Reg. No. | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATION, MAY/JUNE 2017
FIRST SEMESTER

PH16151 – ENGINEERING PHYSICS – I
(Common to all branches)

(Regulation 2016)

Q. Code: 893964

Time: Three Hours **Maximum : 100 Marks**

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. What are Bravais Lattices?
2. A crystal plane cuts at 3a, 4b and 2c distances along the crystallographic axes. Find the Miller indices of the plane.
3. State Hooke's law of Elasticity.
4. State Newton's law of cooling.
5. What is Compton effect?
6. Give the physical significance of wave function.
7. What are the factors affecting the acoustics of building?
8. State Weber- Fechner Law.
9. Distinguish spontaneous and stimulated emission of radiation.
10. What is total internal reflection?

PART B - (5 X16 = 80 Marks)

11. (a) Explain the construction and working of Bridgman and Czochralski technique for growing crystals with its advantages. **(16)**

(OR)

(b) Show that in an ideal hexagonal closed packed structure, the c/a ratio is 1.633 and its atomic packing factor equals to that of the face-centred cubic structure. **(16)**

12. (a) (i) What is Cantilever beam? **(2)**

(ii) Derive the expression for the Young's Modulus of a Cantilever beam. **(14)**

(OR)

(b) (i) Derive the expression for effective thermal conductivity through compound media in series and parallel. **(12)**

(ii) Two metal bars A and B of length 1.0 m and 0.5 m respectively **(4)**

and of co-efficient of thermal conductivity 400 $Wm^{-1}K^{-1}$ and 50 $Wm^{-1}K^{-1}$ respectively are joined together by welding. The free ends of A and B are maintained at 100°C and 0°C respectively. Calculate the temperature at the welded joint assuming that their cross sections are equal.

13. (a) (i) Using quantum theory derive an expression for Planck's radiation law. **(10)**

(ii) Deduce Wien's displacement law and Rayleigh-Jeans law from Planck's quantum theory of radiation. **(6)**

(OR)

(b) What is the principle of scanning electron microscope? Draw the construction of scanning electron microscope and explain its working. Give its advantages and applications. **(16)**

14. (a) (i) Explain with neat diagram, principle, construction, working of magnetostriction method to produce ultrasonic waves. **(12)**

(ii) A quartz crystal with a thickness of 0.5 mm and a density of 2650 kg/m^3 vibrates longitudinally producing ultrasonic waves. Find the fundamental frequency of vibration, if the Young's modulus of quartz is $7.9 \times 10^{10} N/m^2$. **(4)**

(OR)

(b) (i) What is meant by Reverberation Time? **(2)**

(ii) Derive the expressions for growth and decay of energy density inside a hall and hence deduce Sabine's formula for the reverberation time of the hall. **(14)**

15. (a) (i) Explain the modes of vibrations of CO_2 Laser. **(6)**

(ii) Describe the construction and working of CO_2 Laser with necessary diagrams. **(10)**

(OR)

(b) (i) Derive the expression for Numerical aperture and Acceptance angle of an optical fibre. **(10)**

(ii) Explain the construction and working of displacement and temperature fibre optic sensors. **(6)**