INDIAN MARITIME UNIVERSITY

(A central University, Government of India)

May/June 2018-END SEMESTER EXAMINATION

B. Tech (Marine Engineering)

Semester: I

Material Science (UG11T2501)

Date: 02-07-2018 **Maximum Marks: 100**

Time: 3 hrs **Pass Marks : 50**

SECTION –A (All Questions are Compulsory) (10X3 = 30)

(1) (a) Write short notes on (i) Miller Indices (ii) Atomic Packing factor.

(b) **Structure of Atom** – Discuss the present concept.

(c) State the advantages of alloy steel.

(d) State the name of material used for Crucibles, side and bottom of Furnace and its properties.

(e) Hardness testing machine –Describe.

(f) What is meant by Iron Carbon Equilibrium diagram?

(g) Differentiate between substitutional solid solution and interstitial solid Solution.

(h) List the purposes for which annealing heat treatment process take place for steels.

(I) Explain the Mechanical property of Material: **Creep and fatigue.**

(j) Differentiate between Uniform corrosion and intergranular corrosion.

SECTION - B Answer any five of the following seven questions. 5X14 = 70

(2) Classify all types of **Metallic Crystal imperfections**. Explain in detail about **each crystal defect** in metals. (14 marks)

(3) (a) List the factors affecting the selection of materials for the Engineering purposes. (4 marks)

(b) Write short notes on the following mentioning its applications

(i) High Speed Steel (ii) malleable cast Iron (iii) Titanium (iv) Thorium

(10 marks)

(4) (a) Explain in detail Creep Testing mentioning Test procedure and drawing Creep testing machine (7 marks)

(b) Explain in detail Impact Testing mentioning Test procedure and drawing Impact testing machine (7 marks)

(5) Draw the **Iron Carbon Equilibrium diagram** in detail and explain various parameters. (14 marks)

(6) (a) Explain in detail about the **Mechanisms of corrosion**. Define Corrosion

(6 marks)

(b) Explain the following **(i) Microbiological corrosion (ii) fretting Corrosion (iii) Cavitation Corrosion** (8 marks)

(7) Explain in detail about the following **Heat treatment Process** used for steels.

(i) Annealing (ii) Hardening (iii) Tempering (iv) Normalizing

(14 marks)

(8) (a) Draw and explain **CREEP Curve** . (4 marks)

(b) Explain in detail the **Mechanism of Fatigue** and the **variables** affecting the Fatigue Life . (10 marks)