

C 15005

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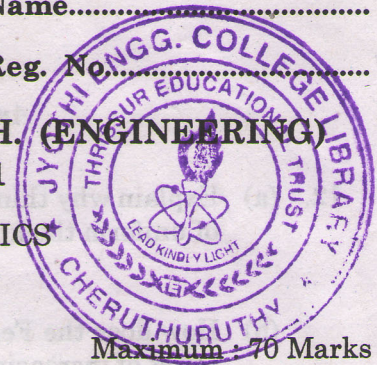
Name.....

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 \AA are reflected from (110) plane of a rock salt crystal ($a = 2.82 \text{ \AA}$). Calculate the glancing angle corresponding to second order reflection.
8. If a 15 g. marble is moving with speed of $1/3 \text{ m/s}$ 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 excursive 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 ? Discuss 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)