

**CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS**

**II-B.TECH-I-Semester End Examinations (Supply) - December- 2024
MATERIAL SCIENCE AND METALLURGY
(MECH)**

[Time: 3 Hours]

[Max. Marks: 70]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A**(20 Marks)**

1. a) Distinguish between Unit cell and space lattice. [2M]
- b) State the difference between a point defect and a line defect. [2M]
- c) Differentiate substitutional and interstitial solid solution with examples. [2M]
- d) What is phase diagram? [2M]
- e) Differentiate between normalizing and annealing. [2M]
- f) State the purpose of Heat treatment. [2M]
- g) In what ways cyaniding differs from carburizing? [2M]
- h) What is induction hardening? [2M]
- i) List the properties and applications of grey cast Iron. [2M]
- j) Write a note on Titanium alloys. [2M]

PART-B**(50 Marks)**

- 2.a) Describe about point defects in materials. [5M]
 - b) Explain briefly about crystal imperfections. [5M]
- OR**
3. Classify in detail the different types of crystal imperfections and Explain the edge dislocation with a neat sketch. [10M]
 4. Explain with a phase diagram of peritectic, eutectic and eutectoid reaction. [10M]
- OR**
5. Draw the Fe-Fe₃C equilibrium diagram and label all the points, lines and areas. Explain its important features. [10M]
- 6.a) Differentiate between Hardening and Tempering. [5M]
 - b) Discuss different types of annealing processes. [5M]
- OR**
7. Draw the TTT diagram for Fe-C alloys and label the phases. [10M]
 8. Describe in detail about induction hardening, vacuum hardening and plasma hardening. [10M]
- OR**
9. Write a short note on (i) Carburizing (ii) Nitriding (iii) Flame hardening (iv) Cyaniding [10M]
- 10.a) Write short notes on Ti alloys. [5M]
 - b) Explain the production of malleable cast iron. [5M]
- OR**
11. Classify different types of cast iron. Why silicon is added to cast iron? Explain the effects of any four alloying elements on the properties of cast iron. [10M]
