

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2022
Programme Name: B Tech (NAOE)
Semester: Third
Subject Code: UG12T2304
Subject Name: Marine Materials

Date: 15.12.2022

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Options, if any, are specified in respective section.

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. Tank's underdeck, where air has been trapped, appears to have a _____ corrosion rate than other areas of the tank where they are submerged and have a lower availability of oxygen.
2. In ICCP, signal from _____ is sent to controller which allows cathodic protection system to adjust to changing conditions.
3. Malleable Cast Iron can be obtained by annealing _____.
4. _____ is a surface heat treatment process which results in both carbon and nitrogen in case.
5. The structure of martensite is _____.
6. Mixture of Ferrite and Cementite is called as _____.
7. A _____ is produced when an atom or ion is not present in its normal site of crystal structure.

8. The practice of intentionally introducing nucleating particles into hot liquid is called as _____.
9. The property of an element attaining more than one crystal structure is called as _____.
10. The Atomic Packing Factor of Body Centred Crystal Structure is _____.

Section B

Five Questions of 02 Marks each

11. Write down the difference between crystalline solid and amorphous solid.
12. Explain carburising surface heat treatment method.
13. What are the required properties of aluminium alloy in marine applications?
14. Explain the concept of martensite.
15. Explain the effect of length of fiber, amount of fiber and orientation of fiber on strength of composite material.

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

16. Explain hypoeutectoid and hypereutectoid steel microstructure with help of iron-iron carbide diagram.
17. Explain the effect of cooling rate on hardness and TTT diagram of eutectoid steel.
18. Compare the process and effectiveness of sacrificial anode and ICCP for corrosion control.
19. Compare the difference between pack, gas and liquid carburising.
20. Explain the microstructure of ferritic malleable cast iron, ferritic ductile cast iron and ferritic grey cast iron.
21. Explain the concept of different types of composite materials and their applications.
22. Explain the concept of Dye Penetrant Test and Radiographic Test.