2E2003

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2E2003

B. Tech. II Sem. (Main / Back) Exam., May - 2017

203 Engineering Physics - II

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks Back: 24

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT – I

Q.1 (a) What is Compton Scattering? Obtain an expression for shift in wavelength of scattered photon by Compton Scattering. [8]

(b) Explain the physical significance of wave function and hence derive One Dimensional time dependent Schrodinger's wave equation. [8]

OR

Q.1 (a) Write down Schrodinger's equation for a particle enclosed in One Dimensional box of infinite height. Solve it for eigen values and eigen functions. [8]

(b) Calculate maximum percentage change in the wavelength due to Compton Scattering for incident photons of wave length 1A°, 10A°, 100A°. What inference do go draw from this calculation? [8]

UNIT – II

Q.2 (a) What are the postulates of Somerfield's Gas Model? Obtain the expression for density of Energy States for free electron as in a metal, also find the formula for Fermi energy at absolute zero temperature. [8]

(b) Write a short note on 'α – decay'. [8]

OR

Q.2 Explain in Detail – 'Tunnel effect', and prove that $R + T = 1$. [16]

UNIT – III

Q.3 (a) What do you mean by spatial and Temporal coherence for propagating waves? [6]

(b) Explain the Term Coherence Length and Coherence Time. [6]

(c) Show that visibility is a measure of degree of Coherence. [4]

OR

Q.3 (a) What is an Optical Fiber? What do you mean by Numerical aperture of an optical fiber? Find an expression for the numerical aperture of a Step Index Optical fiber. [8]

(b) What are the applications of Optical fibers? [4]

(c) An optical fiber has refractive index of core to be 1.5 and the relative refractive index difference of core cladding to be 0.01. Determine numerical aperture and maximum angle of acceptance. [4]

UNIT – IV

Q.4 (a) What is the principle of laser action? Explain in detail. [8]

(b) In He – Ne laser, What is function of He – atoms? Explain the answer with the help of Energy level diagram for He – Ne. Describe with neat sketch the working of He – Ne laser. [8]

OR

Q.4 (a) Discuss construction and reproduction of image of a hologram. In brief, discuss applications of a hologram. [8]

(b) What is holographic microscopy? How it is superior to ordinary microscopy? With illustrative diagram show outlay of a holographic microscope and explain its working. [8]

UNIT – V

Q.5 (a) Draw a labeled diagram of G M counter. Draw its voltage characteristics. Explain and indicate the following over it - [10]

(i) Threshold Voltage

(ii) Plateau Region

(iii) Working Voltage and

(iv) Continuous Discharge Region

(b) Explain the meaning of Avalanche. How can this effect be used to detect a single particle? [6]

OR

Q.5 Write a short note on the following (any two) [8+8=16]

(a) Ionization Chamber

(b) Halogen quenchers

(c) Proportional Counters
