## APPENDIX B.

### SIGHT-TESTS.

Auckland, Wellington, Lyttelton, Dunedin: Saturday morning from 10 to 12, by the Examiners of Masters and Mates.

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## APPENDIX H.

### EXAMINATION OF A MASTER OR MATE IN STEAM.

These examinations are conducted under paragraphs 97 to 100 of these regulation·.

The examination is for the most part *viva voce*, and extends to a general knowledge of the practical use and working of steam engines and boilers, and of the various valves, fittings, and pieces of machinery connected with them, and of the way in which electric lighting is carried out on board ship.

Candidates must—

(*a.*) Know the names and understand the uses of the various parts of engines and boilers, and their connecting pipes, valves, cocks, &c. :

(*b.*) Have a thorough grasp of the construction of the steam engine and boiler, to enable them to understand the nature and importance of any defect which may be reported to them by the chief engineer :

(*c.*) Have a looking-on knowledge of what the principal repairs about engines, boilers, and pipes are, and how these repairs are accomplished :

(*d.*) Be able to form an independent opinion as to a breakdown, and the consequent propriety or impropriety of proceeding under steam with temporarily repaired or defective machinery :

(*e.*) Understand how to estimate approximately the reduction of fuel required for reduced speed, and be able to satisfy themselves as to the sufficiency of the coal on board for the voyage :

(*f.*) Have an intelligent grasp of the general run of pipes and connections in the engine-room, the working of cocks, the opening and closing of cocks and valves, and know how mistakes of importance may be made and how best to guard against such mistakes :

(*g.*) Be capable of being left in charge of the feeding of a set of boilers, understand the working of the water-gauge, and be able to guard against being misled by false indications of the gauge-glass :

(*h.*) Understand the operation of blowing down and surfacing, the reason for such practices, and the danger which may result from the neglect of them in certain circumstances.

A master or mate presenting himself for examination in steam must be understood to have made up for his want of practical experience by reading about the steam-engine. He ought, therefore, to show that he intelligently understands the rationale of its action. Under this head he should be able to state approximately the quantity of heat required in the formation of steam, the relation of "latent" heat to "sensible" heat, how much steam can be raised by the combustion of 1 lb. of coal, what horse-power measure is, what is the action of the slide-valve, the course of the steam through the engine, the advantage of working expansively, and how the expansive action is shown by the indicator diagram.

He should know the uses of the various parts of the engines and dynamos used for electric lighting, and how they and the cables are fitted in the hull; how wires are jointed, insulated, and cased; why it is desirable that they should be led along places which are dry and accessible; what "short-circuiting" is, and what are the causes which produce it; what is its danger in coal-bunkers and petroleum-carrying steamers; what are the uses of switches and cut-outs, and why is it so important to prevent short-circuiting taking place?

Candidates will be required to give written answers to sixteen out of twenty questions taken from the elementary questions (printed in Appendix B of the Regulations relating to the Examination of Engineers: Exn. 1*a*) given on the sheets marked "Steam," or questions similar to them. These questions will be altered from time to time