SECOND-CLASS ENGINEER.

(a) Age.

48. A candidate for a second-class engineer's certificate, whether ordinary or motor, must be not less than twenty-one years of age.

(b) Workshop and Sea Service.

In addition to the workshop service required to be performed by a candidate for a third-class certificate a candidate for a second-class certificate must have served at sea for a period equivalent to eighteen months in foreign-going vessels, as engineer on regular watch on the main propelling machinery of steamships of not less than 66 nominal horse-power, and/or motor-ships of not less than 373 brake horse-power. Time served in the home trade is reckoned as two-thirds of the time similarly served in foreign-going vessels.

For an ordinary certificate at least two-thirds of the required period of service must have been performed in steamships, and for a motor certificate at least two-thirds must have been performed in motor-ships.

The remainder of the service, in each case, may be performed in either steam or motor ships.

(c) Each Candidate must possess a Third-class Certificate.

(1) A candidate for a second-class certificate whether ordinary or motor, must possess a third-class certificate.

(2) Any qualifying sea-service within the meaning of clause (*b*) hereof performed by such candidate prior to his obtaining a third-class certificate may be accepted as qualifying sea-service for a second-class certificate.

(d) Candidates from Overseas.

Any candidate from overseas who may desire to present himself for examination in New Zealand for a second-class certificate must first obtain a third-class certificate, and have complied with the requirements of the British Board of Trade in respect of workshop and sea service.

SECOND-CLASS CERTIFICATE: SYLLABUS OF EXAMINATION.

49. In addition to compliance with **Rule 47**, a candidate for a second-class certificate, whether ordinary or motor, is required—

(*a*) To be able to deal successfully with simple problems relating to beams, safety and relief valves, stresses in shafting, and other important parts of the machinery, strength of pipes and receivers subjected to internal pressure, capacities of bunkers and tanks, speed and fuel consumption of vessels, &c.:

(*b*) To be familiar with the nature and physical qualities of the materials commonly used in the construction of marine engines and boilers, and to have a knowledge of the principal mechanical tests to which they are subjected:

(*c*) To understand how to test the alignment of the shafting and other working-parts; how to make good the results to the machinery of ordinary wear-and-tear; how to remedy defects due to deterioration, flaws, or accident; and how a temporary or permanent repair could be effected in the event of derangement or total breakdown:

(*d*) To understand the causes, effects, and usual remedies for incrustation and corrosion:

(*e*) To be familiar with the principal requirements concerning the combustion of fuel; and to have a creditable knowledge of the facts and phenomena relating to heat, steam, and combustion:

(*f*) To be able to apply the indicator, to calculate mean pressure and horse-power, and to explain the variation of pressure in the cylinder as revealed by the diagrams obtained:

(*g*) To understand the general requirements in regard to bilge, ballast, and fuel-oil pumping-systems, and the disposition and use of the various valves and connections:

(*h*) To understand thoroughly the precautions to be taken against fire or explosion in the fuel-bunkers and machinery spaces of a vessel, and how to deal with fire should it break out; also to be familiar with the construction and working of the types of fire-extinguishing apparatus usually fitted on board ship: