Roll No. Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (2011 Onwards) (Sem.-1,2)
ENGINEERING PHYSICS
Subject Code: BTPH-101
Paper ID: [A1102]

Time: 3 Hrs. Max. Marks: 60

INSTRUCTION TO CANDIDATES:

- 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 at least TWO questions from SECTION B & C.

SECTION-A

1. Write briefly:

- a. What are main characteristics of dielectric materials?
- b. What do you mean by polarization of EM waves?
- c. What do you understand by Meissner effect?
- d. What are type I superconductors?
- e. What do you mean by X-ray radiography?
- f. What do you mean by stimulated emission?
- g. What do you mean by length contraction?
- h. What is physical significance of Numerical aperture in reference to fibre communication?
- i. What is the concept of wave packet?
- j. What is quantum dot?

1 M-54105 (S1)-362

SECTION-B

2	a)	Deduce Maxwell equation using Gauss Law in electrostatics.	(5)
	b)	In free space, $E(x, t) = 80 \cos(wt-\beta x)a_y$ V/m. Find the average power cross circular area of radius 8m in plane $x = \text{constant}$.	ing a (3)
3	a)	What is Magnetostriction effect. How can we exploit it to produce ultrasonic way	ves? (4)
	b)	Differentiate between Dia, Para and Ferro magnetic materials by taking su examples.	itable (4)
4	a)	A beam of X-rays, λ = 0.745 Å is incident on a crystal at a grazing angle of when first order Bragg's reflection occurs. Calculate the glancing angle for 4 th reflection.	
	b)	Derive Bragg's law of diffraction of X-rays by crystals.	(4)
5	a)	Draw energy level diagram and discuss working of CO ₂ Laser.	(5)
	b)	What is the concept of population inversion?	(3)
CECTION C			
		SECTION-C	
6	a)	Find the core radius necessary for single mode operation at 700 nm in step index with n_1 =1.50 and n_2 =1.48. Also find the Numerical Aperture and maximacceptance angle.	
	b)	Discuss important applications of optical fibres.	(4)
7	a)	Give a brief account of Michelson Morley experiment and discuss its important reference to special theory of relativity.	(6)
	b)	What are main postulates of special theory of relativity?	(2)
8	a)	Compute the de-Broglie wavelength of a proton whose kinetic energy is double rest energy of an electron. Mass of proton is 1800 times that of the electron.	le the (4)
	b)	What do you mean by eigen values and eigen functions?	(4)
9	a)	"The properties of a material get modified at nano scale!" Comment and justify answer.	your (4)
	b)	How can we synthesize a nano material using ball milling? Can you suggest better method for synthesizing nanomaterial?	some (4)

2 | M- 54105 (S1)-362