Q.P. Code : 011896

[Time: 3 Hours] [Marks: 80

Please check whether you have got the right question paper.

N.B:
1) Question No.**1** is **compulsory**
2) Attempt **any three** questions from remaining **five** questions.
3) Illustrate answers with neat sketches wherever required.
4) Assume suitable data wherever required and state them clearly.

Q. 1 a) Explain band model of conductivity in solid materials. 5
b) Differentiate between diamagnetism and paramagnetism. 5
c) What is fracture? Explain the different types of fractures in materials in brief. 5
d) State and explain Heisenberg's uncertainty principle. 5

Q. 2 a) Explain edge dislocation and screw dislocation in detail with neat sketches. 10
b) Explain factors used for selecting materials for process equipment. 10

Q. 3 a) Explain Griffith's crack theory for brittle fracture with the help of neat sketches. 10
b) Explain the phenomenon of superconductivity. Explain its types and applications in detail. 10

Q. 4 a) Explain elastic deformation and plastic deformation in engineering materials in detail. 10
b) Discuss the properties and applications of ceramics. 10

Q. 5 a) Draw and explain in detail the iron-iron carbide phase diagram. Mention the different phases and explain the phase transformation reactions involved. 10
b) What is corrosion? Explain the mechanism of corrosion in metals. 10

Q. 6 a) Explain fiber reinforced plastic composites in detail with respect to: 10
   i) Matrix material
   ii) Fibers
b) Write short notes on :- 10
   i) Graphite
   ii) DeBroglie's wavelength

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