate.*—Arithmetic and navigation, 2 hours; Chart, 3 hours.

*Master.*—Arithmetic and navigation, 2 hours; Chart, 3 hours; Nautical astronomy and the compass, 3 hours; Nautical astronomy, 2 hours.

## OTHER CERTIFICATES.

*Master of a Cargo-vessel under 25 Tons Register or Master of a Fishing-boat.*—Arithmetic and navigation, 2 hours; Chart, 3 hours.

*Master of a River-steamer or Master of a Sailing-ship plying in Harbours and Rivers.*—Arithmetic, 2 hours.

**145. Punctuality.**—Candidates are required to appear at the examination-room punctually at the appointed time.

**146. Strangers.**—No person other than those whose duties require them to be present will be allowed in the examination-rooms during the examination.

Instructors will not be allowed on the premises.

**147. Paper and Books removed.**—Before commencing the examination the tables or desks must be cleared of all loose paper or books that are not used in the examination.

**148. Books and Papers forbidden.**—Candidates are prohibited from bringing into the examination-room books or papers of any kind whatever.

The slightest infringement of this regulation will subject the offender to all the penalties of a failure, and he will not be allowed to present himself for re-examination for a period of three months.

**149. Silence.**—Perfect silence is to be preserved in the examination-room.

**150. Copying, &c., must be prevented.**—Candidates must be so placed as to prevent one copying from the other, and no communication whatever between the candidates shall be allowed.

**151. Copying, &c., Penalty for.**—In the event of any candidate being discovered referring to any book or paper, or copying from another, or affording any assistance or giving any information to another, or communicating in any way with another candidate during the time of examination, or copying any part of the problems for the purpose of taking them out of the examination-rooms, he will subject himself to all the penalties of a failure, and will not be allowed to be examined for a period of six months.

A candidate guilty of a second offence will not be allowed to be examined until twelve months have elapsed.

**152. All Work to be shown.**—A candidate will not be allowed to work out his problems on waste paper, or to write on the blotting-paper supplied for his use in the examination.

Violation of this rule will subject him to all the penalties of a failure.

A sheet of clean blotting-paper must be issued to each candidate with his first examination-paper, and it must be returned to the Examiner when the last paper is completed each day.

The Examiner will be careful to see that the blotting-paper has not been used by the candidate in solving his problems, or for conveying information to other candidates.

**153. Leaving Room or Building.**—A candidate shall not leave the examination-room without permission and without giving up the

\* One of these subjects will not be given.

paper on which he is engaged. Under no circumstances will a candidate be allowed to leave the building while the examination is proceeding.

Violation of this rule will subject a candidate to all the penalties of a failure.

**154. Instruments, Books, &c., are provided.**—All instruments, books, &c., necessary for use in the examinations are supplied by the Marine Department.

**155. Azimuth Tables.**—In cases in which a time azimuth problem is allowed to be solved by use of time azimuth tables, Blackburne's A, B, and C Azimuth Tables may be used in lieu of the time azimuth tables used in identical examinations conducted by the Board of Trade in Great Britain.

**156. Instruments, Books, &c., Injury to.**—If a candidate defaces' blots, writes in, or otherwise injures any book, form, or instrument, &c., belonging to the Marine Department his papers will be retained until he has made restitution for the damage. He will not be allowed to remove the damaged book, document, or instrument, and will be subjected to all the penalties of a failure.

**157. Examination-papers : How to be dealt with.**—The envelopes containing the examination-papers when received from Wellington must not be opened by any officer other than the Examiner, and by him only at the commencement of the examination. Should the envelope containing the examination-papers appear to have been opened or in any way tampered with on its arrival from Wellington the Examiner should, if he thinks it necessary, defer the examination until the following day, and telegraph immediately to the Principal Examiner in Wellington for a fresh set of papers.

In the event of any case of this kind occurring a full report of the circumstances, and of the steps taken in the matter, should immediately be forwarded to the Principal Examiner.

After the envelopes have been opened, and until the examination-papers are again sealed up and despatched to Wellington, the Examiner must take special precautions to preclude the possibility of any person having access to them. The responsibility of ensuring that this is effectually done will rest with the Examiner. The examination-papers of candidates must in all cases be sent to the Principal Examiner in Wellington for his approval, together with the report of the examination on Forms Exn. 14 and Exn. 34.

The envelopes in which the examination-papers are returned to the Principal Examiner must be carefully sealed with the official seal at both the top and bottom, and this must be done under the eye of the Examiner.

**158. Nautical Almanac : G.M.T.**—In the 1925 Nautical Almanac (abridged edition) the times styled G.M.T. are reckoned from midnight as in civil usage, and not from noon. The problems in nautical astronomy have been revised accordingly, and all times therein given will be in the 24-hours notation unless otherwise stated in the problem.

**159. Navigation, Examination in.**—The whole of the written portion of the examination will be taken on the marks system. The candidate will be furnished with sheets of blank ruled paper (Exn. 30) which is supplied for the purpose, with instructions that he is to work or write only on one side of the paper, and to answer in a clear and legible hand each of the questions on the paper, and to commence each answer by writing in the margin the number of the question to which it relates.

Marks will be allotted for each question, and candidates will be required to obtain at least 75 per cent. of the total marks in order to pass for an ordinary certificate, and 85 per cent. for an extra certificate, and in the voluntary examination in Compass Deviation.

Papers will not be handed back to candidates for correction.

Candidates will be allowed to complete the whole of their written work even although they may have lost more than 25 per cent. of the total marks obtainable before the conclusion of the examination.

**160. Beall's Deviascope.**—In answering questions on the tentative method of compass-adjustment the candidate's knowledge will be tested by Beall's compass deviascope.

**161. Barometer, Tides, &c.**—The examination on the barometer, thermometer, and hydrometer, prevailing winds and currents of the

globe, trade routes, and tides, will be conducted orally; and the questions asked by the Examiner, which will be constantly varied, will be confined to and based on the information given in the text-books mentioned in Appendix M.

Candidates will be required to have a fair and intelligent knowledge of the contents of those books.

**162. Sextant.**—Particular attention will be paid to the sextant, the examination in which will be conducted orally and practically. Every candidate will be required to measure both vertical and horizontal angles, and will be examined practically as to his knowledge of the adjustments and the use of the various screws; he must be able to read correctly on and off the arc, and he must also be able to find the index error both by the horizon and by the sun.

**163. Tables, Corrections by.**—The corrections by inspection of tables given in some of the works on navigation will not be allowed. Every correction must appear on the papers of the candidates.

**164. Degree of Precision.**—Degree of precision required in the solution of the problems:—

a. Candidates are expected to work their problems to the nearest half-minute of arc and to the nearest second in time.

b. In interpolating for the correct deviation to be applied in solving the chart questions it will usually be sufficient if the candidate works throughout with the nearest degree of deviation taken from the deviation-card; and, even in cases where the deviations may vary but little, the nearest half-degree used throughout will be sufficiently precise.

It is not necessary that the candidate should waste his time in solving the course to odd minutes, as is sometimes done.

c. In calculating the correction to apply to soundings the candidate is not required to work to the exact inch, as is sometimes done. It will be sufficient if he brings his answer within half a foot or so of a precise result.

**165. Candidates may use Own Method.**—Except where a particular method is specified in the question, candidates will be allowed to work out the various problems according to any method they have been accustomed to use, provided such method is correct in principle.

**166. Supplementary viva voce.**—Candidates will be examined orally as to their knowledge of all their written and worked papers.

**167. No Candidate to be examined twice in a Week.**—A candidate will not be allowed to undergo examination for the same grade of certificate twice in the same week, unless, under very special and urgent circumstances, the Examiner should see fit to relax this rule. In such case a special set of examination-papers must be applied for from Wellington.

**168. Breach of Rules, Penalty for.**—Any candidate violating any of the regulations, or being guilty of insolence to the Examiner, or of disorderly or improper conduct in or about the examination-rooms, will render himself liable to the postponement of his examination, or, if he has passed, to the detention of his certificate for such period as the Marine Department may direct.

## APPENDICES.

### APPENDIX A.

#### EXAMINATION DAYS.

##### 169. Certificates of Competency, all Classes and Grades:—

Auckland—First Tuesday in March, June, September, and December.

Lyttelton—First Tuesday in January, April, July, and October.

Wellington—First Monday in each month.

Intending candidates must make application to be examined not later than one week previous to the date on which the examinations are to be held, and they must ascertain from the Superintendent of Mercantile Marine the day on which the examination will commence. Candidates for foreign-going or home-trade certificates who have failed whilst attending any of the examinations referred to in the foregoing schedule may, if they so desire, provided they are eligible and immediate application is made for that purpose to the Examiner, be allowed again to sit for examination during the week succeeding that on which the failure occurred.

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#### APPENDIX B.

##### SIGHT TESTS.

##### 170. Examination Days :—

Auckland, Dunedin, Lyttelton, Wellington—Saturday mornings from 10 to 12, by the Examiners in sight-tests. Application to be examined must be made to the Superintendent of Mercantile Marine.

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#### APPENDIX C.

##### ST. JOHN AMBULANCE ASSOCIATION.

##### 171. Secretaries of St. John Ambulance Association at Ports where Examinations are held :—

Auckland : W. Rattray, Ambulance Station, Rutland Street.

Christchurch : C. J. Treleaven, A.P.A. (N.Z.), 119 Worcester Street.

Dunedin : Rogers, The Octagon, Dunedin.

Wellington : H. C. W. Blick, A.P.A. (N.Z.), 56 Willis Street, P.O. Box 570. Phone 41-567.

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#### APPENDIX D.

**172. Examination in Signalling.**—The examination in signalling must in all cases and for all grades consist of an examination in the "International Code of Signals," and (excepting the master of a river steamer) the "Allied Signal Manual," Morse lamp-flashing, Morse flag-waving, and Semaphore.

**173. International Code of Signals.**—1. Examiners are recommended to frame the examination in the International Code of Signals upon the instructions and illustrations given at the commencement of Parts I and II of the Signal-book. The information there given will be found sufficient to indicate all the characteristics of the code.

2. By the form of the hoist an observer can at sight understand the nature of any signal he sees flying; the examination should therefore tend to elicit a clear knowledge of all the distinctive features of the code.

3. With this object in view the Examiners should question the candidates as to the distinguishing forms of the respective hoists, which will be indicated according as a burgee, a pennant, or a square flag is uppermost; and also with regard to the number of flags and the position of the code flag when used in the hoist, making the one-, two-, three-, and four-flag signals with the model flags supplied for the purpose, and varying the signals made, showing two- and three-flag signals, with and without the code flag included, or a geographical or a vocabulary signal, the name of a merchant ship or of a ship of war.

4. As the two latter signals are not found in the Signal-book the candidate should know where to find them and how to look them out.

5. The candidate should—

a. Be able to read a signal at sight so far as to name the flags composing the hoist.

b. Know the use of the code pennant and of the pennants C and D, also of the two burgees A and B, and the square flags S and P, and the flags used to indicate cholera, plague, &c., on board, and the quarantine flag.

- c. Be required to signal some word or words not included in the vocabulary of the code, either by letters or by the spelling table (page 516), or both.
  - d. Have a knowledge of the distant signals, and of their object, and the different modes of signalling therewith.
  - e. Know the special Morse signals indicated by certain letters as given on page 550.
  - f. Have a good knowledge of the distress signals, and understand the penalty which may be incurred by their improper use.
6. The candidate should know that the International Code is used on board H.M. ships, and has been adopted by all the principal maritime Powers for use on their public as well as merchant ships.

**174. "Allied Signal Manual."**—1. Candidates must know the meaning of any or all of the single-flag signals given therein, and the signification of the Pilot Jack when incorporated in a hoist. They will also be required to make or read from the Pilot Jack table a hoist given by the Examiner. Candidates need not be expected to commit the Pilot Jack table to memory, but there should be no hesitation whatever in making or reading a signal.

2. They should also know how to recognize any of the special signals given in the "Allied Signal Manual."

#### MORSE LAMP-FLASHING, MORSE FLAG-WAVING, AND SEMAPHORE.

**175. Conditions of Examinations for all Grades.**—1. All candidates for all grades of certificates of competency (except master of a river steamer) will be tested, practically, in both receiving and sending messages in each of the three methods of signalling—that is, in Morse lamp-flashing, Morse flag-waving, and semaphore.

2. The tests in each method of signalling will be carried out in the following order—lamp-flashing, flag-waving, semaphore; and in each method the candidate will first be required to make his portion of the test to be read by the Examiner; after which the Examiner will make the portion of the test to be read by the candidate.

3. In the lamp-flashing test the candidate will be required to make all his signals and messages by use of a Morse key, and the messages which he is required to read will be made by the Examiner either manually or mechanically by an automatic signalling-device, or both, as he may decide.

4. The flag-waving test will be conducted by the type of Morse flag as used in H.M. service ashore and afloat.

5. The semaphore test may be conducted either by hand flags or mechanical semaphore, or both, at the Examiner's discretion.

6. The test messages will in each case be a block-letter test message comprising three alphabets (seventy-eight letters) assembled haphazard in groups of five letters.

7. Selection of spelling messages, which may be passages from any newspaper or book in English and may contain figures, is left to the discretion of the Examiner. The candidate may either make the figures (if given) or spell them out in full; but, if figures are made, the Examiner must see the proper signs are made before and after the figures.

8. The spelling and test messages as read by a candidate should be taken down by another candidate where such is possible, otherwise by a clerk or other person, according as the Examiner may deem expedient.

9. Candidates must be thoroughly tested in the various signs, and in the procedure of calling up, sending, receiving, and answering a signal, as laid down in the "Allied Signal Manual," and this course should always be strictly adhered to.

10. Particular attention must be paid by Examiners to the accurate spacing of the Morse signs, and to the intervals between letters and words, both in lamp-flashing and flag-waving; also to the correct making of the semaphore signs. Any attempted increase in speed at the expense of accuracy must be discouraged.

11. Marks will be allotted for each description of message as follows:—

Test messages— $\frac{2}{3}$  of a mark for each correct letter (see tables on reverse of test-message cards).

Spelling messages—Two marks for each correct word or group of figures.

12. The block-letter tests and spelling messages as read by the candidate must be forwarded on Form Exn. 19A, together with the percentage of marks allotted and Examiner's report on Form Exn. 19B, to the Principal Examiner, with any remarks the Examiner may have to add with respect to the examination.

13. *Extra Master*.—Candidates must attain the following minimum speeds in words per minute: Morse lamp-flashing, 10; Morse flag-waving (the average length of a word being taken as five letters), 6; and semaphore, 12.

14. The lamp-flashing and flag-waving tests will in each case, both in making and reading, be a test message (see "Allied Signal Manual"), followed by a spelling message of 25 words.

15. The semaphore test will, both in making and reading, be a spelling message of 50 words.

16. *Degree of Accuracy*.—At least 90 per cent. of the maximum of marks in lamp-flashing, flag-waving, and semaphore, both in making and reading in each method, must be attained.

17. *Lower Grades*.—In lamp-flashing, candidates must attain a speed of 6, in flag-waving 5, and in semaphore 10, words per minute. The tests, both in making and reading, will be—

Lamp-flashing—A test message, followed by a spelling message of 10 words.

Flag-waving—A spelling message of 10 words.

Semaphore—A spelling message of 25 words.

18. *Degree of Accuracy*.—In lamp-flashing and flag-waving an aggregate of at least 90 per cent. of the maximum marks in both the test and spelling messages must be attained. In semaphore 90 per cent. of the maximum must be attained.

19. *NOTE*.—The "International Code of Signals," also the "Signal Letters of British Ships," is prepared by the Registrar-General of Shipping and Seamen, and these, also the "Official Mercantile Navy List and Maritime Directory," may be obtained from the publishers, Messrs. Spottiswoode, Ballantyne, and Co., 1 New Street Square, London E.C. 4, and the principal booksellers at the various ports. The "Allied Signal Manual" may be obtained through any bookseller or directly from H.M. Stationery Office.

## APPENDIX E.

### WIRELESS SIGNALLER.

176. **Instructions to Holders of Certificates of Competency, and to Intending Candidates for their First Home-trade Certificate of Competency.**—1. Every candidate for a home-trade certificate, on every occasion on which he presents himself for examination for his first certificate of competency, will be required to produce a certificate in the form of an "Examiner's authority" issued by the Minister of Telegraphs to the effect that he has "passed examination for wireless signaller":

Provided, however, that if such candidate holds a valid certificate as wireless operator of any grade issued by the Minister of Telegraphs, or its equivalent, such certificate will be accepted in lieu of an Examiner's authority, and he will not be required to submit himself for examination for wireless signaller.

2. The Examiner's authority must be obtained by the candidate when seventeen and a half years of age or more, and the examination for it must have been passed not more than one year before the date of examination for a certificate of competency.

3. A candidate for examination who does not possess a certificate as wireless operator issued by the Minister of Telegraphs, or its equivalent, should, some time before he wishes to sit for a certificate of competency, apply to a District Telegraph Engineer, who will inform him when and where the examination for wireless signaller may be held.

4. The examination for wireless signaller will be for one grade only, and will be conducted as is prescribed by the Minister of Telegraphs.

The examination will not be of a technical nature, but will be confined to a practical knowledge of how to manipulate the transmitting and receiving apparatus and its appurtenances, and the care and attention of the equipment necessary to produce its efficient operation.

The candidate will be required to send and to receive in prose, for a continuous period of five minutes in each case, at a speed of not less than ten words per minute ; and he will require to have a working knowledge of the customary procedure to be observed when communications are being established between his station and another station ashore or afloat, and of the regulations applying thereto. Also, he will be examined closely in the procedure to be followed in cases where the distress signal or other important signal is involved.

The fee prescribed by the Minister of Telegraphs to be paid by each candidate for examination is 5s.

#### APPENDIX F.

##### EXAMINATION OF A MASTER OR MATE IN STEAM.

177. These examinations are conducted under paras. 94 to 98 of these regulations.

The examination is partly *viva voce*, and extends to a general knowledge of the practical use of coal and oil fuel, the working of steam engines (including turbines) and boilers, and of the various valves, fittings, and pieces of machinery connected with them, and of the way in which electric lighting is carried out on board ship.

Candidates must—

- a. Know the names and understand the uses of the various parts of engines and boilers, and their connecting pipes, valves, cocks, &c.
- b. Have a thorough grasp of the construction of the steam engine and boiler, to enable them to understand the nature and importance of any defect which may be reported to them by the chief engineer :
- c. Have a knowledge of the strength of materials, of the principal repairs required in connection with engines, boilers, and pipes, and how these repairs are accomplished :
- d. Be able to form an independent opinion as to a breakdown, and the consequent propriety or impropriety of proceeding under steam with temporarily repaired or defective machinery :
- e. Understand how to estimate approximately the reduction of fuel required for reduced speed, and be able to satisfy themselves as to the sufficiency of the coal or other fuel on board for the voyage :
- f. Have an intelligent grasp of the general run of pipes and connections in the engine-room, the working of cocks, the opening and closing of cocks and valves, and know how mistakes of importance may be made and how best to guard against such mistakes :
- g. Be capable of being left in charge of the feeding of a set of boilers, understand the working of the water-gauge, and be able to guard against being misled by false indications of the gauge-glass :
- h. Understand the operations of blowing down and surfacing, the reasons for such practices, and the danger which may result from the neglect of them in certain circumstances.

A master or mate presenting himself for examination in steam must be understood to have made up for his want of practical experience by reading about the steam-engine. He ought therefore to show that he intelligently understands the rationale of its action. Under this head he should be able to state approximately the quantity of heat required in the formation of steam ; the relation of "latent" heat to "sensible" heat ; how much steam can be raised by the combustion of 1 lb. of fuel ; what horse-power measure is ; what indicated horse-power is ; what is the action of the slide-valve ; the course of the steam through the engine ; the advantage of working expansively, and how the expansive action is shown by the indicator diagram.

He should know the uses of the various parts of the engines and dynamos used for electric lighting, and how they and the cables are fitted in the hull ; how wires are jointed, insulated, and cased ; why it is desirable they should be led along places which are dry and accessible ; what "short-circuiting" is, and what are the causes which

produce it; what is its danger in coal-bunkers and petroleum-carrying steamers; what are the uses of switches and cut-outs, and why it is so important to prevent short-circuiting taking place.

Candidates will be required to give written answers to sixteen out of twenty questions in engineering knowledge. These questions will not be difficult, theoretical, or book questions, but such as any man of ordinary capacity who has a fair amount of practical knowledge of the use and working of the steam-engine ought to answer.

Examiners will require all candidates to fill up a Form Exn. 15B, and they will forward it to the Chief Examiner of Engineers with the report of the examination.

If a candidate refers to any book, paper, or memorandum, or obtains information from another candidate or any other person during the examination, he will be treated as having failed, will forfeit his fee, and will not be allowed to be re-examined for such period as the Marine Department may determine.

The Examiners will report, in the case of failure, the nature of the question or questions that decided the failure, or the point in the management of the engines or boilers in which the candidate was deficient.

Applicants for the voluntary examination need not necessarily have served on board steamships; all that is required is that they shall have a practical knowledge of the use and working of the steam-engine.

Practical knowledge is best gained in the engine-room; and the examination of an officer who does not produce official evidence of service in steamships, and of experience of engines, must necessarily be more searching than in the case of one who produces evidence of such service and experience.

The answers to the questions in engineering knowledge are frequently given by candidates as learned by rote from a book. Candidates should therefore be asked such *viva voce* questions as will necessitate answers in different words, so as to discover whether they have the root of the matter in them.

A large part of the *viva voce* examination should be conducted on board a steamer, preferably one with which the candidate is unacquainted. He should be told to look about and try to find out the arrangement of the machinery without assistance, and the Examiner should be in the engine-room to see that this independent examination is properly carried out. When the candidate reports that he thinks he knows the arrangement the Examiner will question him on the uses of the parts, get him to point out the different cylinders, pumps, valves, condenser, &c.; also the dynamo, its field magnets, armature, commutators, brushes, cables, &c. The candidate must show that he understands the run of the pipes in the bilges, not necessarily that he has gone over every one of them, but he ought to be directed to trace at least one important range of pipes, and to thoroughly satisfy the Examiner that he could be safely trusted to manipulate the valves or cocks in connection therewith. It will not often be practicable for the candidate actually to work engines under steam, but he must satisfy the Examiner that he knows how to do so, and that he is aware of the precautions to be taken in regard to water in the cylinders, &c. It is most important that a candidate should show that, in the event of an accident depriving him of the assistance of engineers, he knows what to do to safely take his vessel to an anchorage, or to stop the engines and proceed under sail alone.

The examination of a mate in steam is the same as that of a master. The knowledge required has no reference to the mate's position.

A mate may be examined, but such examination implies that the mate possibly may one day be a master, when the possession of the knowledge will be an advantage to him in the discharge of his duties.

#### APPENDIX G.

##### SIGHT TESTS.

**178. Conduct of the Tests.**—These tests must be conducted under the strict personal supervision of the Examiner. A careful record must be kept of all mistakes made by the candidate both in the letter test and in the lantern test.

Each Examiner must keep a record of all candidates passed by him, for reference when required.



**179. Letter Test :—**

1. *Letter Test to be passed first.*—The first test which the candidate is required to undergo is the letter test. Until he has passed this test he must not be allowed to proceed further with the examination.

2. *Apparatus used.*—The letter test to be used for all candidates is that conducted on Snellen's principle by means of sheets of letters.

3. *Object of the Test.*—The object of the letter test is to determine whether the candidate can reach a sufficient standard of visual acuteness, or, in other words, to find out whether his eyesight is good or bad.

4. *Standard of Vision required.*—Every candidate for a first certificate of competency will be required to possess normal vision. With the exceptions indicated below (see subpara. 9), every candidate for a second or higher certificate will be required to possess normal vision.

"Normal vision" is defined, for the purpose of these regulations, as ability to read correctly nine of the twelve letters in the sixth line and eight of the fifteen letters in the seventh line of a test-sheet placed in a good light at a distance of 16 ft. from the eye.

The candidate will have the option of using either eye separately or both eyes together.

5. *Spectacles not allowed.*—During the examination in the letter test candidates must not be allowed to use spectacles or glasses of any kind, or any other artificial aid to vision.

6. *Method of Testing.*—The test-sheets should be hung on the wall, in a good light but not in direct sunlight, at a height of 5 ft. or 6 ft. from the ground. The candidate should be placed at a distance of exactly 16 ft. from the sheets, and exactly opposite them. This distance should be carefully measured, and should never in any circumstances be varied.

One of the sheets should then be exposed, and the candidate should be asked to read the letters on each sheet, beginning at the top and going downwards. Any mistakes which he makes should be carefully noted. If then it is found that he has read correctly at least nine letters in the sixth line and eight letters in the seventh line of a sheet the candidate may be considered to have normal vision, and should be marked "Passed" in the appropriate column of the form of application (Exn. 2 or Exn. 2B, as the case may be).

7. *Passing or Failure.*—If at the conclusion of the test the candidate is found to reach the required standard he may be considered to have passed, and the Examiner should proceed with the lantern test. If the candidate fails to reach the standard required for the certificate entered for he should be tested with at least four sheets, and the Examiner should fill in a Form Exn. 17B, and should forward it, with any remarks he may wish to make, to the Principal Examiner for his instructions as to whether the candidate is to be regarded as passing or as failing in the letter test.

8. Failure to pass the letter test is due to some defect in form vision, and the Board are advised that such defects are sometimes curable. Whenever, therefore, a candidate fails to pass this test the Examiner should advise him to consult an ophthalmic surgeon, with a view to ascertaining what is the nature of the defect in his form vision, and whether it is curable.

9. *Lower Standard required in certain Cases.*—Candidates who are in possession of certificates obtained before the 1st January, 1914, may be regarded as passing the letter test if they can read correctly with both eyes at least five of the eight letters in the fifth line of a test-sheet.

10. *Tests to be varied.*—The Examiner must take care, by varying the order of the test-sheets and by every other means in his power, to guard against the possibility of any deception on the part of any candidate.

11. *Result of Examination to be reported.*—The result of every examination in the letter test must be reported, in the case of a candidate for a certificate of competency, to the Marine Department on Form Exn. 2, and to the Principal Examiner on Form Exn. 14; and, in the case of a candidate for the sight tests only, to the Principal Examiner on Form Exn. 2B.

**180. Lantern Test :—**

12. *Apparatus.*—A special lantern and a mirror have been provided for this test. The lantern must be placed directly in front of the mirror so that the front part of the lantern is exactly 10 ft. from the mirror. Care must be taken that the lantern is properly placed—

that is to say, the lights reflected in the mirror must show clearly when viewed through the rectangular aperture on the left of the lantern. The Examiner must always satisfy himself that these conditions are fulfilled before commencing the examination.

13. *Darkness Adaptation.*—It is essential that a candidate should be kept in a room which is either completely or partially darkened for at least a quarter of an hour before he is required to undergo this test.

Before the examination commences the Examiner must satisfy himself that the room in which it is conducted is so darkened as to exclude all daylight.

14. *Method of Testing.*—The lantern supplied for the examination is so constructed as to allow one large or two small lights to be visible, and is fitted with twelve glasses of three colours—red, white, and green. At the commencement of the examination the Examiner should show to the candidate a series of lights through the large aperture, and should require him to name the colours as they appear to him. Care should be taken in showing the white light to emphasize the fact that the light is not a pure white.

If a candidate makes a mistake of calling the light “red,” a proper red light should be shown immediately after, and the candidate’s attention directed to the difference between the two.

After a series of lights through the large aperture has been shown, the Examiner should make a complete circuit with the two small apertures, requiring the candidate to name the colours of each set of two lights from left to right. To prevent any possibility of the order in which the lights are arranged from being learnt, the Examiner must at least twice in each circuit go back a varying number of colours.

A record of any mistakes made with either the large aperture or the two smaller apertures should be kept on Form Exn. 17c, in accordance with the instructions thereon.

15. *Passing or Failure.*—If a candidate with either the large aperture or the two smaller apertures of the lantern mistakes red for green or green for red he should be considered to have “failed” in the lantern test.

If the only mistake made by the candidate with the lantern is to call the white light “red,” and if, after his attention has been specially directed to the difference between the two, he makes no further mistake of this nature he should be considered to have passed in the lantern test.

If a candidate makes any other mistake with the lantern—i.e., if he calls white “red” repeatedly or red “white” at all, or confuses green and white—his case should be reported to the Principal Examiner, and he should be told that the decision as to whether he is passed or failed, or a further examination is necessary, will be communicated to him in due course. Pending receipt of the Principal Examiner’s instructions such a candidate should only be allowed to proceed with the remainder of the examination for a certificate of competency on the express understanding that the latter examination will be cancelled in the event of failure in the sight tests.

16. *Further Examination and Appeals.*—If in the cases covered by the preceding paragraph the Principal Examiner decides that a further examination is necessary, arrangements will be made for a special examination to be held, and the second-class travelling-expenses necessarily incurred by a candidate in attending such an examination will be paid by the Marine Department, together with a subsistence allowance at a rate which will be notified to the candidate, but which will not in any circumstances exceed 10s. for each day necessarily occupied in attending the examination. In these cases the above expenses will be paid whatever may be the result of the final examination.

If, however, on the report of the local Examiner the Principal Examiner decides that the nature of the mistakes made shows conclusively that a candidate’s sight is so defective as to render him unfit to hold a certificate, the candidate shall be considered to have failed.

In cases where, upon the report of the local Examiner, a candidate is failed by the Principal Examiner, as well as in the cases covered by subpara. 15, the Marine Department will be prepared to allow a candidate who is dissatisfied with this decision to appeal for a special examination; but the Marine Department will not pay the travelling-expenses of any such candidate unless he is reported by the Special Examiners conducting the appeal examination to have passed.

**181. Reports :—**

17. The result of every test must be reported to the Marine Department on Form Exn. 2, and to the Principal Examiner on Form Exn. 14, when the candidate is up for examination for a certificate of competency; and to the Marine Department on Form Exn. 2B when the candidate is up for examination in the sight tests only.

All cases of failure should also be reported to the Principal Examiner on Form Exn. 17B, to which should be attached Form Exn. 17C containing the record of any mistakes made with the lantern.

*Every report relating to such an examination must be signed by the Examiner who conducted the examination.*

**APPENDIX H.****REGULATIONS FOR PREVENTING COLLISIONS AT SEA.**

(Imperial Order in Council of the 13th October, 1910.)

**SCHEDULE I.****PRELIMINARY.**

**182.** These rules shall be followed by all vessels upon the high seas and in all waters connected therewith navigable by seagoing vessels.

In the following rules every steam-vessel which is under sail and not under steam is to be considered a sailing-vessel, and every vessel under steam, whether under sail or not, is to be considered a steam-vessel.

The word "steam-vessel" shall include any vessel propelled by machinery.

A vessel is "under way" within the meaning of these rules when she is not at anchor or made fast to the shore or aground.

The word "visible" in these rules, when applied to lights, shall mean visible on a dark night with a clear atmosphere.

**RULES CONCERNING LIGHTS, ETC.**

**Art. 1.**—The rules concerning lights shall be complied with in all weathers from sunset to sunrise, and during such time no other lights which may be mistaken for the prescribed lights shall be exhibited.

**Art. 2.**—A steam-vessel when under way shall carry—

- a. On or in front of the foremast, or if a vessel without a foremast, then in the fore part of the vessel, at a height above the hull of not less than 20 ft., and if the breadth of the vessel exceeds 20 ft., then at a height above the hull not less than such breadth—so, however, that the light need not be carried at a greater height above the hull than 40 ft.—a bright white light, so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel—viz., from right ahead to two points abaft the beam on either side—and of such a character as to be visible at a distance of at least 5 miles.
- b. On the starboard side a green light, so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side, and of such a character as to be visible at a distance of at least 2 miles.
- c. On the port side a red light, so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side, and of such a character as to be visible at a distance of at least 2 miles.
- d. The said green and red sidelights shall be fitted with inboard screens projecting at least 3 ft. forward from the light, so as to prevent these lights from being seen across the bow.

*e.* A steam-vessel when under way may carry an additional white light similar in construction to the light mentioned in subdivision *a*. These two lights shall be so placed in line with the keel that one shall be at least 15 ft. higher than the other, and in such a position with reference to each other that the lower light shall be forward of the upper one. The vertical distance between these lights shall be less than the horizontal distance.

**Art. 3.**—A steam-vessel when towing another vessel shall, in addition to her sidelights, carry two bright white lights in a vertical line one over the other, not less than 6 ft. apart, and when towing more than one vessel shall carry an additional bright white light 6 ft. above or below such lights if the length of the tow, measuring from the stern of the towing-vessel to the stern of the last vessel towed, exceeds 600 ft. Each of these lights shall be of the same construction and character, and shall be carried in the same position, as the white light mentioned in Article 2 *a*, except the additional light, which may be carried at a height of not less than 14 ft. above the hull.

Such steam-vessel may carry a small white light abaft the funnel or aftermast for the vessel towed to steer by, but such light shall not be visible forward of the beam.

**Art. 4.**—*a.* A vessel which from any accident is not under command shall carry at the same height as the white light mentioned in Article 2 *a*, where they can best be seen, and, if a steam-vessel, in lieu of that light, two red lights in a vertical line one over the other, not less than 6 ft. apart, and of such a character as to be visible all round the horizon at a distance of at least 2 miles; and shall by day carry in a vertical line one over the other, not less than 6 ft. apart, where they can best be seen, two black balls or shapes, each 2 ft. in diameter.

*b.* A vessel employed in laying or in picking up a telegraph-cable shall carry in the same position as the white light mentioned in Article 2 *a*, and, if a steam-vessel, in lieu of that light, three lights in a vertical line one over the other, not less than 6 ft. apart. The highest and lowest of these lights shall be red, and the middle light shall be white, and they shall be of such a character as to be visible all round the horizon at a distance of at least 2 miles. By day she shall carry in a vertical line one over the other, not less than 6 ft. apart, where they can best be seen, three shapes not less than 2 ft. in diameter, of which the highest and lowest shall be globular in shape and red in colour, and the middle one diamond in shape and white.

*c.* The vessels referred to in this article, when not making way through the water, shall not carry the sidelights, but when making way shall carry them.

*d.* The lights and shapes required to be shown by this article are to be taken by other vessels as signals that the vessel showing them is not under command, and cannot therefore get out of the way.

These signals are not signals of vessels in distress and requiring assistance. Such signals are contained in Article 31.

**Art. 5.**—A sailing-vessel under way, and any vessel being towed, shall carry the same lights as are prescribed by Article 2 for a steam-vessel under way, with the exception of the white lights mentioned therein, which they shall never carry.

**Art. 6.**—Whenever, as in the case of small vessels under way during bad weather, the green and red sidelights cannot be fixed, these lights shall be kept at hand lighted and ready for use; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side, nor, if practicable, more than two points abaft the beam on their respective sides.

To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the colour of the light they respectively contain, and shall be provided with proper screens.

**Art. 7.**—Steam-vessels of less than 40, and vessels under oars or sails of less than 20, tons gross tonnage, respectively, and rowing-boats, when under way, shall not be obliged to carry the lights mentioned in Article 2 *a*, *b*, and *c*, but if they do not carry them they shall be provided with the following lights:—

1. Steam-vessels of less than 40 tons shall carry—
  - a. In the fore part of the vessel, or on or in front of the funnel, where it can best be seen, and at a height above the gunwale of not less than 9 ft., a bright white light constructed and fixed as prescribed in Article 2 *a*, and of such a character as to be visible at a distance of at least 2 miles.
  - b. Green and red sidelights constructed and fixed as prescribed in Article 2 *b* and *c*, and of such a character as to be visible at a distance of at least 1 mile, or a combined lantern showing a green light and a red light from right ahead to two points abaft the beam on their respective sides. Such lantern shall be carried not less than 3 ft. below the white light.
2. Small steamboats, such as are carried by seagoing vessels, may carry the white light at a less height than 9 ft. above the gunwale, but it shall be carried above the combined lantern mentioned in subdivision 1 *b*.
3. Vessels under oars or sails, of less than 20 tons, shall have ready at hand a lantern with a green glass on one side and a red glass on the other, which, on the approach of or to other vessels, shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.
4. Rowing-boats, whether under oars or sail, shall have ready at hand a lantern showing a white light, which shall be temporarily exhibited in sufficient time to prevent collision.

The vessels referred to in this article shall not be obliged to carry the lights prescribed by Article 4 *a*, and Article 11, last paragraph.

**Art. 8.**—Pilot-vessels, when engaged on their station on pilotage duty, shall not show the lights required for other vessels, but shall carry a white light at the masthead, visible all round the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals, which shall never exceed fifteen minutes.

On the near approach of or to other vessels they shall have their sidelights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the green light shall not be shown on the port side, nor the red light on the starboard side.

A pilot-vessel of such a class as to be obliged to go alongside of a vessel to put a pilot on board may show the white light instead of carrying it at the masthead, and may, instead of the coloured lights above mentioned, have at hand ready for use a lantern with a green glass on the one side and a red glass on the other, to be used as prescribed above.

A steam pilot-vessel exclusively employed for the service of pilots licensed or certified by any pilotage authority or the committee of any pilotage district, when engaged on her station on pilotage duty and not an anchor, shall, in addition to the lights required for all pilot-boats, carry, at a distance of 8 ft. below her white masthead-light, a red light visible all round the horizon, and of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least 2 miles, and also the coloured sidelights required to be carried by vessels when under way.

When engaged on her station on pilotage duty and at anchor she shall carry, in addition to the lights required for all pilot-boats, the red light above mentioned, but not the coloured sidelights.

Pilot-vessels when not engaged on their station on pilotage duty shall carry lights similar to those of other vessels of their tonnage.

**Art. 9\*†.**—Fishing-vessels and fishing-boats, when under way and when not required by this article to carry or show the lights hereinafter specified, shall carry or show the lights prescribed for vessels of their tonnage under way.

- a. Open boats, by which it is to be understood boats not protected from the entry of sea-water by means of a continuous deck, when engaged in any fishing at night with outlying tackle extending not more than 150 ft. horizontally from the boat into the seaway, shall carry one all-round white light.

Open boats, when fishing at night with outlying tackle extending more than 150 ft. horizontally from the boat into

\* This Article does not apply to Chinese or Siamese vessels.

† The expression "Mediterranean Sea" contained in subsections *b* and *c* of this article includes the Black Sea and the other adjacent inland seas in communication with it.

the seaway, shall carry one all-round white light, and in addition, on approaching or being approached by other vessels, shall show a second white light at least 3 ft. below the first light and at a horizontal distance of at least 5 ft. away from it in the direction in which the outlying tackle is attached.

- b.\* Vessels and boats, except open boats as defined in subdivision a, when fishing with drift-nets, shall, so long as the nets are wholly or partly in the water, carry two white lights where they can best be seen. Such lights shall be placed so that the vertical distance between them shall be not less than 6 ft. and not more than 15 ft., and so that the horizontal distance between them, measured in a line with the keel, shall be not less than 5 ft. and not more than 10 ft. The lower of these two lights shall be in the direction of the nets, and both of them shall be of such a character as to show all round the horizon, and to be visible at a distance of not less than 3 miles.

Within the Mediterranean Sea and in the seas bordering the coasts of Japan and Korea† sailing fishing-vessels of less than 20 tons gross tonnage shall not be obliged to carry the lower of these two lights; should they, however, not carry it, they shall show in the same position (in the direction of the net or gear) a white light, visible at a distance of not less than 1 sea mile, on the approach of or to other vessels.

- c. Vessels and boats, except open boats as defined in subdivision a, when line-fishing with their lines out and attached to or hauling their lines, and when not at anchor or stationary within the meaning of subdivision h, shall carry the same lights as vessels fishing with drift-nets. When shooting lines, or fishing with towing-lines, they shall carry the lights prescribed for a steam or sailing vessel under way respectively.

Within the Mediterranean Sea and in the seas bordering the coasts of Japan and Korea† sailing fishing-vessels of less than 20 tons gross tonnage shall not be obliged to carry the lower of these two lights; should they, however, not carry it, they shall show in the same position (in the direction of the lines) a white light, visible at a distance of not less than 1 sea mile, on the approach of or to other vessels.

- d. Vessels when engaged in trawling, by which is meant the dragging of an apparatus along the bottom of the sea—

1. If steam-vessels, shall carry, in the same position as the white light mentioned in Article 2 a, a tricoloured lantern so constructed and fixed as to show a white light from right ahead to two points on each bow, and a green light and a red light over an arc of the horizon from two points on each bow to two points abaft the beam on the starboard and port sides respectively; and, not less than 6 ft. nor more than 12 ft. below the tricoloured lantern, a white light in a lantern, so constructed as to show a clear, uniform, and unbroken light all round the horizon:

2. If sailing-vessels, shall carry a white light in a lantern, so constructed as to show a clear, uniform, and unbroken light all round the horizon; and shall also, on the approach of or to other vessels, show, where it can best be seen, a white flare-up light or torch in sufficient time to prevent collision. All lights mentioned in subdivision d 1 and 2 shall be visible at a distance of at least 2 miles.

- e. Oyster-dredgers and other vessels fishing with dredge-nets shall carry and show the same lights as trawlers.

- f. Fishing-vessels and fishing-boats may at any time use a flare-up light in addition to the lights which they are by this article required to carry and show, and they may also use working-lights.

- g. Every fishing-vessel and every fishing-boat under 150 ft. in length, when at anchor, shall exhibit a white light visible all round the horizon at a distance of at least 1 mile.

- Every fishing-vessel of 150 ft. in length or upwards, when at anchor, shall exhibit a white light visible all round

\* Dutch vessels and boats when engaged in the "kol," or hand-line, fishing will carry the lights prescribed for vessels fishing with drift-nets.

† Also, as regards Russian vessels, in the seas (excluding the Baltic) bordering the coasts of Russia.

the horizon at a distance of at least 1 mile, and shall exhibit a second light as provided for vessels of such length by Article 11. Should any such vessel, whether under 150 ft. in length or of 150 ft. in length or upwards, be attached to a net or other fishing gear, she shall on the approach of other vessels show an additional white light at least 3 ft. below the anchor-light, and at a horizontal distance of at least 5 ft. away from it in the direction of the net or gear.

*h.* If a vessel or boat when fishing becomes stationary in consequence of her gear getting fast to a rock or other obstruction, she shall, in daytime, haul down the day signal required by subdivision *k*; at night, show the light or lights prescribed for a vessel at anchor; and during fog, mist, falling snow, or heavy rain-storms, make the signal prescribed for a vessel at anchor. (See subdivision *d*, and the last paragraph of Article 15.)

*i.* In fog, mist, falling snow, or heavy rain-storms, drift-net vessels attached to their nets, and vessels when trawling, dredging, or fishing with any kind of drag-net, and vessels line-fishing with their lines out, shall, if of 20 tons gross tonnage or upwards respectively, at intervals of not more than one minute, make a blast—if steam-vessels, with the whistle or siren; and if sailing-vessels, with the fog-horn—each blast to be followed by ringing the bell. Fishing vessels and boats of less than 20 tons gross tonnage shall not be obliged to give the above-mentioned signals; but if they do not, they shall make some other efficient sound signal at intervals of not more than one minute.

*k.* All vessels or boats fishing with nets or lines or trawls, when under way, shall in daytime indicate their occupation to an approaching vessel by displaying a basket or other efficient signal where it can best be seen. If vessels or boats at anchor have their gear out they shall, on the approach of other vessels, show the same signal on the side on which those vessels can pass. The vessels required by this article to carry or show the lights hereinbefore specified shall not be obliged to carry the lights prescribed by Article 4 *a* and the last paragraph of Article 11.

**Art. 10.**—A vessel which is being overtaken by another shall show from her stern to such last-mentioned vessel a white light or a flare-up light.

The white light required to be shown by this article may be fixed and carried in a lantern, but in such case the lantern shall be so constructed, fitted, and screened that it shall throw an unbroken light over an arc of the horizon of twelve points of the compass—viz., for six points from right aft on each side of the vessel—so as to be visible at a distance of at least 1 mile. Such light shall be carried as nearly as practicable on the same level as the sidelights.

**Art. 11.**—A vessel under 150 ft. in length, when at anchor, shall carry forward, where it can best be seen, but at a height not exceeding 20 ft. above the hull, a white light in a lantern so constructed as to show a clear, uniform, and unbroken light visible all round the horizon at a distance of at least one mile.

A vessel of 150 ft. or upwards in length, when at anchor, shall carry in the forward part of the vessel, at a height of not less than 20 ft. and not exceeding 40 ft. above the hull, one such light, and at or near the stern of the vessel, and at such a height that it shall be not less than 15 ft. lower than the forward light, another such light.

The length of a vessel shall be deemed to be the length appearing in her certificate of registry.

A vessel aground in or near a fairway shall carry the above light or lights and the two red lights prescribed by Article 4 *a*.

**Art. 12.**—Every vessel may, if necessary in order to attract attention, in addition to the lights which she is by these rules required to carry, show a flare-up light or use any detonating signal that cannot be mistaken for a distress-signal.

**Art. 13.**—Nothing in these rules shall interfere with the operation of any special rules made by the Government of any nation with respect to additional station and signal lights for two or more ships of war or for vessels sailing under convoy, or with the exhibition of

recognition signals adopted by shipowners which have been authorized by their respective Governments and duly registered and published.

**Art. 14.**—A steam-vessel proceeding under sail only, but having her funnel up, shall carry in daytime, forward, where it can best be seen, one black ball or shape 2 ft. in diameter.

#### SOUND SIGNALS FOR FOG, ETC.

**Art. 15.**—All signals prescribed by this article for vessels under way shall be given—

1. By steam-vessels, on the whistle or siren :
2. By sailing-vessels and vessels towed, on the fog-horn.

The words "prolonged blast" used in this article shall mean a blast of from four to six seconds' duration.

A steam-vessel shall be provided with an efficient whistle or siren, sounded by steam or some substitute for steam, so placed that the sound may not be intercepted by any obstruction, and with an efficient fog-horn, to be sounded by mechanical means, and also with an efficient bell.\* A sailing-vessel of 20 tons gross tonnage or upwards shall be provided with a similar fog-horn and bell.

In fog, mist, falling snow, or heavy rainstorms, whether by day or night, the signals described in this article shall be used as follows, viz. :—

- a. A steam-vessel having way upon her shall sound, at intervals of not more than two minutes, a prolonged blast.
- b. A steam-vessel under way, but stopped and having no way upon her, shall sound, at intervals of not more than two minutes, two prolonged blasts, with an interval of about one second between them.
- c. A sailing-vessel under way shall sound, at intervals of not more than one minute, when on the starboard tack, one blast ; when on the port tack, two blasts in succession ; and when with the wind abaft the beam, three blasts in succession.
- d. A vessel when at anchor shall, at intervals of not more than one minute, ring the bell rapidly for about five seconds.
- e. A vessel when towing, a vessel employed in laying or in picking up a telegraph-cable, and a vessel under way, which is unable to get out of the way of an approaching vessel through being not under command, or unable to manœuvre as required by these rules, shall, instead of the signals prescribed in subdivisions *a* and *c* of this article, at intervals of not more than two minutes, sound three blasts in succession—viz., one prolonged blast followed by two short blasts. A vessel towed may give this signal, and she shall not give any other.

Sailing-vessels and boats of less than 20 tons gross tonnage shall not be obliged to give the above-mentioned signals ; but, if they do not, they shall make some other efficient sound-signal at intervals of not more than one minute.†

#### SPEED OF SHIPS TO BE MODERATE IN FOG, ETC.

**Art. 16.**—Every vessel shall, in a fog, mist, falling snow, or heavy rainstorms, go at a moderate speed, having careful regard to the existing circumstances and conditions.

A steam-vessel hearing, apparently forward of her beam, the fog-signal of a vessel the position of which is not ascertained shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.

\* In all cases where the rules require a bell to be used a drum may be substituted on board Turkish vessels, or a gong where such articles are used on board small sea-going vessels.

† Dutch steam pilot-vessels, when engaged on their station on pilotage duty in fog, mist, falling snow, or heavy rain-storms, are required to make at intervals of two minutes at most one long blast with the siren, followed after one second by a long blast with the steam-whistle, and again after one second by a long blast on the siren. When not engaged on their station on pilotage duty they make the same signals as other steamships.



## STEERING AND SAILING RULES.

*Preliminary.—Risk of Collision.*

Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass-bearing of an approaching vessel. If the bearing does not appreciably change, such risk should be deemed to exist.

**Art. 17.**—When two sailing vessels are approaching one another so as to involve risk of collision one of them shall keep out of the way of the other, as follows, viz. :—

- a. A vessel which is running free shall keep out of the way of a vessel which is close-hauled.
- b. A vessel which is close-hauled on the port tack shall keep out of the way of a vessel which is close-hauled on the starboard tack.
- c. When both are running free, with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.
- d. When both are running free, with the wind on the same side, the vessel which is to windward shall keep out of the way of the vessel which is to leeward.
- e. A vessel which has the wind aft shall keep out of the way of the other vessel.

**Art. 18.**—When two steam-vessels are meeting end-on, or nearly end-on, so as to involve risk of collision, each shall alter her course to starboard, so that each may pass on the port side of the other.

This article only applies to cases where vessels are meeting end-on, or nearly end-on, in such a manner as to involve risk of collision, and does not apply to two vessels which must, if both keep on their respective courses, pass clear of each other.

The only cases to which it does apply are when each of the two vessels is end-on, or nearly end-on, to the other—in other words, to cases in which, by day, each vessel sees the masts of the other in a line, or nearly in a line, with her own; and, by night, to cases in which each vessel is in such a position as to see both the sidelights of the other.

It does not apply, by day, to cases in which a vessel sees another ahead crossing her own course; or, by night, to cases where the red light of one vessel is opposed to the red light of the other, or where the green light of one vessel is opposed to the green light of the other, or where a red light without a green light, or a green light without a red light, is seen ahead, or where both green and red lights are seen anywhere but ahead.

**Art. 19.**—When two steam-vessels are crossing, so as to involve risk of collision the vessel which has the other on her own starboard side shall keep out of the way of the other.

**Art. 20.**—When a steam-vessel and a sailing-vessel are proceeding in such directions as to involve risk of collision, the steam-vessel shall keep out of the way of the sailing-vessel.

**Art. 21.**—Where by any of these rules one of two vessels is to keep out of the way, the other shall keep her course and speed.

NOTE.—When, in consequence of thick weather or other causes, such vessel finds herself so close that collision cannot be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision. (See Articles 27 and 29.)

**Art. 22.**—Every vessel which is directed by these rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.

**Art. 23.**—Every steam-vessel which is directed by these rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed, or stop, or reverse.

**Art. 24.**—Notwithstanding anything contained in these rules, every vessel overtaking any other shall keep out of the way of the overtaken vessel.

Every vessel coming up with another vessel from any direction more than two points abaft her beam—*i.e.*, in such a position with reference to the vessel which she is overtaking that at night she would be unable to see either of that vessel's sidelights—shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing

between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

As by day the overtaking vessel cannot always know with certainty whether she is forward or abaft this direction from the other vessel, she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

**Art. 25.**—In narrow channels every steam-vessel shall, when it is safe and practicable, keep to that side of the fairway or mid-channel which lies on the starboard side of such vessel.

**Art. 26.**—Sailing-vessels under way shall keep out of the way of sailing-vessels or boats fishing with nets, or lines, or trawls. This rule shall not give to any vessel or boat engaged in fishing the right of obstructing a fairway used by vessels other than fishing vessels or boats.

**Art. 27.**—In obeying and construing these rules, due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

*Sound Signals for Vessels in Sight of one another.*

**Art. 28.**—The words “short blast” used in this article shall mean a blast of about one second’s duration.

When vessels are in sight of one another, a steam-vessel under way, in taking any course authorized or required by these rules, shall indicate that course by the following signals on her whistle or siren, viz. :—

One short blast to mean, “I am directing my course to starboard.”

Two short blasts to mean, “I am directing my course to port.”

Three short blasts to mean, “My engines are going full speed astern.”

*No Vessel under any Circumstances to neglect Proper Precautions.*

**Art. 29.**—Nothing in these rules shall exonerate any vessel, or the owner or master or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper look-out, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

*Reservation of Rules for Harbours and Inland Navigation.*

**Art. 30.**—Nothing in these rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbour, river, or inland waters.

**DISTRESS-SIGNALS.\***

**Art. 31.**—When a vessel is in distress and requires assistance from other vessels or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, viz. :—

In the daytime—

1. A gun or other explosive signal fired at intervals of about a minute;
2. The International Code signal of distress indicated by N.C.;
- †3. The distant signal, consisting of a square flag, having either above or below it a ball or anything resembling a ball;
4. A continuous sounding with any fog-signal apparatus.

\* If a master of a vessel uses or displays, or causes or permits any person under his authority to use or display, any of those signals of distress, except in the case of a vessel being in distress, he shall be liable to pay compensation for any labour undertaken, risk incurred, or loss sustained in consequence of that signal having been supposed to be a signal of distress; and that compensation may, without prejudice to any other remedy, be recovered in the same manner in which salvage is recoverable. (Merchant Shipping Act, 1894, section 434 (2).)

† A further distress-signal is provided in the International Code of Signals. It is a distant signal consisting of a cone, point upwards, having either above it or below it a ball, or anything resembling a ball. This signal has not been sanctioned by Order in Council under the provisions of section 434 of the Merchant Shipping Act, 1894.

At night—

1. A gun or other explosive signal fired at intervals of about a minute ;
2. Flames on the vessel (as from a burning tar-barrel, oil-barrel, &c.) ;
3. Rockets or shells, throwing stars of any colour or description, fired one at a time at short intervals ;
4. A continuous sounding with any fog-signal apparatus.

**183. Rule of the Road :—**

AIDS TO MEMORY.

In Four Verses, by the late Mr. THOMAS GRAY, C.B.

1. *Two steamships meeting.*

When both sidelights you see ahead—  
Port your helm and show your RED.

2. *Two Steamships passing.*

GREEN to GREEN—or, RED to RED—  
Perfect Safety—Go ahead !

3. *Two Steamships crossing.* NOTE.—This is the position of greatest danger ; there is nothing for it but good look-out, caution, and judgment.

If to your starboard RED appear,  
It is your duty to keep clear.  
To act as judgment says is proper—  
To Port—or Starboard—Back—or, Stop her.  
But when upon your Port is seen  
A Steamer's Starboard Light of GREEN,  
There's not so much for you to do,  
For GREEN to Port keeps clear of you.

*All ships must keep a good look-out, and Steamships must stop and go astern, if necessary.*

Both in safety and in doubt  
Always keep a good look-out ;  
In danger, with no room to turn,  
Ease her, stop her, go astern.

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**APPENDIX I.**

**184. Signals to be made by Ships wanting a Pilot :—**

*In the Daytime.*—The following signals, numbered 1, 2, 3, and 4, when used or displayed together or separately, shall be deemed to be signals for a pilot in the daytime, viz. :—

1. To be hoisted at the fore, the Union Jack, having round it a white border, one-fifth of the breadth of the flag ; or
2. The International Code pilotage signal indicated by P.T.
3. The International Code flag S, with or without the Code pennant over it.
4. The distant signal, consisting of a cone point upwards, having above it two balls or shapes resembling balls.

*At Night.*—The following signals, numbered 1 and 2, when used or displayed together or separately, shall be deemed to be signals for a pilot at night, viz. :—

1. The pyrotechnic light, commonly known as a blue light, every fifteen minutes ; or
2. A bright white light, flashed or shown at short or frequent intervals just above the bulwarks for about a minute at a time.

If a master of a vessel uses or displays, or causes or permits any person under his authority to use or display, any of the pilot signals for any other purpose than that of summoning a pilot, or uses, or causes or permits any person under his authority to use, any other signal for a pilot, he shall for each offence be liable to a fine not exceeding £20.—(Merchant Shipping Act, 1894, section 615 (3).)

## APPENDIX J.

## EXAMINATION-PAPERS.

(NOTE.—*The following are specimen sets of examination-papers for all classes and grades of certificates of competency as master and mate.*)

**185. Specimen Examination-paper for Master of a River Steamer :—**

## ARITHMETIC.

Time allowed 2 hours.

1. Express in figures—Twenty-four millions seven hundred and two thousand ; five hundred and nine thousand and four.
2. Add the following quantities together : 1402, 86, 903, 7284, 16708 ; also add together 72498, 60382, 704, 208, 7.
3. From 6840298 take 3826989 ; from 684062 take 508349 ; from 1800426 take 99849 ; from 1638072 take 899708.
4. Multiply 9886 by 37 ; multiply 98486 by 3972.
5. Divide 38409687 by 3837 ; divide 943068 by 14.
6. Add the following quantities together : £8468 9s. 4d., £1306 3s. 10d., £1608 4s. 6d., £3089 11s. 7d. Also add together 9843 tons 16 cwt. 2 qr. 14 lb., 4860 tons 13 cwt. 3 qr. 2 lb., 90 tons 18 cwt. 2 qr. 23 lb., 6028 tons 16 cwt. 1 qr. 3 lb.
7. From £6488 17s. 6½d. take £5840 3s. 9¾d. ; and from 54833 tons 16 cwt. 2 qr. 2 lb. take 9808 tons 3 cwt. 0 qr. 4 lb.
8. Multiply the following quantities by 92 : £1840 4s. 6d. ; 284 tons 16 cwt 3 qr. 4 lb.
9. Divide the following quantities by 67 : £134 2s. 10d. ; 6094 tons 3 cwt. 1 qr. 18 lb.

**186. Specimen Set of Examination-papers for Master of a Cargo-vessel under 25 tons, or for Master of a Fishing-boat :—**

## 1. ARITHMETIC AND NAVIGATION.

Time allowed 2 hours.

1. Express in figures—Thirty-eight millions nine hundred thousand and seven ; twenty-five thousand three hundred.
2. Add the following quantities together : 1706, 74, 2, 4835, 972 ; also add together 987, 22, 9044, 6298, 806.
3. From 4825726 take 3987244 ; from 8465099 take 2999847 ; from 6238429 take 5989777 ; from 78432 take 69586.
4. Multiply 9842 by 68 ; multiply 8498 by 7286.
5. Divide 94862948 by 1989 ; divide 694382 by 9.
6. Add the following quantities together : £9248 4s. 9d. ; £232 14s. 11d., £6982 3s. 7d., £63 15s. 2d. Also add together 842 tons 13 cwt. 2 qr. 1 lb., 414 tons 11 cwt. 3 qr. 14 lb., 8249 tons 3 cwt. 1 qr. 9 lb., 72 tons 16 cwt. 3 qr. 7 lb.
7. From £92486 16s. 7d. take £7829 4s. 10d. ; and from 684 tons 2 cwt. 2 qr. 4 lb. take 399 tons 16 cwt. 3 qr. 2 lb.
8. Multiply the following quantities by 27 : £1483 17s. 7d. ; 29 tons 16 cwt. 3 qr. 17 lb.
9. Divide the following quantities by 94 : £5806 4s. 8d. ; and 9663 tons 8 cwt. 1 qr. 15 lb.
10. In a ship making 12 knots on a N. 15° E. course by compass, a point was sighted bearing N. 10° W., and after continuing to make good the same course and speed for 20 minutes the point bore N. 26° W. by compass.

Required—The distance the ship will pass off the point.

## 2. CHART.

Time allowed 3 hours.

1. i. Using deviation card No. 4, find the course to steer by compass from X to North Cape ; also the distance.
- ii. With the ship's head on the above-named compass course, Great Barrier Peak (2,330 ft.) bore by compass S. 48° E., and Poor Knights bore S. 50° W. by compass :  
Required—The position of the ship.
- iii. With the ship's head as above, Cape Brett bore by compass S. 56° W., and after continuing on the same course for 12 miles it bore S. 30° W. :  
Required—The position of the ship and the distance from Cape Brett at the time of taking the second bearing.

2. The bearing of two objects in transit was found on the chart to be S.W.  $\frac{1}{4}$  S. mag., but when brought in line on board they bore S.W.  $\frac{1}{4}$  W. by compass :  
Required—The deviation of the compass for the direction of the ship's head.
3. Required the times of high and low water, a.m. and p.m., at Port Russell on 12th May, 1925, by the tide-tables in the "New Zealand Nautical Almanac."

All the foregoing questions must be answered ; but this does not preclude the Examiner from putting any other questions of a practical nature.

### 187. Specimen Examination-paper for Second Mate (H.T.) :—

#### ARITHMETIC AND NAVIGATION.

Time allowed 2 hours.

1. Express in figures—Twenty-four millions seven hundred and two thousand ; five hundred and nine thousand and four.
2. Add the following quantities together : 1402, 86, 903, 7284, 16708 ; also add together 72498, 60382, 704, 208, 7.
3. From 6840298 take 3826989 ; from 684062 take 508349 ; from 1800426 take 99849 ; from 1638072 take 899708.
4. Multiply 9886 by 37 ; multiply 98486 by 3972.
5. Divide 38409687 by 3837 ; divide 943068 by 14.
6. Add the following quantities together : £8468 9s. 4d., £1306 3s. 10d., £1608 4s. 6d., £3089 11s. 7d. Also add together 9843 tons 16 cwt. 2 qr. 14 lb ; 4860 tons 13 cwt. 3 qr. 2 lb. ; 90 tons 18 cwt. 2 qr. 23 lb. ; 6028 tons 16 cwt. 1 qr. 3 lb.
7. From £6488 17s. 6 $\frac{1}{2}$ d. take £5840 3s. 9 $\frac{3}{4}$ d. ; and from 54833 tons 16 cwt. 2 qr. 2 lb. take 9808 tons 3 cwt. 0 qr. 4 lb.
8. Multiply the following quantities by 92 : £1840 4s. 6d. ; 284 tons 16 cwt. 3 qr. 4 lb.
9. Divide the following quantities by 67 : £134 2s. 10d. ; 6094 tons 3 cwt. 1 qr. 18 lb.
10. In a vessel steering south by compass and steaming 10 knots a point of land bore S. 15° W. by compass, and after making good the course and speed for 15 minutes the point bore S. 30° W. by compass :  
Required—The distance of the vessel from the point of land when abeam.

### 188. Specimen Set of Examination-papers for Mate (H.T.) :—

#### 1. ARITHMETIC AND NAVIGATION.

Time allowed 2 hours.

1. Express in figures—Five millions sixteen thousand seven hundred and six ; thirteen millions four thousand two hundred and one.
2. Add the following quantities together : 684092, 78064, 90284, 70987, 45298 ; also add together 4624, 30897, 604838, 908421, 904.
3. From 6087241 take 904563 ; from 64889 take 38421 ; from 778794 take 389006 ; from 8296 take 999.
4. Multiply 86298 by 999 ; multiply 64862 by 787.
5. Divide 984629 by 378 ; divide 8406823 by 9984.
6. Add the following quantities together : £724 14s. 3d. ; £680 19s. 6d. ; £280 13s. 10d. ; £60 4s. 10d. Also add together 9846 tons 13 cwt. 2 qr. 3 lb. ; 68 tons 3 cwt. 1 qr. 14 lb. ; 806 tons 3 cwt. 3 qr. 10 lb. ; 983 tons 19 cwt. 3 qr. 7 lb.
7. From £39802 14s. 6 $\frac{1}{2}$ d. take £986 17s. 7 $\frac{3}{4}$ d. ; from 6842 tons 13 cwt. 2 qr. 8 lb. take 747 tons 18 cwt. 3 qr. 9 lb.
8. Multiply the following quantities by 89 : £760 3s. 10 $\frac{1}{2}$ d. ; 6089 tons 18 cwt. 2 qr. 16 lb.
9. Divide the following quantities by 72 : £8049 3s. 6 $\frac{3}{4}$ d. ; 7284 tons 1 cwt. 1 qr. 2 lb.
10. On 20th January, 1925, long. by A/c 172° 50' E., the observed meridian altitude of the sun's lower limb was 70° 14'·5 north of the observer ; index error of sextant 2' 40" to add ; height of eye 27 ft. Compute the latitude.
11. On 15th May, 1925, at 06 h. 50 m., New Zealand mean time, at ship in lat. 41° 15' S., long. 176° 40' E., the sun rose bearing by compass N.E. :  
Required—The true amplitude and error of the compass ; also the deviation, the variation being 15° E.

12. A lighthouse is found to be 13 miles distant from the vessel :  
Find the angle on the bow to which it should be brought  
so as to enable the vessel to pass 4 miles off it.

## 2. CHART.

Time allowed—3 hours.

1. Deviation card 12 : In a vessel steaming towards Cape Brett Lt. Ho., steering by compass N. 30° W. at 9 knots, Henry Is. bore by compass S. 22° W. and Home Pt. extreme bore S. 75° W. by compass.  
State the position of the vessel, and the distance from Home Point.
2. From the position as found in question 1 set courses to reach a position with Coal Point bearing 310° 4 miles distant ; maintaining a distance of 1 mile off Cape Brett Lt. Ho. and 2 miles off outer end of the eastern island of the Cavalli Group. On the last course allow for a current which set 340° (N. 34° 5 W. mag.) at the rate of 2.5 knots.  
Required—The compass courses steered, the distance made good on each course, and the distance that the log should show when in final position supposing it to have been set at the position off Home Point.
3. When steering the second compass course Ngakotu Raranui Pt. bore by compass S. 6° W., and after continuing on the same course for 4 miles the south end of Cavalli Is. bore by compass S. 58° W. Assuming that the vessel has made good her course and distance between the bearings :  
State the position of the vessel and the distance from the south end of Cavalli Is. at the time of taking the second bearing.
4. The following horizontal angles were taken to determine the position of the ship : Between G and D, 42° 20' ; between D and F, 37° 40'.  
Required—The position of the ship by station pointer.
5. Arriving off Manukau Bar at 14 h. 00 m., New Zealand mean time, on 16th September, 1925, state the depth of water you would expect to find on the bar if the soundings on the chart showed 3½ fathoms.
6. Chart 695 : Find approximately (without the use of Admiralty or other tide tables) the time of high water on the afternoon of 14th June, 1925, off Stephens Island, and state also the direction of the tidal stream at 10 h. 00 m. on that day.

**189. Specimen Set of Examination-papers for Master (H.T.) :—**

## 1. ARITHMETIC AND NAVIGATION.

Time allowed 2 hours.

1. Express in figures—Eighteen millions seventy thousand and three ; seven hundred and three thousand five hundred and two.
2. Add the following quantities together : 48567, 30928, 6079, 405, 3268, also add together 4862, 90486, 382, 90, 2079.
3. From 7048629 take 6099893 ; from 92804 take 80993 ; from 721984 take 719932 ; from 4806 take 999.
- 4 Multiply 6439 by 47 ; multiply 2961 by 983.
5. Divide 8320968 by 4289 ; divide 68406 by 97.
6. Add the following quantities together : £62548 3s. 7d., £4862 10s. 8d., £1984 3s. 6½d., £1829 4s. 11¾d. Also add together 6284 tons 2 cwt. 3 qr. 22 lb. ; 184 tons 2 cwt. 1 qr. 3 lb. ; 5086 tons 18 cwt. 2 qr. 14 lb. ; 40527 tons 16 cwt. 2 qr. 18 lb.
7. From £8726 14s. 11¾d. take £908 16s. 3¾d. ; from 14872 tons 18 cwt. 1 qr. 9 lb. take 8042 tons 19 cwt. 1 qr. 10 lb.
8. Multiply the following quantities by 92 : £872 18s. 2½d. ; 6432 tons 14 cwt. 2 qr. 16 lb.
9. Divide the following quantities by 87 : £943 11s. 6d. ; 804 tons 13 cwt. 3 qr. 17 lb.
10. On 2nd February, 1925, long. by A/c 176° E., the observed meridian altitude of the sun's lower limb was 72° 18' north of observer ; index error of sextant 1' 10" to subtract ; height of eye 22 ft.  
Compute the latitude.

11. On 17th March, 1925, at 18 h. 15 m. New Zealand mean time at ship in lat.  $44^{\circ} 30' S.$ , long.  $172^{\circ} 21' E.$ , the sun set bearing by compass W.S.W.

Required—The true amplitude and error of the compass, also the deviation, the variation being  $17.9^{\circ} E.$

12. In a vessel steering S.E. by compass and steaming 10 knots a light is observed bearing S.S.E. by compass, and after making good the course and speed for 24 minutes the light was observed to bear south by compass.

Required—The course to be steered to enable the vessel to pass 2 miles off the light.

## 2. NAUTICAL ASTRONOMY AND THE COMPASS.

Time allowed 3 hours.

1. 1925, August 20th: Ship in D.R. position, lat.  $35^{\circ} S.$ , long.  $172^{\circ} E.$  Shortly after sunset the observed altitude of the star *a* Scorpii (Antares) on the meridian was  $78^{\circ} 45'.$  Height of eye, 28 ft. Index error of sextant,  $2' 30''$  off the arc.

Required—The latitude.

2. A vessel steering N.N.W. observed a shore light bearing N., and after steaming for 5 miles the light bore N.N.E.

Find the distance the vessel will be from the light when it is abeam, assuming the vessel to make good the course steered.

3. 1925, on 31st January, at 07 h. 10 m. N.Z. mean time, at ship in lat.  $36^{\circ} 4' S.$ , long.  $172^{\circ} 48' E.$ , the sun bore by compass N.  $76^{\circ} E.$

Required—The true bearing of the sun by time-azimuth tables, and the error and deviation of the compass, the variation being  $16^{\circ} E.$

4. The bearing of two objects when in line with each other was found on the chart to be S.  $80^{\circ} W.$  mag., but when brought in line on board they bore S.  $76^{\circ} W.$  by compass.

Required—The deviation of the compass for the direction of the ship's head at the time.

5. When taking a meridian altitude, how do you know when the sun is on the meridian; or, in other words, when it is noon?
6. How does the sun bear (true and magnetic) when on the meridian of an observer in these latitudes (home-trade limits).
7. What do you mean by the "deviation" of the compass, and how is it caused?
8. Having determined the deviation, how do you know when it is easterly and when westerly?
9. How could you find the deviation of your compass when in port or when sailing along a coast?
10. Name some suitable objects by which you could readily obtain the deviation of your compass when sailing along the coasts, or the channels you have been accustomed to use.
11. What means are there for checking the deviation of your compass by night?
12. Do you expect the deviation to change? If so, state under what circumstances.
13. What is meant by the "variation" of the compass, and what is the cause of it?

## 3. NAUTICAL ASTRONOMY.

Time allowed 2 hours.

1. 1925, June 10th, p.m., in D.R. long.  $173^{\circ} 30' E.$ , the observed altitude of the sun's lower limb was  $12^{\circ} 4'$  when a chronometer indicated 05 h. 03 m. 20 s. Eye elevated 30 ft. Sextant error  $2.0$  off the arc. The chronometer was 14 m. 10 s. fast of M.T.G. Later, after the ship had made 12 miles on a  $130^{\circ}$  course, the latitude by meridian altitude of the star Regulus was found to be  $40^{\circ} 18' S.$

Required—The longitude by chronometer at the time when the meridian altitude of Regulus was observed.

(Or, at the Examiner's discretion, as an alternative to Question 1) :

On 10th August, 1925, at 18 h. 10 m. New Zealand mean time, at ship in approximate position lat.  $47^{\circ}$  S., long.  $171^{\circ}$  E., the observed altitude of the star Achernar was  $17^{\circ} 2'$ . Height of eye, 28 ft. Index error,  $2'4$  to add. After steering west (true) for 12 miles, Nuggets Pt. Lt. was sighted bearing N.  $40^{\circ}$  W. (true).

Required—The position of the ship when the light was sighted.

2. On 10th March, 1925, at 04 h. 15 m., New Zealand mean time, at ship in lat.  $45^{\circ} 0'$  S., long.  $171^{\circ} 50'$  E., the star Altair bore by compass E.N.E.

Required—The true azimuth and error of the compass by time azimuth tables ; and, supposing the variation to be  $19^{\circ}$  E., find the deviation of the compass for the direction of the ship's head at the time.

#### 4. CHART.

Time allowed 3 hours.

1. Deviation card 12 : In a vessel steaming towards Cape Brett Lt. Ho. steering by compass N.  $30^{\circ}$  W. at 9 knots, Henry Island bore by compass S.  $22^{\circ}$  W. and Home Point extreme bore S.  $75^{\circ}$  W. by compass.

State the position of the vessel, and the distance from Home Point.

2. From the position as found in question 1, set course to reach a position with Coal Point bearing  $310^{\circ}$  4 miles distant, maintaining a distance of 1 mile off Cape Brett Lt. Ho. and 2 miles off the outer end of the eastern island of the Cavalli Group. On the last course allow for a current which set  $340^{\circ}$  (N.  $34^{\circ}5$  W. mag.) at the rate of 2.5 knots.

Required—The compass courses steered and the distance made good on each course, and the distance that the log should show when in final position supposing it to have been set at the position off Home Point.

3. When steering on the second compass course Ngakotu Raranui Pt. bore by compass S.  $6^{\circ}$  W., and after continuing on the same course for 4 miles the south end of Cavalli Is. bore by compass S.  $58^{\circ}$  W. Assuming that the vessel has made good her course and distance between the bearings :

State the position of the vessel and the distance from the south end of Cavalli Is. at the time of taking the second bearing.

4. The following horizontal sextant angles were taken to determine the position of the ship : Between G and D,  $42^{\circ} 20'$  ; between D and F,  $37^{\circ} 40'$ .

Required—the position of the ship by station pointer.

5. Arriving off Manukau Bar at 14 h. 00 m. New Zealand mean time on 16th September, 1925, state the depth of water you would expect to find on the bar if the soundings on the chart showed  $3\frac{1}{2}$  fathoms.

6. Chart 695 : Find approximately (without the use of Admiralty or other tide tables) the time of high water on the afternoon of 14th June, 1925, off Stephens Island, and state also the direction of the tidal stream at 10 h. 00 m. on that day.

#### 190. Specimen Set of Examination-papers for Second Mate (F.G.) :—

##### 1. NAVIGATION AND NAUTICAL ASTRONOMY.

Time allowed 3 hours.

Draw suitable figures and give the necessary description for each problem.

1. In lat.  $41^{\circ} 45'$  the departure made good was 186 m.

Required—The difference of longitude by parallel sailing.



2. Day's work : 1925, July 3rd, at noon, departure taken from Cape Blanco in lat.  $42^{\circ} 52' N.$  and long.  $124^{\circ} 47' W.$ , which bore by compass  $N. 40^{\circ} E.$ , 10 m., ship's head being  $S. 65^{\circ} W.$  by compass, deviation and variation as per log, the ship sailing as follows during the next 24 hours :—

Hours	Compass Courses	Knots	10ths	Winds	Lee-way	Devn	Remarks &c.
1	S $65^{\circ} W$	20	5	SSE	O	$5^{\circ} E$	Varn $20^{\circ} E$
2	"	"	"	"	"	"	
3	"	"	"	"	"	"	
4	"	"	"	"	"	"	
5	"	20	5	"	"	"	
6	"	"	"	"	"	"	
7	"	"	"	"	"	"	
8	"	"	6	"	"	"	
9	"	20	—	"	"	"	
10	"	"	5	"	"	"	
11	"	"	"	"	"	"	
12	"	"	—	"	"	"	
1	"	21	—	"	"	"	
2	"	"	—	"	"	"	
3	"	"	—	"	"	"	
4	"	"	—	"	"	"	
5	"	20	5	"	"	"	
6	"	"	"	"	"	"	
7	"	"	"	"	"	"	
8	"	"	"	"	"	"	
9	"	20	"	"	"	"	
10	"	"	"	"	"	"	
11	"	"	"	"	"	"	
12	"	"	"	"	"	"	

Find the course and distance made good from Cape Blanco, and the latitude and longitude in by dead reckoning, also the set and drift experienced during the day's run supposing the ship was found to be in lat.  $42^{\circ} 30' N.$ , long.  $136^{\circ} 10' W.$  by observation at noon of 4th July.

3. On 8th June, 1925, in long.  $110^{\circ} 15' W.$ , the observed meridian altitude of the sun's L.L. was  $61^{\circ} 56'$ , bearing north, index error,  $1' 30''$  to add, height of eye 21 ft.

Required—The latitude.

4. On 18th June, 1925, in lat. by account  $39^{\circ} 17' S.$ , long.  $47^{\circ} 16' E.$ , time by chronometer 04 h. 11 m. 13 s., which was 3 m. 18 s. slow for mean time at Greenwich, the sun rose bearing by compass  $E. 3^{\circ} S.$

Required—True amplitude, and error of the compass; and, supposing the variation to be  $24^{\circ} 30' W.$ , required the deviation of the compass for the direction of the ship's head.

5. On 27th May, 1925, in lat. by account  $51^{\circ} 58' N.$ , long.  $54^{\circ} 56' W.$ , when a chronometer correct for mean time at Greenwich indicated 19 h. 35 m. 00 s., the sun bore by compass  $N. 62^{\circ} W.$

Required—The true azimuth and error of the compass, by time azimuth tables; and, supposing the variation to be  $32^{\circ} 30' W.$ , required the deviation of the compass for the direction of the ship's head.

6. Define the terms "azimuth," "amplitude," and "refraction."

2. NAUTICAL ASTRONOMY AND TRIGONOMETRY.

Time allowed 2 hours.

Draw suitable figures and give the necessary description for each problem.

1. On 18th May, 1925, a.m. at ship, the observed altitude of the sun's L.L. was  $17^{\circ} 23'$  height of eye, 19 ft., the sun's bearing

by compass N. 65° E., time by a chronometer 04 h. 58 m. 27 s., which was slow for mean noon at Greenwich, 20th April, 1925, 1 m. 10 s., and losing 2.8 s. daily. The latitude by meridian altitude at noon being 39° 38' S., the ship having run 070° 41 m., between the time of taking the observation for longitude and noon.

Required—The longitude by chronometer at the time of taking the observation, also brought up to noon.

Required also—The true alt.-azimuth, and error of the compass; and, supposing the variation to be 26° W., required the deviation of the compass for the direction of the ship's head.

2. On board a ship steaming south at 10 knots, a lighthouse was observed bearing S. 54° E. After steaming for 36 min., the same lighthouse was observed to bear S. 80° E.

Find the distance of the ship from the lighthouse at the second observation.

3. Draw a figure and prove that  $\sin 45^\circ = \sqrt{\frac{1}{2}}$

### 3. CHART.

Time allowed 3 hours.

1. Using Deviation Card No. XIV, find the courses to steer by compass from a position with Inisheer Lt.-Ho' bearing N. 8° W. (mag.), distance 3 m., to reach a position with Fastnet Lt.-Ho' bearing N.E. (mag.), distance 6 m., and giving the distance run on each course.

*Note.*—Take the ship from position off Inisheer to the position off Fastnet on three courses, altering course when Inishtearaght Lt.-Ho' bears abeam on approaching course, distant 6 m., again altering course when Gull Rock Lt.-Ho' bears abeam, distant 12 m.

2. With the ship's head on the first above-named compass course, Loop Head Lt.-Ho' bore S. 88° E. by compass and Sybil Head bore in transit with Clogher Head, find the ship's position and the set and drift experienced, the ship having run 4 hours on this course, steaming 10 knots.
3. With the ship's head on third above-named compass course, Gull Rock Lt.-Ho' bore by compass S. 76° E., and after continuing on the same course 2 hours, it bore by the same compass N. 29° E., find the position of the ship and her distance from Gull Rock Lt.-Ho' at the time of taking the second bearing, making due allowance for a current which set west (mag.) 2 knots, ship steaming 8 knots.
4. Find the course to steer by compass from the position where course is altered off Inishtearaght (*see* Question 1), to position where course is altered off Gull Rock, to counteract the effect of a current setting S. 62° W. (mag.) at the rate of 2 knots, ship making by log 9 knots. Find also the length of time it would take the ship to reach the given position.
5. The following horizontal sextant angles were taken to determine the ship's position: Fastnet Lt.-Ho'. 79°, Galley Head Lt.-Ho'. 40°, Old Head of Kinsale Lt.-Ho'.

Find the latitude and longitude, using a station pointer.

6. On 6th March, 1925, at 08 h. 40 m., standard time, being off Avonmouth, took a cast of the lead.

Required—The correction to be applied to the depth obtained before comparing it with the depth given on the chart.

### 4. ESSAY.

Time allowed 1 hour.

*A suitable subject will be selected by the Examiner.*

### 191. Specimen Set of Examination - papers for First Mate (F.G.):—

#### 1. NAVIGATION AND NAUTICAL ASTRONOMY.

Time allowed 3 hours.

*Draw suitable figures and give the necessary description for each problem.*

1. On 28th April, 1925, a.m. at ship, the observed altitude of sun's L.L. was 22° 27', index error 1' 10" to add, height of eye 23 ft.,

the sun's bearing by compass N.  $35^{\circ}$  E., time by a chronometer (27th April) 22 h. 29 m. 36 s., which was slow for mean noon at Greenwich, 4th March, 1925, 4 m. 44.8 s., and losing 2.3 s. daily. The latitude by meridian altitude at noon being  $40^{\circ} 31'$  S., the ship having run 033°, 37 m., between the time of taking the observation for longitude and noon.

Required—The longitude by chronometer at the time of taking the observation; also brought up to noon.

Required also the true alt.-azimuth and error of the compass; and, supposing the variation to be  $13^{\circ} 30'$  E., required the deviation of the compass for the direction of the ship's head.

2. Required the true course and distance from B to H, by calculation on Mercator's principle; also the compass course, assuming the variation to be  $20^{\circ}$  W., and deviation of the compass  $27^{\circ} 30'$  E. Lat. of B,  $46^{\circ} 45'$  N.; long.  $53^{\circ} 00'$  W. Lat. of H,  $34^{\circ} 22'$  S.; long.  $18^{\circ} 29'$  E.
3. On 21st August, 1925, the observed meridian altitude of the star  $\alpha$  Pavonis was  $35^{\circ} 57'$ , south of the observer, height of eye 28 ft., and index error  $3' 00''$  to subtract.

Required—The latitude.

4. On 21st August, 1925, in lat. by account  $2^{\circ} 35'$  S. and long.  $52^{\circ} 45'$  E., compute the approximate observed meridian altitude of  $\alpha$  Aquilæ (Altair), as a guide to setting the sextant for observation, height of eye 28 ft., and index error of sextant  $3' 00''$  to subtract.
5. Supposing you are not familiar with the stars and wish to take an observation, find the names (from the Nautical Almanac) of the stars, not less bright than the second magnitude, that will be within half an hour east of your meridian, above the Pole and above the horizon, at about 04 h. 10 m., apparent time at ship, on 17th December, 1925, in lat.  $40^{\circ} 20'$  N. and long.  $5^{\circ} 30'$  E.

Required also approximately the hour angle of each of the stars, and state also whether they will be to the north or south of your zenith when passing the meridian.

6. Define the terms "zenith," "nadir," and "prime vertical."

## 2. NAUTICAL ASTRONOMY AND TRIGONOMETRY.

Time allowed 2 hours.

*Draw suitable figures and give necessary description for each problem.*

1. On 15th May, 1925, at ship, being in lat. by account  $4^{\circ}$  S., long  $85^{\circ}$  W., required the approximate apparent time at ship when the star  $\alpha$  Boötis (Arcturus) would be on the meridian.
2. On 10th May, 1925, in lat. by account  $43^{\circ} 13'$  S., long.  $136^{\circ} 19'$  E., the observed altitude of the sun's L.L., near the meridian, was  $28^{\circ} 33'$ , north of the observer, height of eye 24 ft., time by a chronometer 02 h. 18 m. 14 s., which was 2 m. 02.3 s. slow of mean time at Greenwich.

Required—The latitude of the ship at the time of taking the observation; also required the latitude at noon, the ship having run  $031^{\circ}$ , 7 m., between the time of taking the observation and noon.

3. Two ships, A and B, steam from positions  $13\frac{1}{2}$  m. apart, North 15 knots and East 18 knots, respectively. Find the bearing and distance of A from B one hour later, supposing that B bore N.  $36^{\circ}$  W. from A at the commencement of the run.
4. Draw a figure and prove that  $\tan \frac{1}{2}A = \frac{\sec A \cos A}{\cot A}$

## 3. DOUBLE ALTITUDE (POSITION LINES) PROBLEM.

Time allowed 2 hours.

*Draw a suitable figure and give the necessary description for this problem.*

On 27th January, 1925, a.m. at ship, in lat. by account  $46^{\circ} 50'$  N., long. by account  $151^{\circ} 30'$  E., when a chronometer (corrected) indicated mean time at Greenwich (26th January) 23 h. 42 m. 21 s., the observed altitude of the sun's L.L. was  $17^{\circ} 19'$ , and again p.m. on the same day, when the same chronometer (corrected) indicated 03 h. 15 m. 07 s., the observed altitude of the sun's L.L. was  $22^{\circ} 54'$ , height of eye at

each observation being 30 ft., the ship having made 32 m. on a 258° course during the interval between the observations.

Required—The line of position, and the true bearing of the sun, when the first altitude was observed; and the position of the ship when the second altitude was observed.

#### 4. CHART.

Time allowed 3 hours.

1. A ship in lat. by D.R. 55° 6' N., long. by observation 9° 2' W., the true bearing of the sun being East, obtained a wireless bearing from sea view 260° (sea view lat. 50° 22' N., long. 7° 19½' W.).  
Using deviation-card No. 10, find the course to steer by compass from this position to a position off Belfast Lough with Black Head bearing 260° and Corsewall Pt. 032°, also the distance on each course. NOTE.—Alter course when Inishtrahull Lt. is abeam on approaching course distant 5 m., and again when crossing the meridian of 6° west longitude, passing 2 m. off Altacarry Hd. Lt. when abeam.
2. With the ship's head on the first compass course, Tory Island Lt. bore by compass S. 65° W., and the horizontal sextant angle it made with Fanad Pt. was 67°.  
Find the ship's position, also the set and drift experienced, supposing the expected position to be with Fanad Pt. bearing S. 3° W. (mag.), distant 10 m.; also, the distance the ship passed off Tory Island when abeam.
3. With the ship's head on the third compass course, Altacarry Hd. Lt. bore by compass N. 44° W., and after continuing on the same course one hour Sanda Is. Lt. bore N. 44° E.  
Find the position of the ship and her distance from Sanda Island Lt., making due allowance for tidal stream one hour before H.W. at Dover, ship steaming 12 knots.
4. Find the course to steer by compass from Altacarry Hd., bearing 295°, Mull of Cantyre bearing 043°, to Black Hd., bearing 260°, distant 10·5 m., to counteract the effect of a current which set 157° at the rate of 2·8 m. per hour, the ship making by log 12 knots; also, the time it would take to reach the latter position.
5. The following horizontal sextant angles were taken to determine the ship's position: Mew Island Lt. 45°, Black Hd. Lt. 44°, Maiden's Lt.  
Find the latitude and longitude, using a station pointer.
6. On 3rd March, 1925, 1 hour before H.W. p.m., being off Belfast Lough, took a cast of the lead:  
Required—The correction to be applied to the depth obtained by the lead-line before comparing it with the depth marked on the chart.

#### 5. METEOROLOGY.

Time allowed 1½ hours.

1. Describe the atmospheric conditions which (a) increase terrestrial radiation, and (b) retard terrestrial radiation.
2. In what localities have the sun's rays the greatest effect? Give the reasons for this, and state how these effects are modified in certain places.
3. How does the observed velocity of the wind compare with the theoretical velocity as calculated from the gradient? What reasons have been assigned for the difference so found?
4. What proportion of an iceberg is immersed? How is this proportion arrived at?
5. Describe fully the tracks usually followed by cyclones in the Bay of Bengal, stating where they originate and the months during which they are most likely to occur.
6. When there is reason to believe that a revolving storm is approaching, what two points is it necessary for seamen to know, and how can these best be determined?

192. Specimen Set of Examination-papers for Master (F.G.) :—

1. NAVIGATION AND NAUTICAL ASTRONOMY.

Time allowed 3 hours.

Draw suitable figures and give the necessary description for each problem.

1. Day's work : 7th May, 1925, at 6 p.m. Muckle Flugga Lt.-Ho., in lat.  $60^{\circ} 51' \cdot 3$  N. and long.  $0^{\circ} 53'$  W., bore four points before the starboard beam, and at 7 p.m. was abeam ; deviation and variation as per log :—

Hours	Compass Courses	Miles	10ths	Winds	Lee-way	Devn	Remarks &c
1	N54°E	11	5	SSE	0	1°E	Varn 18°W
2	"	10	"	"	"	"	
3	"	10	"	"	"	"	
4	"	10	"	"	"	"	
5	N76°E	7	—	North	8°	4°W	
6	"	7	—	"	"	"	
7	"	7	—	"	"	"	
8	"	7	—	"	"	"	
9	"	8	—	"	"	"	
10	"	8	—	"	"	"	
11	"	8	5	"	"	"	
12	"	8	"	"	"	"	
1	S87°E	12	—	South	0	7°W	Allow for a current setting S15°W magnetic 18 m. during this 24 hours
2	"	12	—	"	"	"	
3	"	12	5	"	"	"	
4	"	12	"	"	"	"	
5	"	12	—	S by W	"	"	
6	"	12	—	"	"	"	
7	"	11	4	"	"	"	
8	"	11	6	"	"	"	
9	"	11	4	"	"	"	
10	"	11	6	"	"	"	
11	"	11	—	"	"	"	
12	"	11	—	"	"	"	

Find the course and distance made good from the previous noon, and the latitude and longitude in at noon of the 8th May.

2. On 29th April, 1925, in lat.  $49^{\circ} 20'$  N., long.  $130^{\circ} 00'$  W., time by a chronometer 17 h. 49 m. 36 s., which was 11 m. 36 s. fast of mean time at Greenwich, the sun bore by compass east.

Required—The true azimuth, and error of the compass, by the Time Azimuth Tables ; and, supposing the variation to be  $25^{\circ} 30'$  E., required the deviation of the compass for the direction of the ship's head.

3. On 2nd November, 1925, in lat. by account  $18^{\circ} 36'$  N., long. by account  $64^{\circ} 45'$  E., the observed altitude of the star  $\alpha$  Arietis (Hamel), east of the meridian, was  $36^{\circ} 16'$ , time by a chronometer 14 h. 53 m. 06 s., which was fast for mean noon at Greenwich, 18th September, 1925, 3 m. 47 s., and losing 1.8 s. daily, height of eye 26 ft., index error of sextant  $3' 00''$  to add.

Required—The longitude by chronometer.

4. On 5th June, 1925, in lat. by account  $51^{\circ} 28'$  S., long.  $79^{\circ} 16'$  W., the observed altitude of sun's L.L., near the meridian, was  $15^{\circ} 08'$ , north of the observer, height of eye 40 ft., time by a watch 18 h. 09 m. 47 s., which had been found to be fast of apparent time at ship 5 h. 23 m. 30 s., but the ship had made  $19'$  difference of longitude to the westward since the determination of the error on apparent time at ship.

Required—The latitude of the ship at the time of taking the observation ; also required the latitude at noon, the ship having run  $016^{\circ}$ , 11 m., between noon and the time of taking the observation.

2. NAUTICAL ASTRONOMY AND TRIGONOMETRY.

Time allowed 2 hours.

Draw suitable figures and give the necessary description for each problem.

1. On 8th June, 1925, in long.  $57^{\circ} 45'$  E., the observed meridian altitude of the moon's L.L. was  $70^{\circ} 40'$ , south of the observer, index error  $3' 20''$  to add, height of eye 28 ft.

Required—The latitude.

2. Having taken the following compass bearings of a distant object, find the object's magnetic bearing and thence the deviation:—

MAGNETIC BEARING REQUIRED.

Ship's Head by Standard Compass	Bearing of Distant Object by Standard Compass	Deviation required	Ship's Head by Standard Compass	Bearing of Distant Object by Standard Compass	Deviation required
North	N34°W		South	N66°W	
NE	N47°W		SW	N49°W	
East	N64°W		West	N36°W	
SE	N73°W		NW	N31°W	

3. With the deviations as above, construct a curve of deviations on a Napier's diagram, and give the courses you would steer by the standard compass to make the following courses, magnetic: Magnetic courses—NNE, SE by E, WSW, NW by W. Compass courses required.
4. A ship's mast measures vertically 124 ft. from trunk to water-line. Required—The angle to which a sextant must be set for another ship to maintain station on her at a distance of one cable, height of observer's eye being 30 ft.

5. Draw a figure and prove that  $\frac{1}{\sqrt{1 + \cot^2 A}} = \sqrt{1 - \frac{1}{\sec^2 A}}$

3. GREAT-CIRCLE SAILING.\*

Time allowed 2 hours.

Find the initial course and distance on the arc of a great circle from Y to Z: Lat. of Y, 34° 10' S.; long. of Y, 25° 42' E. Lat. of Z, 20° 00' S.; long. of Z, 105° 10' E.

Find the latitude and longitude of vertex and the latitude at which the track of the great circle intersects the meridians, passing through the 40th degree of east longitude and every 20° of longitude in succession until arriving at Z. Explain briefly how the course and distance from one point to another is then found.

4. COMPASS-DEVIATION.

Time allowed 1½ hours.

*Diagrams should be drawn where necessary to illustrate the answers.*

1. What is meant by "deviation," and how would you determine whether the deviation was easterly or westerly?
2. Describe the meaning of the term "semicircular deviation," stating by what coefficients it is represented, and how you determine when they are plus (+) and when minus (-).
3. State clearly what rules must be observed when placing compensating-magnets and soft iron to correct a compass, and what may be the result if these rules are not observed.
4. If coefficient B be corrected by means of a permanent magnet only, would you expect the compensation to remain correct when the ship changes her magnetic latitude? State your reasons.
5. Supposing that it is possible for you to move your correcting-magnets, describe how, on the open sea, you would proceed to adjust your compass.
6. If a ship is beating to windward when she tacks, under what circumstances will the heeling-error retain the same name, and under what circumstances will it take the contrary name?

5. NAVAL ARCHITECTURE AND STABILITY.

Time allowed 1½ hours.

1. What are the chief functions of the garboard strake, and how is it fitted to a (a) flat plate keel, (b) side bar keel, (c) bar keel?
2. Describe how transverse bulkheads are plated, stiffened, and connected to the shell plating, and how they are made water-tight.

\* One of these papers will be omitted.

3. Which is the best arrangement for uniting web frames and stringers at their intersections? Give a sketch in illustration.
4. A vessel was inclined, in smooth water, to ascertain her initial stability, when it was found that by moving a weight of 40 tons across the deck a distance of 20 ft. she heeled from the vertical to an angle of  $4^\circ$ . Her displacement being 7,500 tons, what was her metacentric height?
5. Find by Simpson's "First Rule" the area of the waterplane of a vessel 200 ft. long whose half-ordinates measure 0.4, 7.6, 10.4, 14.8, 15.2, 13.6, 10.8, 7.8, and 2.2 ft. respectively.

#### 6. METEOROLOGY.\*

Time allowed  $1\frac{1}{2}$  hours.

1. What are the principal causes which disturb the equilibrium of the atmosphere and produce winds?
2. What effect has height upon the temperature of the air? State the reason for this.
3. What are gusts and squalls, and how are they caused?
4. Describe what is known as a V-shaped depression.
5. State which is the dangerous and which the navigable semicircle in tropical revolving storms. Give your reasons for this.
6. Your ship is hove to on the starboard tack, heading north in the Northern Hemisphere, and the indications lead you to believe that a cyclone is approaching: supposing the wind to change to the north-east, what action would you take? State your reasons.

#### 7. CHART.

Time allowed 3 hours.

1. Early one morning during neap tides and about half an hour before high water at Dover, when steering S.  $30^\circ$  W. by compass, Great Castle Head lights were observed in transit bearing N.  $63^\circ$  E. The log then registered  $97\frac{1}{2}$  m.  $16\frac{1}{2}$  minutes later the red sector of Smalls light was entered, and after an interval of 46 minutes the light turned white, log 110. The course was then altered to N.  $4^\circ$  E. by compass. On this course South Bishop Lt.-Ho. and Hill 444 (Ramsey Island) were observed in transit when abeam. When the log showed 122 the course was altered to N.  $63^\circ$  E. by compass, and soon afterwards Ramsey Hill opened eastward of North Bishop, bearing S.  $19^\circ$  E. When the log showed 146, Strumble Head Lt.-Ho. bore S.  $3^\circ$  W. by compass, and Kemmaes Head bore S.  $71^\circ$  E. by the same compass.

Project the above traverse, making due allowance for tidal drift as indicated on the chart, and find the position of the ship at the time of leaving the red sector of Smalls light. Find also the distances from South Bishop and Strumble Head light-houses when abeam, the total distance made good, and the average speed, and also the deviation on each course steered.

2. Find the course to steer by compass, using deviation-card No. 5, in order to counteract the effect of the tidal stream as indicated on the chart 4 hours after high water at Dover, 10th September, 1925, ship steaming 12 knots, to reach Mid-channel Rock buoy, from the following position: Smalls Lt.-Ho.  $57^\circ$ , Barrels Rock  $46^\circ$ , Grassholm I. right extreme.
3. On 7th September, 1925, at 06 h. 45 m. standard time, being off Fishguard, took a cast of the lead and found the depth to be 19 fathoms:

Required—The depth marked on the chart in the position when the cast was obtained.

#### 8. ESSAY.\*

Time allowed 2 hours.

*A suitable technical subject will be selected by the Examiner.*

### 193. Specimen Set of Examination-papers for Extra Master:—

#### 1. NAVIGATION AND NAUTICAL ASTRONOMY.

Time allowed 3 hours.

1. On 15th January, 1925, at 19 h. 03 m. apparent time at ship, in lat. by account  $34^\circ 58'$  S., long.  $85^\circ 45'$  E., the sun set bearing by compass S.  $76^\circ$  W.

\* One of these papers will be omitted.

Required—True amplitude, and error of the compass; and, supposing the variation to be  $22^{\circ} 30'$  W., required the deviation of the compass for the direction of the ship's head.

2. Required the true course and distance from B to C by calculation on Mercator's principle; also the compass course, assuming the variation to be  $10^{\circ}$  E., and the deviation of your compass  $17^{\circ}$  W.: Lat. of B,  $36^{\circ} 22'$  S.; long.  $175^{\circ} 33'$  E. Lat. of C,  $48^{\circ} 24'$  N.; long.  $124^{\circ} 46'$  W.
3. On 31st March, 1925, in long.  $140^{\circ} 20'$  W., when a chronometer (corrected) indicated mean time at Greenwich 12 h. 24 m. 20 s., the observed altitude of the Pole Star, out of the meridian, was  $49^{\circ} 30'$ , height of eye 21 ft.

Required—The latitude.

4. On 25th August, 1925, at about 03 h. 00 m. at ship, in lat. by account  $51^{\circ} 40'$  N., long. by account  $150^{\circ} 15'$  W., when a chronometer showed 13 h. 06 m. 52 s., which was fast for mean time at Greenwich, 2nd July, 1925, 10 m. 33 s., and losing 1.5 s. daily, the observed altitude of the star  $\alpha$  Cephei (Alderamin) was  $57^{\circ} 45'$  west of meridian, and the observed altitude of the star Tauri (Nath) taken at the same time was  $39^{\circ} 04'$  east of meridian, height of eye 22 ft.

Required—The position of the ship and the true bearing of the stars.

## 2. GENERAL MATHEMATICAL PAPER.

Time allowed 3 hours.

1. On 28th May, 1925, in lat.  $12^{\circ} 15'$  N., long.  $112^{\circ} 20'$  W., when a chronometer, correct for mean time at Greenwich, indicated 15 h. 22 m. 19.6 s., find the sun's true altitude and azimuth.
2. Find a value for the angle A which will satisfy the following equation:—

$$\operatorname{cosec}^2 A + \frac{1}{\sin A} + \frac{\sqrt{1 + \tan^2 A}}{\tan A} = 19$$

3. To an observer in the same horizontal plane as the base of a perpendicular cliff 250 ft. high, a flagstaff 50 ft. high on the top of the cliff subtended the same angle as that subtended by an object 10 ft. high at the base of the cliff.

Find the distance of the observer from the cliff.

4. Draw a figure and prove that

$$\tan A = \frac{\sin 2A}{2 \cos^2 A}$$

5. Prove that if two straight lines cut one another, the vertically opposite angles are equal.
6. Find the area of a quadrilateral inscribed in a circle, the sides of the quadrilateral being 10, 8, 9, and 7 ft. respectively.

## 3. MAGNETISM.

Time allowed 2 hours.

1. Assuming coefficient B to be  $-6^{\circ} 30'$ , and coefficient C to be  $-10^{\circ} 30'$ :

Required—The direction of the ship's head whilst building, assuming that B and C resulted altogether from permanent magnetism.

2. The deviations observed with ship's head by compass being as follows, compute the value of the coefficients A, B, C, D, and E, and from them find the deviation for ship's head by compass S.  $31^{\circ}$  W. :—

At North, deviation $16^{\circ} 00'$ W.	At South, deviation $16^{\circ} 00'$ E.
„ N.E., „ $1^{\circ} 34'$ W.	„ S.W., „ $12^{\circ} 34'$ E.
„ East, „ $6^{\circ} 00'$ E.	„ West, „ $6^{\circ} 00'$ W.
„ S.E., „ $10^{\circ} 04'$ E.	„ N.W., „ $21^{\circ} 04'$ W.

3. On 6th October, 1925, at 05 h. 20 m. apparent time at ship, in lat.  $30^{\circ} 30'$  N., long.  $135^{\circ} 27'$  W., the star  $\alpha$  Hydrae (Alphard), east of meridian, bore by compass S.  $79^{\circ} 30'$  E.

Compute the true azimuth and thence the deviation of the compass, assuming the variation to be  $14^{\circ} 10'$  E.

4. With the ship's head N.E. by N. by compass, heeling to port  $6^{\circ}$ , the heeling-error was found to be  $7^{\circ} 00'$  easterly.

Required—The probable heeling-error with ship's head S. by E., by the same compass, and heeling  $4^{\circ}$  to starboard.



5. Draw a sketch and show how polarity is developed in a solenoid when an electric current is passed through it.
6. Describe an azimuth mirror and how you would use it. How would you test it for instrumental error?
7. When swinging your ship, if it be required to construct deviation tables for two or more compasses situated in different parts of the vessel, describe the process and how you would employ the Napier's diagram for this purpose.
8. Would you expect the compass to be more seriously affected by any given disturbing force when near the magnetic equator or near the poles? State the reason.

4. CHART-CONSTRUCTION.

Time allowed 3 hours.

Construct a Mercator's chart extending from lat. 35° 10' S. to 37° 20' S., and from long. 24° 45' E. to 27° 30' E., to a scale of 4 in. to 1 degree of longitude, inserting a true compass, subdividing the marginal scales of latitude and longitude to 5' and the compass to degrees. Then, supposing a ship in lat. 37° 10' S., long. 25° 10' E., sails the following courses and distances—030°, 30 m.; 110°, 35 m.; 015°, 60 m.; and 320°, 30 m.—plot the courses and distances on the chart, and find therefrom the position of the ship when the final course was completed.

5. GENERAL KNOWLEDGE.

Time allowed 2 hours.

1. Describe the essential features of Class I, II, and III lifeboats.
2. State the requirements in respect to davits and boats of a cargo-steamer carrying a crew of 60 hands all told.
3. A bar of metal alloy weighs 2,240 grammes, but when weighed in water weighed only 2,040 grammes.  
Find the volume of the bar and its specific gravity.
4. Explain the difference between temperature and heat.
5. Why is the sound of a submarine fog-bell more reliable than the sound of an ordinary surface fog-signal?
6. How is a gnomonic chart constructed, and for what purpose is it used?
7. State briefly how compensation for temperature is effected in a chronometer, and what the result would be if this compensation were not made.
8. What is meant by "priming" and "lagging" of the tides?

6. NAVAL ARCHITECTURE AND STABILITY.

Time allowed 3 hours.

1. Give a sketch of the midship section of a steam-vessel, showing all the principal parts. Name the type of vessel selected.
2. What precautions are taken, from a structural point of view, to compensate for the concentration of weight in the machinery space of a vessel with a cellular double bottom?
3. State how you would determine the position in which to place a weight so that the draught of the vessel aft would not be affected by the addition or gradual consumption of that weight.
4. Calculate the moment of inertia of the waterplane of a vessel whose length is 320 ft. and whose half-breadths taken at intervals of 40 ft. are 0, 12, 21, 23, 23, 23, 20, 12, and 0 ft. respectively.
5. Discuss the advantage and disadvantage from all points of view, including stability, of the turret vessel as compared with the shelter-deck vessel.
6. Supposing the half-breadths at five sections of five different water-planes of a vessel to be as follows:—

Sections	Half-breadth at Water-lines				
	No. 1	No. 2	No. 3	No. 4	No. 5
1	.5	.4	.4	.3	.2
2	16	15	13	8	6
3	20	19	17	10	7
4	17	16	14	10	6
5	.5	.4	.4	.3	.2

Calculate the displacement and the height of the centre of buoyancy, supposing the length of each waterplane to be 200 ft. and the draught at W.L. 1 to be 16 ft.

## 7. CHART.

Time allowed 2 hours.

1. On 5th September, 1925, at 10 h. 58 m., when making for Spithead in hazy weather, steering N. 67° W. by compass and steaming 10 knots, Bembridge Fort flagstaff was sighted bearing N. 85° W. by compass. At 11 h. 07 m., when the Warner Lt.-V. was sighted bearing N. 27° W. by compass, the course was altered to N. 24° W. by compass. At 11 h. 30 m., when Noman's Fort and St. Helen's Fort bore in transit, the course was changed to N. 50° W. by compass. At noon, when Spit Fort and Gilkicker Fort bore S. 64° E. by compass, the ship was steadied on N. 64° W. by compass. At 12 h. 12 m., when off Bramble Bank buoy, the following angles were taken: Old Castle Point (bathhouse) 51°, Trinity Church 22°, Egypt Point Lt.-Ho.

[NOTE.—When steering the first and second courses the tidal stream set N. 54° W. (mag.) at 2 knots; and west (mag.) of unknown strength when steering the third and fourth courses.

Using deviation-card No. 4, find the magnetic courses and distances made good, the average speed during the run, the latitude and longitude at noon, and the magnetic bearing and distance of Spit Fort from the intersection of the second and third courses.

Find also the expected height of the tide above chart datum at Hythe at 01 h. 08 m. standard time, using the special table on page 360.

2. Find the course to steer by compass from Spit Fort Lt., bearing 074° and distant 18 cables, to Spit Fort, bearing 331° and distant 23 cables, to counteract the effect of the tide as indicated on the chart 1 hour after H.W. at Portsmouth, ship steaming 8 knots; also the distance the ship would then make good in 30 minutes.

## 8. ESSAY.

Time allowed 2 hours.

*Meteorology or other subject, as may be selected by the Examiner.*

## APPENDIX K.

**194. Sea Service required to qualify for Examination for Certificates of Competency:—**

The following is a condensed statement of the sea service required to qualify in each of the various grades of certificates of competency. Where service as an officer is required it is shown in tabular form. The letters F.G. are used as denoting foreign-going; and H.T. as denoting home trade: thus, 1 F.G. in the first column of the table showing the officer's service for a first mate's certificate means one year's service in foreign-going ships; mate H.T. in the last column means mate of a home-trade ship; 1½ H.T. in the first column means a year and a half's service in the home trade; and so on.

A candidate for an ordinary (square-rigged) certificate must prove that at least twelve months of his service has been spent in square-rigged sailing-ships, and a candidate for a fore-and-aft certificate must prove that at least twelve months of his service has been spent in sailing-ships, either square-rigged or fore-and-aft-rigged.

## CERTIFICATES FOR FOREIGN-GOING SHIPS.

*Second Mate.*

Minimum age, 18 years. Minimum sea service, 4 F.G. or 6 H.T.  
No officer's service required.

*Only Mate.*

Minimum age, 19 years. Minimum sea service, 5 F.G. or 7½ H.T.  
No officer's service required.

*First Mate.*

Minimum age, 19 years. Minimum sea service, 5 F.G. or 7½ H.T. Officer's service as follows (see also para. 106) :—

Years.	Lowest Capacity.	Lowest Certificate held.
1 F.G. ..	Third mate .. ..	Second mate F.G.
	<i>or</i>	
1½ H.T. ..	Only mate .. ..	Second mate F.G. or mate H.T.

*Master or Extra Master.*

Minimum age, 21 years. Minimum sea service, 6 F.G. or 9 H.T. Officer's service as follows :—

Years.	Lowest Capacity.	Lowest Certificate held.
1 F.G. ..	Only mate .. ..	} Only mate F.G.
1½ H.T. ..	Only mate .. ..	
	And in addition, unless the above service was performed with a first mate's foreign-going certificate, he will also be required to prove one of the following services prescribed for that grade :—	
1 F.G. ..	Third mate .. ..	Second mate F.G.
	<i>or</i>	
1½ H.T. ..	Only mate .. ..	Second mate F.G. or mate H.T.
	<i>or he must have served</i>	
1 F.G. ..	Second mate .. ..	} First mate F.G.
2 F.G. ..	Third mate .. ..	
	<i>And in addition—</i>	
1½ F.G. ..	Third mate .. ..	Second mate F.G.
	<i>or he must have served</i>	
3 H.T. ..	Master .. ..	Master H.T.
	<i>or</i>	
1 H.T. ..	Master .. ..	Master H.T.
	<i>And in addition—</i>	
3 H.T. ..	Mate .. ..	Master H.T. or second mate F.G. for one year of such service.

195.

CERTIFICATES FOR HOME-TRADE SHIPS.

The sea service required for these certificates may have been performed either in the home-trade or in foreign-going ships; a portion of which (denoted in brackets with the letters XL) may have been performed in extended river limits.

*Second Mate.*

Minimum age, 18 years. Minimum sea service, 3 years (2 XL). No officer's service required.

*Mate.*

Minimum age, 19 years. Minimum sea service, 4 years (2 XL). No officer's service required.

*Master.*

Minimum age, 21 years. Minimum sea service, 5 years (2 XL). Officer's service as follows :—

Years.	Lowest Capacity.	Lowest Certificate held.
1 H.T. ..	Only mate .. ..	Mate H.T. or second mate F.G.
	<i>or</i>	
2½ H.T. ..	Second mate in charge of watch	Mate H.T. or second mate F.G.
	<i>or</i>	
1½ H.T. ..	Second mate of a H.T. ship required to carry such	Second mate H.T.
1 H.T. ..	Master of H.T. V. ..	Master H.T. V. under 25 tons.
1 H.T. ..	Master of H.T. V. of 50 tons or upwards	Service certificated master 50 tons or upwards.
1½ H.T. ..	Master .. ..	Service certificated master under 50 tons.

*Master of a Cargo-vessel under 25 Tons.*

Minimum age, 21 years. Minimum sea service, 4 years (2 XL).  
No officer's service required.

*Master of a Fishing-boat.*

Minimum age, 21 years. Minimum sea service, 4 years (2 XL).  
No officer's service required.

*Master of a River-steamer.*

Minimum age, 21 years. Minimum sea service, 2 years (XL).  
No officer's service required.

**APPENDIX L.**

**196. Approved Schools of Nautical Training on Shore in Great Britain.**—The following is a list of schools of nautical training in Great Britain other than the Nautical College, Pangbourne (see para. 130), which the Board of Trade and the Marine Department have approved under para. 131 of the regulations :—

**A. Residential Training Establishments (para. 131 (i)) :—**

Wallasey, Cheshire: The Lancashire and National and Sea Training Homes.

Half-time to count up to a maximum of six months.

**B. Cadet Courses at Junior Technical Schools and Similar Institutions (para. 131 (ii)) :—**

Cardiff: Smith Junior Nautical School.

Hull: Boulevard Nautical School.

Glasgow: Royal Technical College.

Greenock: Watt Memorial School.

Leith: Leith Nautical College.

Half-time to count in each case up to a maximum allowance of six months.

**C. Senior Courses in Navigation (para. 131 (iii)) :—**

(None yet approved.)

**APPENDIX M.****197. Text-books and Instruments used in the Examinations :—**

"The New Zealand Nautical Almanac and Tide Tables." "Tables for Azimuths, Great-circle Sailing, and Reduction to the Meridian." Published by the Marine Department, Wellington, N.Z.

*Naval Architecture.*—"The Modern Practice of Shipbuilding in Iron and Steel," by Samuel J. P. Thearle. Published by William Collins, Sons, and Co. Vols. I and II. "Ship-construction and Calculations," by George Nicol. Published by James Brown and Sons, Glasgow.

*Stability.*—"Ship Stability and Trim," by Percy Hillhouse. Published by Gieve's Publishing Co. (John Hogg), London.

*Deviation of the Compass.*—"The Admiralty Manual for the Deviations of the Compass." To be obtained through any bookseller, or directly from H.M. Stationery Office, or Edward Ponsonby, Dublin.

"The Elementary Manual for the Deviations of the Compass in Iron Ships," by E. W. Creak. Published by J. D. Potter, London.

*Meteorology, including Barometer, Thermometer, and Hydrometer.*—"A Barometer Manual for the use of Seamen; with an Appendix on the Thermometer, Hygrometer, and Hydrometer." Issued by authority of the Meteorological Council. "The Seaman's Handbook on Meteorology." To be purchased through any bookseller, or directly from H.M. Stationery Office, or Edward Ponsonby, Dublin.

*Tides.*—"Tide Tables for the British and Irish Ports." Published annually by the Admiralty, and purchasable, either directly or through any bookseller, from J. D. Potter, London.

*Signalling.*—"The Allied Signal Manual." May be obtained through any bookseller, or directly from H.M. Stationery Office, or Edward Ponsonby, Dublin.

*Elementary Science.*—"General Elementary Science," by W. Briggs. Published by the University Tutorial Press.

*Intending candidates are advised to take these books to sea with them for study purposes.*

**I***nstruments.*—The barometer (Kew pattern marine barometer), thermometer, and hydrometer used in the examinations are precisely similar to those supplied to shipmasters by the Meteorological Office for making observations on board ship.

## APPENDIX N.

## 198. Colonial and Dominion Certificates :—

LIST OF COLONIAL AND DOMINION CERTIFICATES ISSUED UNDER ORDER IN COUNCIL WHICH ARE OF THE SAME FORCE AS THOSE GRANTED BY THE BOARD OF TRADE.

Colony or Dominion	Certificates		Date of Original Order in Council	Date from which Order in Council takes Effect
	By whom granted	Description		
Victoria§ ..	Marine Board* ..	Master, 1st mate, only mate, 2nd mate, 1st-class engineer, 2nd-class engineer	30 Mar 1871	4 Jan 1870
Canada ..	Minister of Marine and Fisheries	Master, 1st mate, only mate, 2nd mate	19 Aug 1871	19 Aug 1871
		1st-class engineer, 2nd-class engineer	10 Nov 1886	1 Jan 1887
New Zealand	Marine Department	Master, 1st mate, only mate, 2nd mate, 1st-class engineer, 2nd-class engineer	9 Aug 1872	1 May 1872
New South Wales§	Department of Navigation†	Master, 1st mate, 2nd mate, 1st-class engineer, 2nd-class engineer	30 Aug 1873	18 June 1872
South Australia§	Marine Board ..	Master, 1st mate, only mate, 2nd mate, 1st-class engineer, 2nd-class engineer	12 May 1874	12 May 1874
Tasmania§ ..	Governor ..	Master, 1st mate, only mate, 2nd mate, 1st-class engineer, 2nd-class engineer	12 Feb 1876	1 April 1876
Bengal ..	Lieutenant-Governor	Master, 1st mate, only mate, 2nd mate, 1st-class engineer, 2nd-class engineer	27 June 1876	27 June 1876
Newfoundland	Governor ..	Master, 1st mate, only mate, 2nd mate	14 May 1877	14 May 1877
		1st-class engineer, 2nd-class engineer	19 July 1910	19 July 1910
Bombay ..	Governor ..	Master, 1st mate, only mate, 2nd mate, 1st-class engineer, 2nd-class engineer	11 July 1877	11 July 1877
Queensland§ ..	Marine Board ..	Master, 1st mate, 2nd mate, 1st-class engineer, 2nd-class engineer	26 Mar 1878	1 Oct 1877
Hong Kong ..	Governor ..	Master, 1st mate, only mate, 2nd mate, 1st-class engineer, 2nd-class engineer	31 Dec 1883	1 Jan 1884
Straits Settlements	Governor ..	Master, 1st mate, 2nd mate	1 May 1890	1 June 1890
		1st-class engineer, 2nd-class engineer	..	1 Aug 1888
Commonwealth of Australia	Minister of Trade and Customs	Master, 1st mate, 2nd mate, 1st-class engineer, 2nd-class engineer, 1st-class motor engineer, 2nd-class motor engineer	11 Oct 1923	1 Oct 1923

\* The Steam Navigation Board was superseded by the Marine Board on 21/12/88.

† The Marine Board was superseded by the Department of Navigation on 17/3/1900.

‡ The issue of certificates of Imperial validity by the Governments of the separate States of the Commonwealth ceased on 1/10/23, the date on which the issue of such certificates was undertaken by the Commonwealth Government.

NOTE.—The Orders in Council giving Imperial validity to certificates of competency issued in Malta and Mauritius were revoked by an Order in Council dated 18/8/16.

## APPENDIX O.

## [List of Forms.

## 199. Used in connection with the Examination and Certificates of Masters and Mates :—

	Form	Exn. No.
Regulations relating to the Examination of Masters and Mates .. .. .	..	1
Application for Examination .. .. .	..	2
Examination-paper, F.G., Second Mate ..	..	4, 4a
"    "    First Mate .. .. .	..	5, 5a, 5b
"    "    Master .. .. .	..	6, 6a, 6b, 6c, 6d
"    "    "    (Answers) .. .. .	..	14a
"    "    Extra Master .. .. .	..	7, 7a, 7b, 7c, 7d, 7e
"    "    "    (Answers) .. .. .	..	14c
"    "    Chart, Second Mate .. .. .	..	8b
"    "    "    (Answers) .. .. .	..	8c
"    "    "    First Mate and Master .. .. .	..	8a
"    "    "    (Answers) .. .. .	..	8
"    "    "    Meteorology .. .. .	..	32
"    H.T., Arithmetic and Navigation .. .. .	..	9b
"    "    Navigation .. .. .	..	9d
"    "    Navigation and Compass .. .. .	..	9c
"    "    Chart .. .. .	..	9a
"    "    "    (Answers) .. .. .	..	9
"    "    Master, Fishing-boat, or Cargo-vessel under 25 tons, Arithmetic .. .. .	..	19, 9f
"    "    Master, Fishing-boat, or Cargo-vessel under 25 tons, Chart .. .. .	..	20
"    "    Master, Fishing-boat, or Cargo-vessel under 25 tons, Chart (Answers) .. .. .	..	21
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