

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AI & DS/ AI & ML / Block Chain / CE / CSE / (AI & ML) (Cyber Security)/(DS) / CS & D / EE / ECE / EEE / ETE / FT / IT / ME / R & AI / CSE (Internet of Things and Cyber Security including Block Chain Technology)) (Sem-1,2)

ENGINEERING PHYSICS

Subject Code : BTPH101/23

M.Code : 93794

Date of Examination : 24-05-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION-B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :

- a) Define unit cell.
- b) Show that at 0 K, the probability of finding an electron in an energy level below the fermi level is 1.
- c) What destroys the superconducting state of a current carrying wire?
- d) Why paramagnetic behavior decreases with increase in temperature?
- e) What is atomic polarizability?
- f) Solve the gradient of $1/r$, where $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$.
- g) What information can be obtained from Wave function?
- h) Write a note on three level laser.
- i) What is total internal reflection?
- j) An electron has a speed of 500 m/s, correct upto 0.01%, with what minimum accuracy, can you locate the electron?

SECTION-B

2. Explain the measurement of wavelength of X-ray using Bragg's spectrometer. Calculate the minimum wavelength of continuous X-rays emitted from an X-ray tube whose operating voltage is 40 kV.
3. What is Tunnel diode? Why it is called so? Discuss the VI characteristics of Tunnel diode.
4. a) What is Hysteresis loop?
b) What are ferromagnetic materials? Explain ferromagnetism using domain theory.
5. Solve the electromagnetic wave equation for isotropic homogeneous medium and show that a wave propagate through a non-conducting medium with constant amplitude.

SECTION-C

6. Explain the construction and working of He-Ne laser with the help of energy level diagram. What is the role of He in He-Ne laser?
7. Derive the expression for group velocity and show that group velocity is equal to particle velocity.
8. What are different modes of propagation of signal in optical fibre? Derive the expression for total number of reflections in a fibre of length L.
9. What are Carbon nanotubes? What are the different types of Carbon nanotubes? Discuss top-down method of synthesis of nano particles.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.