18102

Roll No. _____

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18102

B. Tech. I - Sem. UD (Main / Back) Exam., Jan. - 2020

IFY2 – 02 Engineering Physics

Admitted Batch: 2018 – 19 & 2019 - 20

Time: 3 Hours

Maximum Marks: 100

Min. Passing Marks: 33

Instructions to Candidates:

***PART - A** : Short answer questions (up to 25 words) 10 × 2 marks = 20 marks.*
All ten questions are compulsory.

***PART - B** : Analytical/Problem Solving questions (up to 100 words) 6×5 marks=30 marks.*
Candidates have to answer six questions out of eight.

***PART - C** : Descriptive/Analytical/Problem Solving questions 5×10 marks =50 marks.*
Candidates have to answer five questions out of seven.

1. NIL 2. NIL

PART – A

Q.1 What is Newton's ring?

Q.2 State Bragg's law.

Q.3 What is wave function?

Q.4 State Heisenberg's uncertainty principle.

Q.5 Write two applications of optical fibers.

Q.6 What is Coherence?

Q.7 What is a 'LASER'?

Q.8 What is population inversion?

Q.9 Define the terms: Valence band and Conduction band.

Q.10 State Faraday's Law.

PART – B

Q.1 Describe Fraunhofer's diffraction due to a single slit and deduce the positions of maxima and minima.

Q.2 What do you understand by resolution? Explain the resolving power of a telescope.

Q.3 Derive Schrodinger's time independent wave equation.

Q.4 Calculate the permitted energy levels of an electron in a box 1 Å wide.

Q.5 The refractive index of core of an optical fibre is n_1=1.45 and the relative refractive index difference is 0.01. Find maximum angle of acceptance for this fibre.

Q.6 Prove that in high frequency region laser action is not possible.

Q.7 What do you mean by an intrinsic semiconductor? Can it behave as an insulator?

Q.8 What is Biot-Savart law? Discuss its application.

PART – C

Q.1 A parallel beam of light of two wavelength 6000Å and 6000.5Å falls normally on a diffraction grating 10 mm wide. At a certain diffraction angle θ these lines are close to be being resolved. Find θ.

Q.2 Write down the Schrodinger's equation for a particle enclosed in one dimensional box of size 'a'. Solve it for eigen values and eigen functions.

Q.3 What do you mean by spatial and temporal coherence for propagating waves? Show the visibility is measure of degree of coherence.

Q.4 Describe the construction and working of He-Ne Laser.

Q.5 What is Hall Effect? Give an elementary theory of Hall Effect. Obtain the expression for Hall coefficient in terms of Hall voltage.

Q.6 Derive Maxwell's equations from the basic laws of electromagnetism.

Q.7 Write short notes on-

(a) Poynting Vector

(b) Laplace's and Poisson's equations.