[4656] – 204

Seat No.	

F.E. (Semester – II) Examination, 2014
ENGINEERING PHYSICS
(2012 Course)

Time : 2 Hours | Max. Marks : 50

Instructions : *1)* ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
2) ***Black*** *figures to the* ***right*** *indicate* ***full*** *marks.*
3) ***Use*** *of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is* ***allowed****.*
4) Assume ***suitable*** *data, if* ***necessary****.*

Physical constants :

$h = 6.63 \times 10^{-34}$ *J.Sec.*

$e = 1.6 \times 10^{-19}$ *C*

$m_e = 9.1 \times 10^{-31}$ *Kg*

$C = 3 \times 10^{8}$ *m/s.*

1. a) Prove that in Newton's ring by reflected light the diameter of bright ring is proportional to square root of the odd natural numbers. **6**

   b) Distinguish between musical sound and noise. **3**

   c) A monochromatic beam of light of wavelength 5893 A° is incident normally on the top of a glass which is coated by transparent material MgF_2 having R.I. 1.38. Calculate smallest thickness of the MgF_2 layer which will act as a non reflecting surface. **3**

   OR

2. a) Define magnetostriction effect. Explain how magnetostriction oscillator is used to produce ultrasonic waves, with the help of neat ckt. diagram. **6**

   b) What is diffraction ? What are the types of diffraction ? Distinguish between them (any two point). **3**

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

3. a) Explain the construction and working of Ruby laser with the help of energy level diagram. **6**

   b) Explain Fermi dirac probability distribution function with the meaning of each symbol in it. **3**

   c) Calculate the conductivity of pure silicon at room temperature when the concentration of charge carriers is $1.6 \times 10^{10}/cm^3$. Given that, $\mu_e = 1500\ cm^2/V.Sec.$, $\mu_h = 500\ cm^2/V.Sec.$ **3**

   OR

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4. a) Explain Hall effect. Derive the equation of Hall voltage and Hall coefficient. **6**
   b) Explain propagation of light in a doubly refracting crystal when the optic axis is parallel to the crystal surface, with the help of neat diagram. **3**
   c) How should the polarizer and analyzer be oriented to reduce the beam of light to i) 50% ii) 25% of its original intensity. **3**
5. a) Deduce Schrodinger time independent wave equation. **6**
   b) Define group velocity. Show that the group velocity of matter wave is equal to particle velocity. **4**
   c) Calculate the de Broglie wavelength of electron having kinetic energy 1 KeV. **3**

   OR

6. a) State Heisenberg's uncertainty principle and prove it by thought experiment of electron diffraction at a single slit. **6**
   b) What is wave function ? Explain what is normalization of wave function. **4**
   c) An electron is trapped in a rigid box of width 2 A° . Find its lowest energy level. **3**
7. a) Explain critical field of a superconductor and give any three points to differentiate type – I and type – II superconductors. **6**
   b) Explain the applications of nanoparticles in automobile and electronic industry. **4**
   c) Explain electrical properties of nano-particles. **3**

   OR

8. a) Explain the synthesis of nanoparticles in automobile and electronic by colloidal route with diagram. **6**
   b) Explain the Meissner effect. What important property of superconductor it explain. **4**
   c) Explain two applications of superconductivity. **3**

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