

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, 30 August 2019

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:

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MARINE DIESEL ENGINEERING

Attempt ALL questions

Marks for each part question are shown in brackets

1. (a) With reference to the section of timing chain shown in the figure below, identify the component parts A-E. (5)
- (b) Explain the reasons why chains may elongate or slacken in service and the areas that may wear. (5)

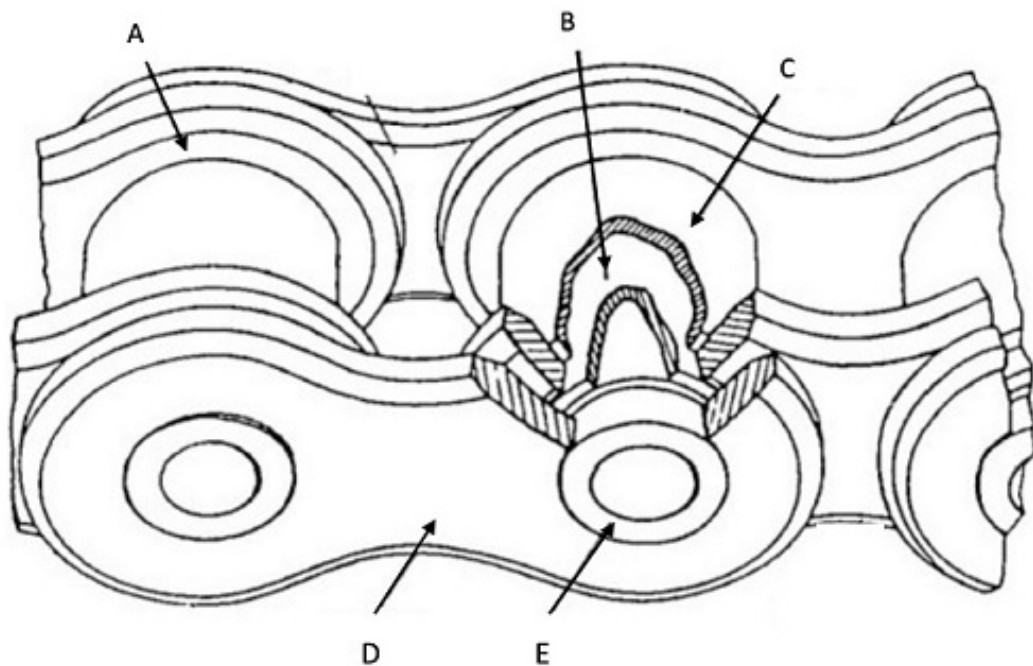


Fig Q1

2. Describe the principle of operation of a simple hydraulic governor. (10)
3. Describe a procedure for manually testing the set points on a diesel generator lubricating oil, low pressure alarm and shut down. (10)
4. (a) Sketch a pneumatically operated friction clutch, labelling all parts. (7)
- (b) State how the clutch sketched in part (a) may be operated in the event of air failure. (3)

5. With reference to modern diesel engine lubricating oils:
- (a) list FIVE possible additives; (5)
 - (b) state the protection that EACH additive listed in part (a) provides. (5)
6. With reference to diesel engine lubricating oil:
- (a) explain how the oil may become contaminated during service; (5)
 - (b) describe how to keep the oil in a satisfactory condition. (5)
7. (a) Describe, with the aid of a sketch, a keel type cooling water system, labelling the MAIN components. (6)
- (b) Explain the purpose of EACH of the following in the cooling system:
- (i) header tanks; (3)
 - (ii) vent lines. (1)
8. With reference to main diesel propulsion engines, state the actions to be taken in the event of EACH of the following:
- (a) high oil mist alarm; (5)
 - (b) exhaust temperature variation across the engine. (5)
9. With reference to diesel engine fuel:
- (a) explain the meaning of the term *microbial contamination*; (1)
 - (b) describe the possible problems the engine may encounter if the fuel received is contaminated with microbes; (4)
 - (c) explain how *microbial contamination* can be avoided; (3)
 - (d) explain the actions to be taken if *microbial contamination* is severe. (2)
10. With reference to a reduction gearing and pneumatic clutch arrangement of a propulsion system:
- (a) state FIVE protection devices fitted; (5)
 - (b) explain the need for EACH device stated in part (a). (5)