

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, 06 February 2026

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. With reference to hydraulic control systems:
 - (a) explain the functions of the reservoir; (5)
 - (b) describe, with the aid of a sketch, meter out speed control for a cylinder in a constant pressure system. (5)

2. With reference to variable speed control of a 3 phase ac induction motors:
 - (a) explain why EACH of the following is not preferred:
 - (i) variable voltage, constant frequency; (3)
 - (ii) variable frequency, constant voltage. (3)
 - (b) explain why voltage and frequency should both be varied. (4)

3. With reference to two identical generators operating in parallel supplying a switchboard that automatically shares load equally, explain EACH of the following:
 - (a) the effect of the excitation of one generator reducing while the load remains constant; (5)
 - (b) the possible effects of closing the main circuit breaker when frequency and voltage are equal but phases are out of phase. (5)

4. Describe, with the aid of a sketch, the operation of the FOUR main components in a simple vapour compression cycle for a refrigeration system, making reference to the physical state and condition of the refrigerant. (10)

5. (a) State THREE types of fire damper that may be used to control the airflow in an air conditioning system. (3)
(b) Describe, with the aid of a sketch, an automatic fire damper installed in a vertical air duct or in those that pass through bulkheads designated as fire boundaries. (7)

6. With reference to a reciprocating air compressor: (4)
- (a) define the term *Volumetric Efficiency*;
 - (b) explain how the operation of the suction and delivery valves affect the volumetric efficiency of the compressor. (6)
7. Explain, with the aid of a sketch, the operation of a hydraulic Pilot Operated Pressure Maintaining Valve. (10)
8. State the safety requirements for small lockers on open deck storing petrol and other highly flammable liquids in hand portable containers. (10)
9. With reference to the application of protective coatings to a vessel's hull:
- (a) state the functions that the coating should perform; (3)
 - (b) state the legislation that applies to certain coatings and what certification is required to comply with it; (2)
 - (c) outline the process for re-coating the hull of a vessel in drydock. (5)
10. With reference to a vessel's motion control:
- (a) outline the SIX degrees of freedom; (3)
 - (b) explain the term *damping*; (4)
 - (c) state THREE considerations to be made, before the installation of a motion reduction system. (3)