44. First Mate, Special Regulations applying only where a Candidate has served continuously with the same Company as Apprentice and Junior Officer.—A candidate who has served continuously with the same company or shipping firm as apprentice and junior officer may be allowed to present himself for examination for a certificate as first mate on completion of two years' service, performed while holding a second mate's certificate, as the junior of two bridge-keeping officers of the watch, provided that the whole of this service has been performed upon ocean-going steamships of not less than 8,000 tons gross, making an average speed of 15 knots or upwards, and carrying a crew of not less than 130 men, including at least five deck officers in addition to the master. If the candidate passes the examination a certificate will not be issued to him, however, until he produces proof of twelve months' sea service in effective charge of a watch (*see* para. 116) in addition to the two years' service as junior bridge-keeping officer described above.

SYLLABUS.

(The Navigation and chartwork papers may include questions on the syllabus for second mate.)

45. Paper 1. (Written.)

PRACTICAL NAVIGATION I. (3 hours.)

(*a*) Knowledge and recognition of stars of first magnitude. To calculate the approximate times (to nearest minute) of meridian passage of any heavenly bodies; to calculate an approximate altitude for setting the sextant for a meridian altitude of a heavenly body.

(*b*) To find the latitude from an altitude of Polaris. Thence to find a position line.

(*c*) To work a ex-meridian altitude of any heavenly body and thence to find a position line.

(*d*) By transfer of a previous position line and an observation of a heavenly body, to obtain a running fix by the use of protractor and plain or squared paper, or by tables. Particular cases of position lines from Meridian Altitudes or from Polaris.

(*e*) By nearly simultaneous altitudes of any heavenly body, to determine the position at the time of observation from the intersection of position lines.

46. Paper 2. (Written.)

PRACTICAL NAVIGATION II. (2 hours.)

(*a*) To find the magnetic bearing of a distant object by swinging on equidistant compass points, thence to construct a deviation table or curve.

(*b*) To calculate the initial course and distance on a Great Circle track between two points, and, by the use of the Vertex of the Great Circle, to lay off such a track on a Mercator's Chart.

(*c*) The use of Admiralty Tide Tables (Part II, Section 1, the use of non-harmonic constants and tidal differences).

(*d*) The harmonic method of tidal prediction and the use of harmonic constants (Admiralty Tide-tables, Part II, Section II).

47. Paper 3.

CHART WORK. (2 hours.)

(*a*) To interpret from a chart the information it gives and to use Sailing Directions intelligently. Description and recognition of a coast. Landfalls in clear weather. Selection of suitable points for bearings. Distance of sighting lights; distance from point of land of known height; distance of passing a point of land; course to pass a point at a given distance. Danger angles—horizontal and vertical. Entering channels allowing for current. To prepare for anchorage and for entering narrow waters. Reliability of charts. Corrections.