

# **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, 22 January 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"><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. Explain the effects of EACH of the following:
  - (a) early ignition; (4)
  - (b) late ignition; (4)
  - (c) low compression. (2)
  
2. (a) State FIVE defects that may be found when carrying out an overhaul of a medium speed diesel engine cylinder head.  (5)  
(b) State FIVE reasons why a diesel engine cylinder head may crack during service. (5)
  
3. The daily engine log shows the engine crankcase pressure gauge is indicating a much higher value than the normal reading.
  - (a) State the implications of this and the immediate actions that should be taken.  (2)
  - (b) Outline the checks and investigations that should be undertaken to ascertain the cause of this increased crankcase pressure.  (8)
  
4. With reference to microbiological contamination of fuel oil, explain EACH of the following:
  - (a) why modern fuels are more prone to infection;  (4)
  - (b) the indications that there is contamination in the fuel;  (3)
  - (c) the process of removing the contamination.  (3)
  
5. (a) Describe how contamination of fuel oil by EACH of the following can occur:
  - (i) microbes; (2)
  - (ii) sodium chloride. (2)  
(b) Describe how to avoid fuel system and engine related problems with reference to the TWO contaminants in part (a). (6)

6. With reference to lubricating oil, explain the meaning of EACH of the following terms:
- (a) boundary lubrication; (3)
  - (b) hydrodynamic lubrication; (5)
  - (c) viscosity. (2)
7. With reference to diesel engine water coolers:
- (a) describe how performance is measured; (5)
  - (b) describe the possible causes of the performance falling off. (5)
8. Describe all the checks that should be made to ascertain the reasons why an engine with an electric starter motor is failing to start. (10)
9. Describe the possible causes and remedies for EACH of the following diesel engine faults:
- (a) low lubricating oil pressure; (3)
  - (b) overheating; (3)
  - (c) unstable speed. (4)
10. With reference to main engine reduction gearing, explain EACH of the following:
- (a) how the condition of the gear teeth can be easily monitored whilst in operation; (2)
  - (b) the possible causes of deterioration of the teeth in service. (8)