Total No. of Questions : 10] [Total No. of Printed Pages : 3

Roll No. .....

BE–201(GS)

B. E. (First/Second Semester) EXAMINATION, June, 2011

(Common for all Branches)

ENGINEERING PHYSICS

Time : Three Hours

Maximum Marks : 70

Minimum Pass Marks : 22 (D Grade)

Note : Attempt all questions. Use standard values of physical constants wherever required. All questions carry equal marks.

Unit – I

1. (a) Obtain the expression for Compton shift in wavelength of incident radiation in Compton scattering process. 10

   (b) The momentum of an electron is 5×10^{-27} kg/s and is measured to an acccuracy of 0·003%. Calculate uncertainty in determining the position of the electron. 4

Or

2. (a) Deduce time dependent and time independent Schrödinger wave equations. 10

   (b) Define phase and group velocities. 4

Unit – II

3. (a) Discuss Newton's rings experiment and prove that the radius of nth dark ring is $r_n \propto \sqrt{n}$. 10

   (b) Discuss Brewster's law. 4

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Or

4. (a) Write short notes on the following : 10
   (i) Diffraction grating
   (ii) Nicol prism
   (b) Yellow light ($\lambda = 589$ nm) illuminates a Michelson's interferrometer. How many bright fringes will be counted as the mirror is moved through 1 cm. 4

Unit – III

5. (a) Explain in detail liquid drop model and various terms of semi-empirical mass formula. 10
   (b) Briefly discuss Geiger-Muller counter. 4

Or

6. (a) Explain construction and working of Bainbridge mass spectrograph. 10
   (b) Briefly discuss cyclotron. 4

Unit – IV

7. (a) Discuss salient features of Kronig-Penny model. 10
   (b) Explain how complex permittivity arises in dielectrics. 4

Or

8. (a) Write short notes on the following : 10
   (i) Effective mass
   (ii) Superconductivity
   (b) What are potential applications of Hall effect ? 4

Unit – V

9. (a) Explain construction and working of any *one* gaseous laser. 10

(b) Derive expression for numerical aperture of a step index optical fiber. 4

Or

10. (a) Discuss various types of optical fibers and loss mechanisms in optical fibers. 10

(b) What is population inversion in lasers and how is it achieved ? 4