CERTIFICATES OF COMPETENCY FOR ENGINEERS (YACHT)

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

SMALL VESSEL CHIEF ENGINEER UNLIMITED
SMALL VESSEL CHIEF ENGINEER LIMITED

059-02 - AUXILIARY EQUIPMENT PART II

FRIDAY, 13 March 2020

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 II

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

1. (a) Sketch the hydraulic symbol for a directional control valve. (3)

   (b) Describe the operation of EACH of the following hydraulic valves:

   (i) directional control valve; (2)

   (ii) speed control valve; (2)

   (iii) brake valve. (3)

2. With reference to induction motor starters:

   (a) state when a STAR/DELTA starter may be required; (2)

   (b) describe the operation of a STAR/DELTA starter; (5)

   (c) explain why the motor configuration is changed from STAR to DELTA. (3)

3. Explain what happens to the output voltage of an a.c. generator from sudden application of a large load to a steady state condition. (10)

4. State THREE different methods used to detect a refrigerant gas leak, explaining EACH method. (10)

5. (a) List FOUR reasons for a refrigeration compressor to stop unexpectedly, after running for a short period. (4)

   (b) Describe the faults which lead to TWO of the reasons for the stoppage, listed in part (a) (6)

6. Explain the maintenance and inspection that should be carried out on SCUBA cylinders. (10)

7. (a) State the maximum time periods between EACH of the following lifting equipment requirements:

(i) inspection; (1)

(ii) testing. (1)

(b) Describe the inspection routine for lifting gear. (6)

(c) State the procedure for recording the results of the inspection and tests. (2)

8. (a) State THREE dangers arising from the use of LPG open flame appliances. (3)

(b) Describe the requirements for a *Gas Detector* suitable for a LPG installation. (7)

9. With reference to longitudinal stresses in a vessel's hull:

(a) state the cause of the stress; (3)

(b) state the areas where the stress is a maximum; (3)

(c) describe the structure that resists the stress. (4)

10. With reference to transverse stresses in a vessel's hull:

(a) state the cause of the stress when the vessel is:

(i) floating in still water; (1)

(ii) being acted on by waves; (2)

(iii) drydocked. (1)

(b) state the areas where the stress is a maximum when the vessel is:

(i) floating in still water; (1)

(ii) drydocked; (1)

(c) describe the structure that resists the stress. (4)