

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, 05 February 2021

1400-1600 hrs

Examination paper inserts:

--

Notes for the guidance of candidates:

- | |
|--|
| <ol style="list-style-type: none">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 used3. 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) State, with reasons, the type of valve that should be fitted to EACH of the following:
 - (i) main engine lubricating oil pump delivery; (2)
 - (ii) fuel service tank outlet; (2)
 - (iii) Ballast tank. (2)
- (b) State the information required to correctly order a replacement valve. (4)

2. Describe, with the aid of a sketch, the operation of a gear pump. (10)

3. Explain the hazards of unauthorised repairs to compressed air lines. (10)

4. With reference to using air as a pneumatic medium:
 - (a) state FOUR advantages; (4)
 - (b) state, with reasons, THREE disadvantages. (6)

5. (a) State the rudder movement required by SOLAS II-I, Reg 29. (5)
- (b) Explain how it is ensured that the maximum movement stated in part (a) is not exceeded in an electro-hydraulic, ram type steering gear. (2)
- (c) Explain how the steering gear system is protected from damage should the maximum movement be exceeded. (3)

6. With reference to controllable pitch propellers:
 - (a) explain why they should maintain a small amount of pitch when in the neutral position; (3)
 - (b) state, with reasons, the failsafe position; (4)
 - (c) explain how pitch may be restored should hydraulic system failure occur. (3)

7. With reference to main propulsion shaft hydraulic sleeve type couplings:
- (a) describe, with the aid of a sketch, the removal procedure; (7)
 - (b) state how it is determined, during reassembly, that the push fit is complete. (3)
8. With reference to comparing modern water lubricated stern tube bearings with those that are oil lubricated:
- (a) state THREE advantages; (3)
 - (b) state THREE disadvantages, explaining how EACH may be overcome. (7)
9. (a) Explain the meaning of the symbol
- A hexagonal symbol with a double-line border. Inside the hexagon, the letters 'Exi' are written in a serif font. The 'E' and 'i' are lowercase, and the 'x' is lowercase. The symbol is centered horizontally and vertically between the question text and the answer line.
- (5)
- (b) Explain the term *flameproof enclosure*. (5)
10. (a) State the factor that determines the minimum number of available generators required for a vessel to put to sea. (3)
- (b) State SEVEN essential services for the operation of a vessel. (7)