

1E2402

Roll No.

1E2402

B. Tech. I - Sem. (Main/Back) Exam., Dec. 2019

1FY2-02 Engineering Physics

Time: 3 Hours

Maximum Marks: 160
Min. Passing Marks: 56

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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

PART - A

(Answer should be given up to 25 words only)

[10×3=30]

All questions are compulsory

- Q.1 What is Diffraction?
- Q.2 Draw labelled diagram of Michelson's Interferometer.
- Q.3 Define Matter waves.
- Q.4 Define basic postulates of wave function.
- Q.5 What is 'Q' factor in Laser?
- Q.6 What is Population inversion?
- Q.7 Define Fermi energy.

[1E2402]

- Q.8 Define Intrinsic and Extrinsic semiconductors.
- Q.9 State Faraday's law.
- Q.10 State Bio-Savart law.

PART – B

(Analytical/Problem solving questions)

[5×10=50]

Attempt any four questions

- Q.1 In Newton's ring experiment, the diameters of the 4th and 12th dark rings are 0.400 cm and 0.700 cm respectively. Find the diameter of the 20th dark ring.
- Q.2 A diffraction grating is just able to resolve two lines of $\lambda = 5140.34 \text{ \AA}$ and 5140.85 \AA in the first order. Will it resolve the lines 8037.20 \AA and 8037.50 \AA in the second order?
- Q.3 An electron is trapped in infinitely deep cubical potential well of width 1 \AA . What is its first excitation energy? <http://www.rtuonline.com>
- (Give $m_e = 9.1 \times 10^{-31} \text{ kg}$, $h = 6.62 \times 10^{-34} \text{ Js}$)
- Q.4 How optical fibers can be used in Medical, Science and Communication fields?
- Q.5 Derive the relation between Einstein's Coefficients and discuss the result.
- Q.6 Classify the elements as conductors, insulators and Semiconductors on the basis of band theory of solids with suitable diagram.
- Q.7 Derive Poisson's and Laplace's equations.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×20=80]

Attempt any two questions

Q.1 The intensity of light diffracted from a plane transmission grating is given by-

$$I = I_0 \left(\frac{\sin \alpha}{\alpha} \right)^2 \left(\frac{\sin N\beta}{\sin \beta} \right)^2$$

Where symbols have their usual meanings. Find the position of maxima and minima. [10+10=20]

Q.2 Write down Schrodinger's time dependent and time independent wave equations. Give physical significance of wave function. [10+10=20]

Q.3 Define spatial and temporal Coherence with their examples. Show that visibility is a measure of degree of Coherence. [5+5+10=20]

Q.4 Describe the construction and working of He-Ne Laser. How is population inversion achieved in such a laser? [10+10=20]

Q.5 What is Hall Effect? Give an elementary theory of Hall Effect. Obtain the expression for all Hall coefficient in terms of Hall voltage. [5+15=20]

http://www.rtuonline.com

Whatsapp @ 9300930012

Your old paper & get 10/-

पुराने पेपर्स भिजे और 10 रुपये पायें,

Paytm or Google Pay से