

Code No: R07A1BS05

R07

Set No. 2

I B.Tech Examinations, May 2011

APPLIED PHYSICS

**Common to BME, IT, ICE, E.COMP.E, ETM, E.CONT.E, EIE, CSE, ECE,
CSSE, EEE**

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) What is population inversion relating to laser action? Explain.
(b) Describe the various methods to achieve population inversion.
(c) Explain the important components of a laser system. [6+6+4]
2. (a) What are the sources of permanent dipole moment in magnetic materials?
(b) Explain the hysteresis loop observed in Ferro-magnetic materials.
(c) Write notes on Ferro-electricity. [6+6+4]
3. (a) Discuss the motion of an electron in a periodic lattice.
(b) What are Brillouin zones? How are they related to energy levels of an electron in a metal?
(c) Explain the concept of effective mass of electron. [8+4+4]
4. (a) Explain the formation of an ionic crystal, with a suitable example.
(b) Derive an expression for the cohesive energy of an ionic crystal. [6+10]
5. (a) Explain, in detail, the various properties of nanomaterials.
(b) Write applications of nanomaterials in 'information technology'. [12+4]
6. (a) Explain the properties of matter waves.
(b) Describe GP Thomson's experiment to verify the wave nature of matter. [6+10]
7. (a) Distinguish between intrinsic and extrinsic semiconductors with suitable examples.
(b) Derive an expression for the density of holes in valence band of an intrinsic semiconductor. [8+8]
8. (a) What are the differences between photography and holography?
(b) What is the basic principle of holography? Explain.
(c) Write the applications of holography. [4+6+6]

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(b) Write applications of nanomaterials in 'information technology'. [12+4]

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Set No. 3

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