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C 15005 (Pages : 2) Name.....

Reg. No.....

COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, MAY 2011

EN 09/PTEN 09 103—ENGINEERING PHYSICS

(2009 admissions)

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

1. Explain the phenomenon of double refraction in calcite crystal.
2. Write the Bragg diffraction equation in reciprocal lattice.
3. Why population inversion is necessary to achieve in lasing action ?
4. What is static and dynamic resistance of Zener diode ?
5. Explain the physical meaning of wave function.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

6. What is half-wave plate ? Explain its action on polarized light incident on it with its electric vector E making an angle θ with the optic axis of the half-wave plate.
7. (a) Derive the expression for the distance between the atomic planes such as (100) and (110) planes.

   (b) X-rays of wavelength 0.71 Å are reflected from (110) plane of a rock salt crystal (a = 2.82 Å). Calculate the glancing angle corresponding to second order reflection.
8. If a 15 g. marble is moving with speed of 1/3 m/s and is confined over a distance of 12 cm., find the total number of energy levels. What do you infer from the results ?
9. What is magnetostriction effect ? Draw circuit diagram of magnetostriction oscillator, explain its working.
10. Explain how the Fermi level changes with the increasing amount of impurity in n-type and p-type semiconductor.
11. Explain the different types of fibers and list out the applications of fibers.

(4 × 5 = 20 marks)

Turn over

Part C

Answer Section (a) **or** *Section (b) of each question.*
Each question carries 10 *marks.*

12. (a) Explain why thin film observed in sunlight exhibit colours. When does an excursing thin film of uniform thickness seen by reflected light shown no colour but appears dark ?

Or

(b) How does the Fermi level change with temperature in extrinsic semiconductor ? Discus the effect of increasing amount of dopants in extrinsic semiconductor.

13. (a) Explain simulated emission process. Describe the construction and working of Nd:YAG laser with band diagram.

Or

(b) Derive Sabine's formula for reverberation time.

14. (a) Explain the properties of Type I and Type II superconductors with suitable diagrams. List out applications of superconductors.

Or

(b) Explain liquid crystal used as a display device. Explain with suitable circuit diagram.

15. (a) Solve the Schrödinger equation for a particle confined in a one-dimensional box of length L. Draw the first few energy levels and the corresponding eigenfunctions.

Or

(b) Explain amplifier characteristics of NPN transistor.

(4 × 10 = 40 marks)