

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, 07 May 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) Sketch a flexible diaphragm valve. (6)
- (b) Describe how the diaphragm is replaced, stating the precautions that should be taken. (4)
2. With reference to positive displacement pumps:
- (a) explain the need for a relief valve, stating where it would be fitted; (5)
- (b) explain when a pulsation damper may be fitted to the delivery line, stating how it works. (5)
3. With reference to a fully automatic, water cooled starting air compressor:
- (a) state the alarms that should be fitted; (4)
- (b) explain how damage from overpressure is prevented in EACH of the following:
- (i) intercoolers; (3)
- (ii) water jackets. (3)
4. With reference to hydraulic systems:
- (a) state TWO functions of an accumulator; (2)
- (b) describe, with the aid of a sketch, a gas charged diaphragm or bladder accumulator; (6)
- (c) describe how the bladder is prevented from being extruded from the accumulator described in part (b). (2)
5. With reference to an electro-hydraulic steering gear, explain EACH of the following:
- (a) how steering may be maintained should the telemotor system fail; (5)
- (b) how steering may be achieved should there be total failure of the hydraulic system. (5)
6. Describe, with the aid of a sketch, the operation of a transverse thruster that is hydraulically driven. (10)

- ✓ 7. With reference to intermediate shaft bearings of the roller type, describe, with the aid of a sketch, EACH of the following:
- (a) how some angular misalignment of the shaft is accommodated; (5)
 - (b) how longitudinal movement of the shaft is accommodated. (5)
- ✓ 8. (a) Describe the operation of a preferential trip. (5)
- (b) State the type of circuits that *cannot* be connected to the preferential trip, listing THREE examples. (5)
- ✓ 9. (a) Describe, with the aid of a sketch, a cartridge type fuse. (7)
- (b) State why a fuse used in a motor circuit differs from a fuse used in a lighting circuit. (3)
- ✓ 10. Describe TWO methods for detecting earth faults within a distribution system. (10)