Roll No. ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚   **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech. (2009-2010 Batches)   (Sem.–1,2)
ENGINEERING PHYSICS
Subject Code :PH-101
Paper ID : [A0122]

Time : 3 Hrs.   **Max. Marks : 60**

INSTRUCTION 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 atleastTWO questions from SECTION - B & C.**

SECTION-A

1.   **Write briefly :**

(a)   Write Maxwell's equations in integral form and attach physical significance to each of them.

(b)   What is the basic drawback of Ampere's Circuital rule and how was it accounted by Maxwell?

(c)   How does the diamagnetism arise on atomic basis?

(d)   What are the essential requirements to enhance the stimulated emission in atoms?

(e)   What is the role of Helium atoms in the Helium Neon laser?

(f)   What is the physical significance of numerical aperture of an optical fiber?

(g)   Give the results of the Michelson-Morley experiment.

(h)   Why an electron can't be accelerated in a cyclotron?

(i)   How are the characteristics x-rays produced?

(j)   What is the physical process resulting in the formation of a Copper pair.

SECTION-B

2. (a) Derive differential form of Maxwell's equations in a material medium. (4)

   (b) Obtain the equation of electromagnetic waves in a dielectric medium and write down their characteristic features. (4)

3. (a) Give brief account of various phenomena involved in formation of domains in ferromagnetic materials. (5)

   (b) Write a short note on hard and soft magnetic materials. (3)

4. (a) Discuss the construction and working of a He-Ne laser. (5)

   (b) Give few applications of holography. (3)

5. (a) What is an optical fiber? Discuss the underlying principle of light guidance through optical fiber. Derive the expression for numerical aperture of optical fiber and attach physical significance to it. (5)

   (b) Give three applications of optical fibers (3)

SECTION-C

6. (a) Discuss the physical process of generation of x-rays. Further discuss the origin of characteristic and continuous x-rays. (4)

   (b) Write a short note on non-destructive techniques. (4)

7. (a) What are the velocities characterizing a matter wave? Derive the expression for these velocities. (4)

   (b) Obtain steady state Schrodinger's equation. Give essential requisites for a wave function to define a state of the system. (4)

8. (a) Derive the expression for time dilation of a relativistically moving body. (5)

   (b) The mean life of a muon, when it is at rest, is 2.2 μ s. Calculate the average distance it will travel in vacuum before it decays, if it has velocity of 0.9c. (3)

9. (a) What are type I and type II superconductors? Give their distinguishing characteristics. (4)

   (b) Give a brief account of BCS theory of superconductivity. (4)