

**MARINE DIESEL ENGINEERING****Attempt ALL questions****Marks for each part question are shown in brackets**

- / 1. Explain the meaning of EACH of the following diesel engine terms:
- (a) overlap; (2)
  - (b) scavenging; (2)
  - (c) afterburning; (2)
  - (d) compression; (2)
  - (e) expansion. (2)
- / 2. (a) Sketch an overspeed trip of the centrifugal type. (6)
- (b) Describe the operation of the overspeed trip sketched in part (a). (4)
- / 3. With reference to distillate fuel oil material safety datasheets, describe with examples the information that would be included for EACH of the following:
- (a) hazards; (4)
  - (b) first aid; (3)
  - (c) fire fighting measures. (3)
- / 4. With reference to diesel engine lubricating oil:
- (a) state the main functions; (6)
  - (b) list FOUR contaminants that may be identified from laboratory analysis of a lubricating oil sample, stating their effects on the engine. (4)
- / 5. 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)

- ✓ 6. (a) State FOUR conditions for the fresh water cooling system treatment program to be effective. (4)
- (b) State the function of the inhibitor used in fresh water cooling treatment. (3)
- (c) Explain the safety considerations needed when handling the inhibitors. (3)
- ✓ 7. Describe, with the aid of a sketch, the operation of a diesel engine hydraulic oil start system, labelling the MAIN components, including all interlocks. (10)
- ✓ 8. (a) State the safety precautions necessary before removing a four stroke diesel engine cylinder head. (4)
- (b) Explain the procedure for removing a four stroke diesel engine cylinder head. (6)
- ✓ 9. With reference to fluid couplings for the main propulsion shaft:
- (a) explain the principle of operation; (5)
- (b) state how the transmitted torque may be varied; (2)
- (c) state THREE advantages. (3)
- ✓ 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)