

CERTIFICATE OF COMPETENCY EXAMINATION

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

SMALL VESSEL CHIEF ENGINEER <3000 GT, UNLIMITED
SMALL VESSEL CHIEF ENGINEER <500 GT, UNLIMITED

059-02 - AUXILIARY EQUIPMENT PART II

FRIDAY, 28 November 2025

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. 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)

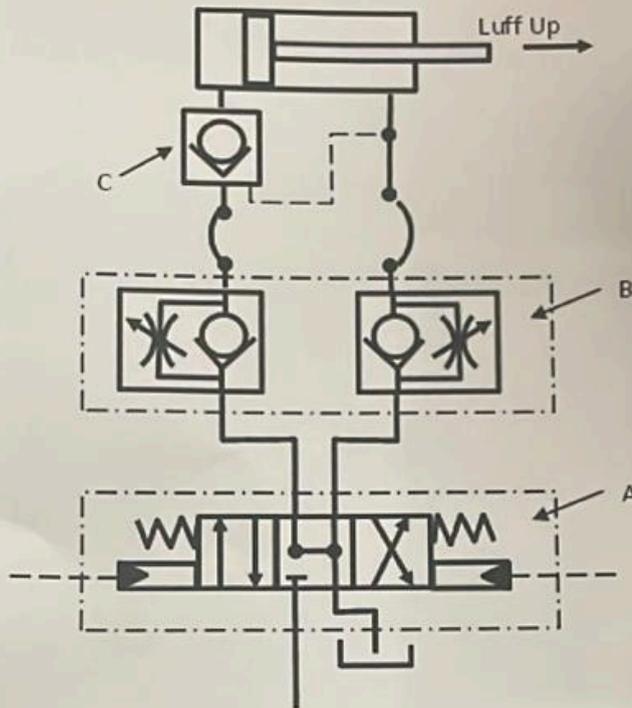


Fig Q1

2. Describe, with the aid of a sketch, a variable frequency drive for speed control of a three phase motor. (10)
3. With reference to a 3-phase brushless generator fitted with a Permanent Magnet Pilot Exciter:
- sketch a block diagram of this arrangement clearly indicating the stationary and rotating parts; (6)
 - explain the advantages of fitting a Permanent Magnet Pilot Exciter. (4)
4. Explain, with the aid of a sketch, the procedure for *vapour* re-charging of a refrigeration plant. (10)

5. (a) Explain EACH of the following refrigeration terms: (2)
- (i) superheated; (2)
 - (ii) saturation temperature; (2)
 - (iii) sub-cooled.
- (b) Sketch a basic vapour compression refrigeration system, showing the refrigerants condition as explained in part (a). (4)
6. (a) Describe TWO possible sources of contamination of compressed air used for breathing. (4)
- (b) State THREE contaminants that may be found in compressed air, outlining the effect of the contaminant on the user when the compressed air is used for diving (SCUBA) purposes. (6)
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. With reference to Open Flame Gas Installation, describe the safety requirements for the installation of EACH of the following:
- (a) cylinders and attachments; (5)
 - (b) fittings and pipework. (5)
9. Explain the cause and effect of propeller induced vibration on a vessel. (10)
10. (a) Describe, with the aid of a sketch, the securing arrangement for a pipe passing through a watertight bulkhead. (5)
- (b) Sketch an arrangement for a watertight electric cable gland labelling ALL components. (5)