

Roll No.

Total Pages : 03

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B. Tech. EXAMINATION, 2021

Semester II (CBCS)

ENGINEERING PHYSICS

PH-101

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D.
Q. No. 9 is compulsory.

Section A

1. State and prove law of equivalence of mass and energy. 15

2. (a) What is Laser pumping ? 7.5
 (b) Explain working of Ruby Laser. 7.5

Section B

3. (a) Calculate the refractive indices of the core and cladding material of a fiber from the following data :
 Numerical Aperture = 0.22 and Fractional refractive index $\Delta = 0.012$. 7.5
 (b) Find expressions for acceptance angle and numerical aperture. 7.5
4. Derive equation for Damped Harmonic Oscillator and solve it. 15

Section C

5. (a) Derive time dependent Schrödinger wave equation. 7.5
 (b) Establish relationship between phase velocity and group velocity. 7.5
6. (a) Illustrate applications of X-rays. 7.5
 (b) Explain working of Coolidge X-rays tube. 7.5

Section D

7. Derive Maxwell's equations for electromagnetic waves. 15
8. Illustrate BCS theory of Superconductivity. 15

(Compulsory Question)

9. (a) Calculate the energy in MeV which is equivalent to a proton of mass 1.67×10^{-27} kg (1e V = 1.6×10^{-19} J).
 (b) Define stimulated emission.
 (c) Define relaxation time.
 (d) What is fiber optics ?
 (e) Define simple harmonic motion.
 (f) What do you mean by X-rays ?
 (g) What is the velocity of propagation of electromagnetic waves in free space ?
 (h) Define superconductors.
 (i) Define Bremsstrahlung effect.
 (j) Define de Broglie wave. 1.5×10=15