NOV-DEC-2012

| Seat No. | |
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**Total No. of Questions : 8]** **[Total No. of Printed Pages : 3**

# [4261]-2

## F. E. Examination - 2012

## ENGINEERING PHYSICS

**(2012 Course)**



**Time : 2 Hours]** **[Max. Marks : 50**

***Instructions :***

*(1) Assume suitable data, if necessary.*

*(2) Neat diagrams must be drawn wherever necessary.*

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**Q.1)** (A) Prove that in Newton's Ring by reflected light the diameter of bright ring are proportional to the square root of the odd natural number. **[06]**

(B) Explain any one application of Ultrasonic Waves. **[03]**

(C) The average reverberation time of a hall is 1.5 sec. and the area of the interior surface is 3340$m^2$. If the volume of the hall is 13000$m^3$. Find the absorption coefficient. **[03]**

**OR**

**Q.2)** (A) Explain how piezoelectric effect can be used for generating Ultrasonic Waves ? **[06]**

(B) Define fringe width for wedge shaped film, obtain an expression for it. **[03]**

(C) Find the half angular width of the central maxima in the fraunhofer diffraction pattern of slit having width $10 \times 10^{-5}$ cm. When illumininated by light having wave length 5000 A°. **[03]**

**Q.3)** (A) State the Phenomena of Double Refraction. Hence explain Huygen's Wave Theory of Double Refraction. **[06]**

(B) Draw energy band picture for P-N junction in case of (i) Zero Bias (ii) Forward Bias (iii) Reverse Bias. **[03]**

(C) A silver wire is in the form of a ribbon 0.5cm wide and 0.1 mm thick. When a current of 2A passes through the ribbon perpendicular to 0.8 Tesla Magnetic Field. Calculate the Hall Voltage produced.

(Given : Density of Silver = 10.5 gm/cc, Atomic Weight of Silver = 108, Avogadros No. $6.02 \times 10^{23}$ gm/mole) **[03]**

**OR**

**Q.4)** (A) Derive an expression for Conductivity in Semiconductor. **[06]**

(B) Explain any one application of Laser. **[03]**

(C) How should the Polarizer and Analyzer be oriented to reduce intensity of beam to (i) 50% (ii) 0.25 of its original intensity ? **[03]**

**Q.5)** (A) Define Phase Velocity and Group Velocity. Hence obtain the relation between Vp and Vg for DeBroglie Wave. **[06]**

(B) Explain the physical significance of $\psi$ and $|\psi|^2$. **[04]**

(C) An electron is bounded by an infinite potential well of width $2 \times 10^{-8}$cm. Calculate the lowest two permissible energies of an electron.

(Given : $h = 6.64 \times 10^{-34}$ J– sec., $m = 9.1 \times 10^{-31}$kg) **[03]**

**OR**

**Q.6)** (A) Derive Schroedinger's Time Independent Wave Equation. **[06]**

(B) State DeBroglie's Hypothesis. Hence obtain the relation for DeBroglie's Wave Length in terms of Energy. **[04]**

(C) The position and momentum of 1 kev electron are simultaneously measured. If its position is located within $1A^{\circ}$. Find the percentage of uncertainty in its momentum.

(Given : $h = 6.64 \times 10^{-34}$ J-sec., $m = 9.1 \times 10^{-31}$ kg) **[03]**