

- (c) Stability diagrams and use of stability curves and information. Effect of beam and freeboard on stability. Practical operations to ensure ship stability at sea. Ship with a list. Management of ballast tanks. Effect of free liquid surfaces and risks of flooding hold spaces, filling and emptying tanks at sea. Suspended weights and shifting cargoes. Deck cargoes. Homogeneous cargoes. Ballasting. Effect of admission of water into interior of a ship. Flooded compartments. Stability and trim of a stranded ship. Trim—moment to change trim.

56. Paper 4. (Written.)

ENGLISH. (2 hours.)

This paper will test and candidate's ability to write clear and grammatical English, with good spelling and penmanship. It will be in no sense a test of technical or legal knowledge.

57. Paper 5. (Written.)

SHIP'S BUSINESS. (2 hours.)

(The legal information required will not go beyond the outline of mercantile law which the shipmaster must know for practical purposes.)

- (a) The official log and reports on exceptional entries.
 (b) A shipmaster's knowledge of the law relating to:—

(1) Engagement, discharge, and management of a ship's crew. Ship's articles of agreement. Discipline and treatment of offences. Wages and other remuneration. Food and accommodation. Entering and clearing the ship. National insurance of crew.

(2) Tonnage, life-saving appliances, salvage and assistance and, in general, the safety of ship, crew, and passengers.

(3) Loadline marks and entries and reports to be made respecting them. Surveys required by law.

(4) Hygiene of ships, living spaces, holds, &c. Water. Fresh and preserved food. Infectious diseases. The law relating to them and the procedure on board in such case. Quarantine procedure. Recognition and simple treatment of common illness—*e.g.*, fevers, &c. [See the Ship Captain's Medical Guide].

(5) The carriage of emigrants.

- (c) A simple knowledge of the law relating to cargo, including a knowledge of shipowners' liabilities in carriage of cargo.
 (d) A general knowledge of shipping business and documents—charter parties, bills of lading, &c. A knowledge of averages—general and particular. Flotsam and jetsam.

58. Paper 6. (Written.)

MAGNETIC COMPASS. (2 hours.)

(Proofs of formulæ not required.)

- (a) Terrestrial magnetism: Variation. Local attraction. Horizontal force and its varying strength in different parts of the globe with the effect of its change upon deviation.
 (b) Properties of magnets: Meaning of the terms "Hard" and "Soft" Iron. Effect of magnets on a compass needle under varying conditions. Precautions with regard to electric lighting loads and other electric fields. Sub-permanent magnetism and its effects at sea.
 (c) Compass compensation: Methods of swinging ship to obtain a deviation table. Use of curves of deviation. Constant semi-circular and quadrantal deviation. To analyse a table of deviation, obtaining and explaining the approximate co-efficients, A, B, C, D, E. General principle of compass correction, and the method of correction of B, C, and D.
 (d) Heeling error: The nature of the deviation caused and the effect on a ship with a list and when rolling. Method of correction.
 (e) A candidate may be required, at some stage in the examination, to carry out certain practical operations of correction on a compass in a binnacle, and/or to construct a deviation table for that compass.