Total No of Questions: [06] *SEAT NO. :* _____

[Total No. of Pages : *02*]

F.E. (Semester - I) Exam-2014
APPLIED SCIENCE-I (PHYSICS) (Semester - I)
(2008 Course)

Time: 2 Hours *Max. Marks : 50*

Instructions to the candidates:

1) *Answers Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6 .*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Use of Calculator is allowed.*
5) *Assume Suitable data if necessary.*

Constants: $h=6.63\times10^{-34}$ J.sec , $C=3\times10^{8}$ m/s , $e=1.6\times10^{-19}$ C , $m_e=9.1\times10^{-31}$kg

Q1) a) Explain the formation of Newton Rings. Show that the diameter of n^{th} dark rings is directly proportional to squre root of natural number. [7]

b) Explain the principle , construction and working of bainbridge mass spectrograph. [6]

c) A glass of refractive index 1.5 is to be coated with a transparent material of refractive index 1.2 , so that the reflection of light of wavelength 6000 A° is eliminated by interference. What is the required thickness of coating? [4]

OR

Q2) a) Obtain an expression for condition of brightness and darkness of the thin parallel film. Why does an excessively thin film appear dark in reflected light? [7]

b) Obtain an expression for the displacement produced when an electric field acts perpendicular to electron motion. [6]

c) Find velocity of proton selected by a velocity selector using cross electric and magnetic fields when electric field is 60KV/m and magnetic field is 0.2 Wb/m^2 . [4]

Q3) a) What is piezoelectric effect? Draw neat diagram and explain the piezoelectric generator for the production of ultrasonic wave. [7]

b) Define resolving power of an optical instrument. Derive an expression for the resolving power of grating. [6]

c) What is the highest order spectrum that is visible with light of wavelength 6000A° by means of grating having 5000 lines per cm. [4]

OR

Q4) a) Discuss the fraunhofer diffraction at single slit and obtain the condition for principle maximum and mininma. Draw intensity distribution curve. [7]

b) Explain echo sounding technique and cavitation with one example each. [6]

c) Calculate the natural frequency of cast iron rod of 2.6cm length.Given: Density = 7.23×10^3 Kg/m^3 and Youngs modulus= 1.16×10^{11} N/m^2 [4]

Q5) a) Explain the phenomenon of double refraction on the basis of Huygens wave theory. [6]

b) Explain principle and working of cyclotron. Obtain an expression for maximum energy of the particle acclerated. [6]

c) Calculate the thickness of QWP and HWP. Given: $\mu_e = 1.553$, $\mu_o = 1.544$, $\lambda = 5000A^\circ$ [4]

OR

Q6) a) Explain principle, construction and working of Betatron. [6]

b) Distinguish between polarised and unpolarised light. Describe the process of production and detection of elliptically polaried light. [6]

c) What is nuclear fusion ? Give an account of proton proton cycle as the cause of stellar energy. [4]