

# **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, 21 April 2023**

**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"><li>1. Candidates should note that 100 marks are allocated to this paper. To pass candidates must achieve 50 marks.</li><li>2. Non-programmable calculators may be used</li><li>3. All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer.</li></ol> |
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Materials to be supplied by examination centres:

Candidate's examination workbook
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## MARINE DIESEL ENGINEERING

Attempt ALL questions

Marks for each part question are shown in brackets

1. With reference to diesel engines thermal and mechanical efficiency, describe where the losses may occur. (10)
  
2. (a) Sketch a cross section through a resilient/flexible mounting for a diesel engine, labelling the MAIN components. (8)  
(b) State the special considerations necessary with respect to the engine attachments and pipework when using the type of mounting in part (a). (2)
  
3. (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)
  
4. Describe FIVE defects which may occur with main engine fuel injectors. (10)
  
5. With reference to distillate fuel oil, explain EACH of the following:  
(a) why it often needs treatment before the engine; (6)  
(b) why it sometimes needs cooling after the engine. (4)
  
6. (a) Explain what is meant by microbial degradation of a lubricating oil. (4)  
(b) State FOUR indications that could be observed if a lubricating oil was suffering from microbial degradation. (4)  
(c) Describe TWO actions that should be taken on detecting the early start of microbial degradation of the main engine lubricating oil. (2)

7. With reference to tube type heat exchangers, explain the purpose of EACH of the following:
- (a) baffle plates; (2)
  - (b) sliding tube plate; (2)
  - (c) tell tale ring; (2)
  - (d) vent cock; (2)
  - (e) anodes. (2)
8. Describe the inspection of a diesel engine piston that has already been removed from the engine. (10)
9. With reference to fluid couplings, explain the effects of EACH of the following:
- (a) increasing oil flow between impellers; (3)
  - (b) increased oil temperature; (4)
  - (c) angular misalignment. (3)
10. Explain why main reduction gearing uses oil sprayers for lubrication rather than rely on a wet sump and the gearing picking up oil as it rotates. (10)