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Third Semester B.E. Degree Examination, Dec.2015/Jan.2016
Materials Science and Engineering

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. Explain the success of quantum free electron theory over classical free electron theory. (05 Marks)
- b. Explain the variation of Fermi level with temperature in n-type and p-type semiconductors. (10 Marks)
- c. Briefly explain Hall effect. (05 Marks)
- 2 a. Explain the phenomena of thermoluminescence and photoluminescence. (10 Marks)
- b. Explain the importance of traps on photoconductivity. (06 Marks)
- c. Mention various types of luminescence. (04 Marks)
- 3 a. What is Giant Magneto Resistance (GMR)? Explain its working with neat diagram. (08 Marks)
- b. What is polarization? Explain the different types of polarization in dielectrics. (10 Marks)
- c. Write a note on advanced ceramics. (02 Marks)
- 4 a. What are Biomaterials? Explain the effect of physiological fluid on properties of biomaterials. (04 Marks)
- b. Explain the properties of biomaterials. (06 Marks)
- c. Explain metallic implant materials and their uses. (10 Marks)

PART – B

- 5 a. Write a note on linear elastic properties. (08 Marks)
- b. What are non-linear elastic properties? Explain with the help of stress-strain curve. (06 Marks)
- c. Write a brief note on hardness of materials. Explain about Rockwell hardness test. (06 Marks)
- 6 a. Explain point defects in solids. (08 Marks)
- b. Explain significance and effect of imperfection in metals. (08 Marks)
- c. State and explain Schmidt's law. (04 Marks)
- 7 a. Explain briefly spinodal decomposition. (06 Marks)
- b. Explain homogeneous and heterogeneous nucleation. (06 Marks)
- c. Explain Martensitic transformations. (08 Marks)
- 8 a. Explain the process involved in the synthesis of ceramics. Mention few applications. (10 Marks)
- b. Give a note on refractories. (10 Marks)

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