Roll No. Total Pages : 03

J-FB-22-00197

B. Tech. EXAMINATION, 2022

Semester I (CBCS)

ENGINEERING PHYSICS

PH-101

Time : 3 Hours *Maximum Marks : 60*

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

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

Section A

1. Derive Lorentz transformation equations of relativity. 10

2. (a) What is population inversion ? 3

   (b) Explain working of He-Ne Laser. 7

Section B

3. (a) Write a note on optical fiber and their applications. 5

   (b) What is numerical aperture and acceptance angle ? 5

4. Derive equation for Forced Damped Harmonic Oscillator and solve it. 10

Section C

5. (a) What are the postulates of quantum mechanics ? 5

   (b) Derive time independent Schrodinger wave equation 5

6. (a) Illustrate method of X-ray production. 5

   (b) Write a note on characteristic X-ray 5

Section D

7. Obtain Poynting theorem for the conservation of energy in electromagnetic field 10

8. (a) What is Meissner effect ? Explain. 5

   (b) Define type I and type II superconductors. 5

(Compulsory Question)

9. (a) What do you mean by inertial frame of reference ?

(b) What do you mean by spontaneous emission ?

(c) How much of mass a proton would gain when accelerated to a kinetic energy of 500 MeV ? ($1\ eV = 1.6 \cdot 10^{-19}\ J$)

(d) Define Quality factor

(e) What do you understand by core and cladding ?

(f) Define X-rays

(g) What is displacement current ?

(h) What do you mean by Bremsstrahlung effect ?

(i) Define superconductors

(j) What is the velocity of propagation of electromagnetic waves in free space. $10 \times 2 = 20$