

- (a.) To find the latitude or position from double altitudes of the sun or of a star.
 - (b.) To determine, from simultaneous observations of two different stars, the position of the ship, and the true bearing of the stars, by Sumner's method. The candidate may either determine the four longitudes from the two assumed latitudes which will be given, or solve the question in any other way he may choose.
 - (c.) To find the error of a chronometer from the altitude of the sun or of a star, observed with an artificial or with the natural horizon.
 - (d.) To 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.) To show approximately on a terrestrial globe the great-circle track and the distance from one given position to another; also the latitude and longitude of vertex; and the longitude from vertex; and to 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.) To 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.) To draw a figure, and write down the trigonometrical ratios.
 - (h.) Right-angled plane trigonometry; deducing and writing down the formula for each computation in the problem given.
 - (i.) Oblique-angled plane trigonometry; deducing and writing down the formula, or the rule, for each computation in the problem given.
 - (j.) To give Napier's rules for circular parts for the solution of right-angled spherical triangles, explaining clearly how the different angles and sides are considered in deducing the formulæ.
 - (k.) Right-angled spherical trigonometry.
 - (l.) To answer a paper on magnetism as relating to the compass.
 - (m.) To construct a plan or chart on Mercator's principle and solve a given problem thereon.
 - (n.) To answer a paper on naval architecture, including ship construction and stability.
 - (o.) To answer a paper on general knowledge, including shipping business, imports and exports, astronomy, and general elementary science (except chemistry).
- He will be examined orally on the following subjects:—

- (p.) The leading principles of the construction of the sextant and vernier; patent logs and leads.
- (q.) The 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 twelve words a minute in semaphore, ten words a minute in Morse flashing, and six words a minute in Morse flag-waving.

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

- (a.) A circle should be drawn projected on the plane of the horizon—unless the problem can be shown better otherwise—and a correct figure drawn in it, the magnitude of the sides and angles being estimated approximately by the eye.
- (b.) The sides and angles used in solving the problem should be marked by distinguishing-letters in the figure, and the candidate should 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.