CERTIFICATES OF COMPETENCY FOR ENGINEERS (YACHT)

EXAMINATIONS ADMINISTERED BY THE
SCOTTISH QUALIFICATIONS AUTHORITY
ON BEHALF OF
MARITIME AND COASTGUARD AGENCY

SMALL VESSEL SECOND ENGINEER

060-03 - AUXILIARY EQUIPMENT PART I

FRIDAY, 19 March 2021

1400-1600 hrs

Examination paper inserts:

Notes for the guidance of candidates:

1. Candidates should note that 100 marks are allocated to this paper. To pass candidates must achieve 50 marks.
2. Non-programmable calculators may be used
3. All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer.

Materials to be supplied by examination centres:

Candidate's examination workbook

AUXILIARY EQUIPMENT PART I

Attempt ALL questions
Marks for each part question are shown in brackets

1. (a) State, with reasons, the type of valve that should be used in EACH of the following situations:

   (i) isolating valve within a fire main; (2)

   (ii) main engine stand-by cooling water circulating pump discharge. (2)

   (b) With reference to a fuel service tank outlet valve:

   (i) describe its operation; (4)

   (ii) state the reason for the operation in part (b)(i). (2)

2. With reference to centrifugal pumps:

   (a) explain why it is common practice to start with the discharge valve closed or throttled; (4)

   (b) explain why the delivery valve must not be left closed after starting; (3)

   (c) state why it is not always necessary to fit a relief valve. (3)

3. With reference to main air receivers:

   (a) list FOUR safety features, stating the purpose of EACH: (8)

   (b) state the pressure at which the relief valve should lift. (2)

4. With reference to pneumatic control systems, explain EACH of the following:

   (a) why having a supply of clean dry air is important; (5)

   (b) how a supply of clean dry air is achieved. (5)

5. Sketch a 2-ram type steering gear including the hydraulic circuit, labelling ALL components. (10)

6. With reference to a vessel with a single electro/hydraulic controllable pitch propeller, explain EACH of the following:

   (a) how manoeuvring may be maintained if the control system fails; (5)

   (b) the action to be taken should the hydraulic system irreparably fail whilst on route and the blades assume zero pitch. (5)

7. With reference to main propulsion shaft hydraulic sleeve type couplings:

   (a) describe, with the aid of a sketch, the tightening procedure; (7)

   (b) state how it is determined that the push fit is complete. (3)

8. (a) Explain, with the aid of sketches, how a new motor is aligned with an existing pump. (7)

   (b) State THREE checks which should be made before using the pump after the motor has been aligned. (3)

9. With reference to storage batteries:

   (a) explain how the level of charge can be determined in EACH of the following:

      (i) lead acid; (3)

      (ii) alkaline; (2)

   (b) state FIVE reasons that the charge may be reduced. (5)

10. With reference to storage batteries, explain EACH of the following:

   (a) boost charge; (3)

   (b) slow charge; (2)

   (c) trickle charge; (3)

   (d) float charge. (2)