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, 19 June 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. Describe, with the aid of sketches, how an axial piston pump can vary the volume of liquid it displaces. (10)

2. The operating hydraulic circuit for a luffing cylinder for a deck crane is shown in the figure. Explain the purpose and describe the operation of EACH item A, B and C. (10)

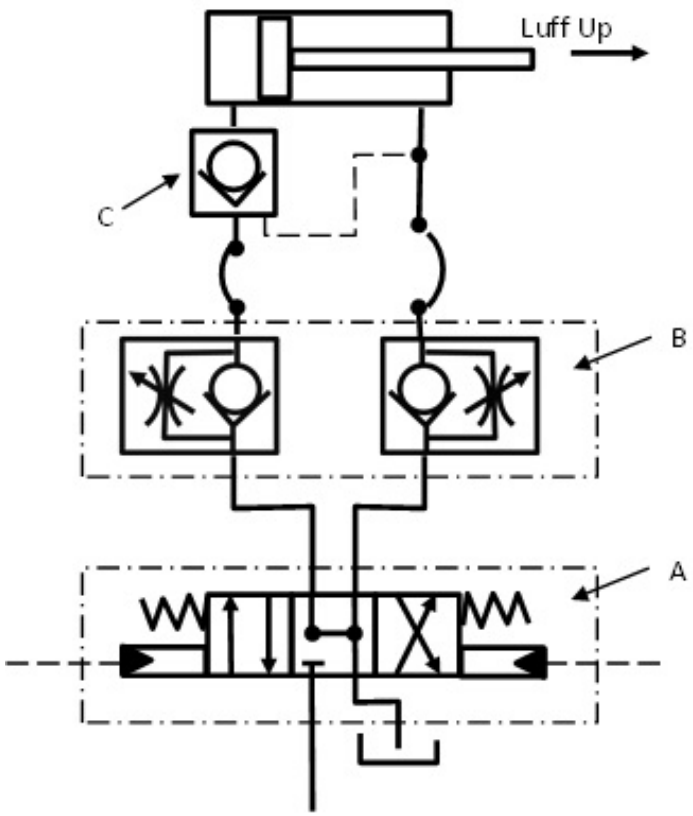

Fig Q2

3. 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)

4. With reference to AVRs:

   (a) explain their purpose; (4)

   (b) explain the effects that would be observed should an AVR give a low output when the generator is:

      (i) running on its own; (2)

      (ii) running in parallel with a second generator whose AVR has no fault. (4)

5. Describe EACH of the following vapour compression refrigeration faults, outlining a possible cause for EACH:

   (a) undercharge; (3)

   (b) overcharge; (3)

   (c) short cycling. (4)

6. Describe, with the aid of a sketch, the procedure for *Liquid Charging* a refrigeration plant, stating all safety procedures and checks to be carried out. (10)

7. With reference to the Code of Safe Working Practices for Merchant Seamen and maintenance of lifting equipment:

   (a) state the interval between testing and who should carry out the testing; (2)

   (b) state the name of the document where details of the vessel's lifting gear is kept; (1)

   (c) state the meaning of SWL; (1)

   (d) state the possible reasons for needing to take a piece of lifting equipment out of service, explaining the measures to be taken before it can be returned to service. (6)

8. State the requirements for the stowage of hand portable petrol containers, in small lockers on open deck. (10)

9. With reference to surface preparation for the painting of a vessels hull in dry-dock, list the advantages and disadvantages of EACH of the following methods:

   (a) abrasive blasting; (5)

   (b) hydroblasting. (5)

10. (a) Define the term *sheer stress*. (3)

(b) Explain how the hull of a vessel may be subject to *sheer stress* in EACH of the following:

(i) while in a seaway; (4)

(ii) while in still water. (3)