I/II Semester B.E. Degree Examination, December 2016
(Y2K6 Scheme)
ENGINEERING PHYSICS

Time : 3 Hours   Max. Marks : 100

Instructions *: 1) Answer **any five** of the following selecting at least **two** from*
*   **each** Part.*
* 2) **Each** question carries **20** marks.*

PART – A

1. a) Define simple harmonic motion and derive an expression for the same.

   b) Explain the theory of damped vibrations and discuss it under different conditions.

   c) Explain :

   i) Forced vibrations

   ii) Resonance and

   iii) Quality factor.   **(6+8+6)**

2. a) Derive the relation between three modulus of elasticity.

   b) Derive an expression for bending moment of a beam.

   c) Explain Joule Thomson effect.   **(7+10+3)**

3. a) Define electrical conductivity and derive an expression for the same on the basis of classical free electron theory.

   b) Describe the classification of materials on the basis of energy band gap.

   c) Describe how the resistance of a superconductor varies with temperature. **(6+8+6)**

4. a) Describe the BCS theory of Superconductivity.

   b) Differentiate between Type-I and Type-II superconductors.

   c) Briefly explain the construction and working of a SQUID.   **(8+6+6)**

PART – B

5. a) Explain the following :
    i) Stimulated emission
    ii) Population inversion and
    iii) Optical resonator.

   b) Describe the construction and working of Helium-Neon Laser.

   c) Calculate the ratio of population of the energy states if the transition between them results in a laser emission of 694.3 nm at 300k. **(9+8+3)**

6. a) Define Numerical Aperture and derive an expression for the same.

   b) Describe the classification of optical fibers.

   c) With a Block diagram explain point to point communication. **(6+9+5)**

7. a) Define Poilarization of dielectrics and explain the types in ti.

   b) Derive Clausius Mossotti equation.

   c) Mention any four applications of dielectric materials. **(10+6+4)**

8. a) Briefly explain how nonomaterials are different from the bulk materials and mention any three properties of nanomaterials.

   b) Describe the classification of Liquid crystals.

   c) Describe the construction and working of a typical Liquid Crystal Display (LCD.) **(6+6+8)**

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