

2E2003	Roll No. _____	Total No of Pages: 4
	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]

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

UNIT – II

- Q.2 (a) What are the postulates of Sommerfeld'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]

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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. www.rtuonline.com [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. **www.rtuonline.com** [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 - **www.rtuonline.com** [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) www.rtuonline.com [8+8=16]

- (a) Ionization Chamber
 - (b) Halogen quenchers
 - (c) Proportional Counters
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