39. Paper 4.

CHART WORK. (2 hours.)

(True courses and bearing will, as a rule, be given as from a Compass Card marked 0° to 360°—e.g., *course 264° True. Magnetic and compass courses and bearings will be given with reference to cardinal points*—e.g., *course S. 84° W. magnetic. Candidates should conform to this practice.)*

(*a*) On a chart, to find the true course and distance between two points; given compass error, to find magnetic and compass course and *vice versa*; to keep the Dead Reckoning on a chart; to lay off courses, allowing for current.

(*b*) On a chart, to fix the ship by simultaneous cross bearings, bearing and range, or by wireless cross bearings, applying the necessary corrections. To fix by the bearings of one or more objects with run between, allowing for current; to find the distance at which the ship will pass a given point.

(*c*) To avoid dangers and to use clearing marks. To use horizontal and vertical danger angles.

(*d*) To interpret from a chart the information it gives, particularly about buoys, lights, depths and nature of bottom, tides, and tidal currents. Recognition of the coast. The intelligent use of Sailing Directions.

(N.B.—The Examiner may ask oral questions on the above syllabus.)

40. Paper 5. (Written.)

CARGO WORK AND ELEMENTARY SHIP CONSTRUCTION. (3 hours.)

(*a*) The stowage and dunnaging of different varieties of cargoes, including bulk cargoes. Elementary ideas on the making and use of cargo plans.

The preparation for stowage, breaking out and discharge of cargo.

Rigging a ship for loading and discharging cargo, and the use of derricks and winches. Strength of cargo gear.

The calculation of capacities of bunkers, holds, tanks, and boats.

Calculation of capacities taken up by part cargoes and of space remaining. Conversion of weight measurement of cargo into space measurement and *vice versa*.

(*b*) The names of the principal parts of a ship.

General ideas on ship construction and hull maintenance. The candidate will be expected to show his practical acquaintance with certain portions of his own ship—*e.g.*, longitudinal and transverse framing. Bulkheads. Hatches. Rudders and steering gear. Shell plating. Stern frame. Propellers and propeller shafts, stern tube, propeller brackets.

The stiffening and strengthening to resist panting, pounding, and propeller vibrations.

Double-bottom tanks, bilges, bilge-pumps, sounding-pipes. Ventilation systems of holds and tanks.

(*c*) Displacement. Deadweight.

Use of tons per inch immersion scale. Calculation of weight of cargo, &c., from draughts.

Effect of varying density of water.

Buoyancy. Centre of gravity and centre of buoyancy. The laws of floating bodies.

Effect of filling and emptying ballast-tanks on centre of gravity of ship as a whole.

41. Paper 6. (Written.)

ENGLISH. (1½ hours.)

(The paper will be designed to test the candidate's ability to write clear and grammatical English with due attention to spelling and penmanship. It will be in no sense a test of technical knowledge.)

42. Oral and Practical Portions.

1. (*a*) Rigging of ships. Strength of ropes, wire, and hemp. Rigging purchases of various kinds, and knowledge of power gained by purchases. Knotting and splicing hemp and steel ropes with strict reference to current practice. Seizings, racking chain stoppers, &c.

(*b*) Sending topmasts up and down.