EXAMINATION OF MARINE ENGINEER OFFICER

Function: Marine Engineering at Management Level

MARINE ENGINEERING KNOWLEDGE (GENERAL) 24 02

M.E.O. Class II (Time allowed - 3hours)

India (February 2024) Total Marks 100

NB: (1) Answer any SIX Questions

(2) All questions carry equal marks

(3) Neatness in handwriting and clarity in expression carries weightage

(4) Illustration of an Answer with clear sketches / diagrams carries weightage.

(5) Start answering from the backside of the front cover page

(6) Blank pages if any, to be struck off by (X) at the end of each question.

1. Explain the working principle of different Pressure Transmitter with the help of diagram and explain the following parts with their usages.
   (a) Zero and span calibration. (b) Negative feedback bellow
   (c) Pilot amplifier functions (d) Zero Elevation Concepts
   (2017 Aug 03) (2023 Jan 06) (2024 Feb 01)

2. (a) Sketch and describe a high pressure cut out in a refrigeration system.
   (b) The refrigeration compressor has stopped due to the operation of the HP cut out. Explain:
      (i) The possible causes
      (ii) How these causes would be found and possible remedies.
   (c) What steps are taken if the compressor “short cycles” on low pressure cut out?
   (2010 Jun 01) (2010 Sep 08) (2019 Apr 07) (2019 Jul 08) (2024 Feb 02)

3. (a) Briefly discuss the principle and the key components and elements of an ICCP system, outlining their functions in safeguarding the integrity of metal structures on ships. (8)

   (b) Explore the advancements in ICCP technology over the years and how these innovations contribute to more efficient and sustainable corrosion protection. (8)
   (2024 Feb 03) (New Question)

4. (a) What different methods are used for preserving ships’ hull during service? What types of antifouling coats are used?

   (b) State what materials are being banned by international regulation or use in Antifouling coats and the reason for banning.

   (c) Discuss briefly how does paint coating on deck differ from that on super structure?
   (2022 Jul 09) (2024 Feb 04)

5. An engine room is operating in the unmanned (UMS) mode, in the event of a failure of the UMS systems, explain the arrangements a second engineer officer should introduce to operate the machinery in manual mode for a passage of 10 days duration.
   (2014 Jun 06) (2024 Feb 05)

6. (a) Discuss three metallurgical processing techniques that are employed to enhance the creep resistance of metal alloys.

   (b) Define creep and specify the conditions under which it occurs?

(2022 Sep 02) (2022 Nov 01) (2024 Feb 06)

7. (a) Give the approximate composition, and the properties of the following metals:
   (i) Manganese Bronze (ii) Cupro-Nickel (iii) Babbits metal.

   In each case, give two examples of the metals in use on board ship and explain why the metal is chosen for the applications you mention.

   (b) Explain the difference between “strength” and “stiffness” of steel. Discuss the importance of these properties in shipboard structural members and machinery components.

(New Question)

8. (a) Describe with the aid of sketch the operation of Boiler feed water regulator controlled by at least two other parameters besides water level in the drum.
   (b) Give reason for the inclusion of the other element besides water level in controlling feed water flow.
   (c) Describe the possible effect when the drain valve on the constant head leg in the level transmitter starts to leak.

(2011 Mar 06) (2024 Feb 08)

9. (a) Sketch and describe a pilgrim nut for securing a propeller to the screw shaft.
   (b) Describe how this device is used to loosen the propeller on the shaft when removal or inspection becomes necessary.
   (c) Give reasons why this method is considered to be superior to all other methods.

(2011 Jan 02) (2024 Feb 09)

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