May - June - 2011

[3961] – 103

F.E. (Semester – I) Examination, 2011
APPLIED SCIENCE – I
(Physics) (2008 Pattern)

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**.*

1. a) Obtain the equation of path difference between the reflected rays when the monochromatic light is incident on the uniform thickness film. Give the conditions of minimum and maximum. **7**

   b) Explain refraction of electron when it travels from low potential region to high potential region and explain electrostatic lens. **6**

   c) When a thin transparent plate of thickness 6.3×10^{-4} cm is introduced in the path of one of the interfering rays of Michelson's interferometer then a central bright fringe shifts to a position previously occupied by 6^{th} bright fringe. If the wavelength of light is 5460 A°, find the refractive index of the plate. **4**

OR

2. a) Explain construction and working of Bainbridge mass spectrograph and prove that different isotopes follow a circular path of different radius. **7**

   b) In Newton's ring's experiment, show that the diameters of dark rings are proportional to square root of natural numbers. **6**

   c) An electron accelerated from rest through a potential difference of 900 V, enters a uniform perpendicular magnetic field of flux density 0.01 Tesla. Determine the linear velocity of electron and radius of circular path followed by electron in mag. field. Given $m_e = 9.1 \times 10^{-31}$ kg, $e = 1.6 \times 10^{-19}$ C. **4**

3. a) With the help of circuit diagram explain how magneto-striction effect is used in oscillator circuit to generate ultrasonic waves. **6**

   b) What is diffraction grating ? Give the equation of resultant intensity of light with the meaning of each symbol, when monochromatic light is diffracted from grating. Obtain the equation of maxima and minima. **6**

P.T.O.