

CERTIFICATES OF COMPETENCY FOR ENGINEERS (YACHT)

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

SMALL VESSEL SECOND ENGINEER

060-01 - MARINE DIESEL ENGINEERING

FRIDAY, 05 February 2021

1400-1600 hrs

Examination paper inserts:

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Notes for the guidance of candidates:

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| <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. |
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Materials to be supplied by examination centres:

Candidate's examination workbook

MARINE DIESEL ENGINEERING

Attempt ALL questions

Marks for each part question are shown in brackets

1. (a) Describe the function of a main engine turbocharger. (5)
(b) Describe how the turbocharger is cooled. (2)
(c) Describe how the turbocharger is lubricated. (3)

2. With reference to a diesel engine chain driven camshaft:
(a) state the important checks that must be made during the drive inspection; (6)
(b) explain why the checks described in part (a) are necessary. (4)

3. Describe the principle of operation of a simple hydraulic governor. (10)

4. (a) Outline the actions which must be taken, by the on-watch engineer when the engine crankcase oil mist detector activates. (5)
(b) Sketch a crankcase explosion relief door, labelling the MAIN components. (5)

5. Describe, with reasons, FIVE properties required of lubricating oil. (10)

6. Explain the principle of operation of EACH of the following types of lubricating oil filter:
(a) magnetic; (2)
(b) centrifugal; (2)
(c) coalescer; (3)
(d) plate edge (eg auto-klean). (3)

7. With reference to leaking cylinder air start valves:
(a) describe how this may be detected whilst the engine is running; (2)
(b) describe the procedure on discovery; (4)
(c) list FOUR possible causes. (4)

8. Describe the possible causes of abnormal diesel engine noises during operation. (10)
9. With reference to friction clutches, state EACH of the following:
- (a) THREE advantages of a wet clutch; (3)
 - (b) THREE disadvantages of a wet clutch; (3)
 - (c) ONE advantage of multiple plates; (1)
 - (d) THREE disadvantages of multiple plates. (3)
10. (a) Sketch a block diagram of a lubricating oil system suitable for use with a reduction gearing, including all the protective devices. (5)
- (b) State the engineering purpose/function of EACH item in the system sketched in part (a). (5)