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Total Number of Pages : 01

B.Tech  
PCMT4404

8<sup>th</sup> Semester Back Examination 2018-19  
MATERIALS FOR ADVANCED APPLICATIONS

BRANCH : METTA, MME

Time : 3 Hours

Max Marks : 70

Q.CODE : F077

Answer Question No.1 which is compulsory and any FIVE from the rest.  
The figures in the right hand margin indicate marks.

- Q1** Answer the following questions : (2 x 10)
- a) State Cellular materials? How the quantitative results will be obtained from microstructure of metal foams?
  - b) State chief strengthening mechanism of micro-alloyed steels?
  - c) State the baintic steel and its typical properties?
  - d) State the typical issues of biomaterials?
  - e) State the critical difference between dispersion hardening and precipitation hardening?
  - f) State the critical difference between inorganic polymer and organic polymer?
  - g) Write what are the different types carbide present in NI-base super alloy and which alloying element is added to increase the creep resistance of super alloys?
  - h) Why conductivity of metals decreases with increase in temperature?
  - i) Draw a stress – strain diagram of matrix, fiber and composite?
  - j) How intergranular corrosion is harmful in steel?
- Q2** a) Explain the effect of major phases present on yield strength of nickel based superalloys? (5)
- b) What is sensitization? Discuss how intergranular corrosion is harmful in steel? (5)
- Q3** a) Write down the advantages and disadvantages of dual phase steel used for advance engineering application? (5)
- b) Describe the properties of metallic glass? Discuss the copper mold casting technique to produce the metallic glass? (5)
- Q4** a) Compare the structure and properties of thermosetting, thermoplastic and elastomeric polymers with examples and applications? (5)
- b) Write down the advantages and disadvantages of dual phase steel used for advance engineering application? (5)
- Q5** a) Define superconductivity? State applications and properties of superconductors? (5)
- b) How to prepare high strength low alloy steels? State critical properties of HSLA Steels? (5)
- Q6** Explain the different mechanism by which high strength and creep resistance are achieve in super alloys? Enlist properties and applications of Co based super alloys? (10)
- Q7** Define biomaterial. Classify the types of biomaterials on basis of their interaction with living tissue? Explain the criteria for the selection of materials for biomedical application? (10)
- Q8** Write short answer on any TWO : (5 x 2)
- a) Maraging steel
  - b) Sol-Gel Process
  - c) TRIP & TWIP Steels