

Total No. of Questions – [6]

Total No. of Printed Pages:1

G.R. No.	
----------	--

December 2021

~~April-2022~~ / INSEM+ENDSEM

**F. Y. M. TECH. (Mechanical- Design Engineering)**  
**(SEMESTER – I)**

**COURSE NAME: ADVANCED ENGINEERING MATERIALS****COURSE CODE: MEPA11205A****(PATTERN 2020)**

Time: [3 Hours]

[Max. Marks: 60]

**(\*) Instructions to candidates:**

- 1) All Questions are compulsory
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator is allowed
- 4) Use suitable data where ever required

- Q.1) Solve any two [10]  
 a) Explain with neat sketch all one-dimensional defects present in crystal structure.  
 b) Calculate the density of BCC and FCC materials  
 c) Sketch the cubic structure and show the miller indices for given plane (1 0 0) (1 1 0)
- Q.2) Draw Iron-Carbon diagram and discuss all the critical [10]  
 temperatures, from room temperature till melting? Discuss all the equilibrium reactions on Iron-Carbon diagram.
- Q.3) a) Why hardening is not possible for non-ferrous materials [5]  
 b) Write a short note on precipitation hardening [5]
- Q.4) a) Write a short note on bio-materials [5]  
 b) What are the advantages of super conducting materials over conventional materials, Explain in detail. [5]
- Q.5) a) Why cermet is different than other explain with proper example. [5]  
 b) What are different techniques used in manufacturing shape memory alloys? Explain anyone them in details. [5]
- Q.6) Write short note on [10]  
 a) PVD  
 b) Ion Implantation