

P P SAVANI UNIVERSITY

Third Semester of B. Tech. Examination

December 2021

SEME2020 Material Science and Metallurgy

14.12.2021, Tuesday

Time: 09:00 a.m. To 11:30 a.m.

Maximum Marks: 60

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION - I

- Q - 1** Answer the Following: (Short Question: Any Five) [05]
- (i) Define Metallurgy.
 - (ii) State Gibbs's phase rule.
 - (iii) Write Full form of TTT.
 - (iv) Write Full form of CCT.
 - (v) Define Unit Cell.
 - (vi) What is Embryo.
 - (vii) Explain Super-Cooling.
- Q - 2 (a)** Draw Miller Indices for the following structure. [05]
(001), (200), (111), (110), (220).
- Q - 2 (b)** Briefly explain classification of materials. [05]
- OR**
- Q - 2 (a)** What is a crystal structure, enlist and explain its correlated properties? [05]
- Q - 2 (b)** Enlist Various Defects in crystals and explain any two. [05]
- Q - 3 (a)** Nucleation and Growth during freezing of pure metal. [05]
- Q - 3 (b)** Explain normalizing. [05]
- OR**
- Q - 3 (a)** Enlist methods to control grain structure during solidification and explain any one. [05]
- Q - 3 (b)** Explain Carburizing and Nitriding. [05]
- Q - 4** Attempt anyone. [05]
- (i) Explain Sintering Process.
 - (ii) What are the advantages of Powder metallurgy?

SECTION - II

- Q - 1** Answer the Following: (Short Question: Any five) [05]
- (i) Define Hardness.
 - (ii) What is ductility?
 - (iii) What is toughness?
 - (iv) What is resilience?
 - (v) Define point defect.
 - (vi) Define line defect.
 - (vii) Define malleability.
- Q - 2 (a)** Draw and explain Iron-Carbon diagram. [05]
- Q - 2 (b)** What are the difference between annealing and normalizing? [05]

OR

- Q - 2 (a) Name various alloying elements and explain their importance in making alloys. [05]
Q - 2 (b) What are the advantages of normalizing? [05]
Q - 3 (a) Define polymers. How polymers are different from alloys? [05]
Q - 3 (b) What is atomization? How sintering is performed in powder metallurgy? [05]
- OR**
- Q - 3 (a) Explain various crystal structure. [05]
Q - 3 (b) How fcc structure is different from bcc structure? Explain. [05]
Q - 4 Attempt any one. [05]
(i) State and explain white cast iron.
(ii) State and explain Grey cast iron.
