Q. Code:480830

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2023

First Semester

PH18151 – ENGINEERING PHYSICS

(Common to all branches)

(Regulation 2018/2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Interpret the thermal properties of the materials	**2**
CO 2	Exhibit the ability to solve the problems pertaining to the behavior of sub-atomic particles using quantum mechanics.	**2**
CO 3	Learn to solve the issues related to defects in the buildings due to acoustic design.	**3**
CO 4	Develop an understanding about photonics and Fiber Optic communication system.	**3**
CO 5	Classify and demonstrate the fundamentals of crystals and their defects.	**2**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Why the specimen used to determine thermal conductivity of a bad conductor should have a large area and smaller thickness?	**1**	**2**
2.	State Newton's law of cooling.	**1**	**2**
3.	In Compton scattering, the incident photon have a wavelength 0.5 nm. Calculate the wavelength of scattered radiation if they are viewed at an angle 45°.	**2**	**3**
4.	Write down the one-dimensional Schrodinger time independent equation and write the same for a free particle.	**2**	**2**
5.	List the factors affecting the good acoustics of building.	**3**	**3**
6.	Why not ultrasonics be produced by passing high frequency alternating current through a loud speaker.	**3**	**3**
7.	Can a two level system be used for the production of Laser? Why?	**4**	**2**
8.	Find the Numerical Aperture of an Optical fiber having a core refractive index of 1.55 and cladding refractive index of 1.50	**4**	**3**
9.	In a cubic crystal, draw [110] and [210] planes.	**5**	**2**
10.	Distinguish between edge dislocation and screw dislocation.	**5**	**2**

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	Define coefficient of thermal conductivity and state its unit.	**(2)**	**1**	**2**
	(ii)	Describe Lee's disc method to find the co-efficient of thermal conductivity of a bad conductor.	**(12)**	**1**	**2**

(OR)

(b)	**(i)**	When two different materials are connected in series and parallel, determine the quantity of heat conducted through the materials having same area of cross section and same thickness.	**(10)**	**1**	**2**
	(ii)	A glass sheet of area 1 m^2 has a thickness of $2x10^{-3}$m. Its opposite faces are at temperature 25°C and 10°C respectively. If coefficient of thermal conductivity of glass is $2x10^{-4}$ kcal/m°Cs, find the quantity of heat conducted in one second.	**(4)**	**1**	**2**
12. (a)		Derive Schrodinger's (i) Time independent and (ii) Time dependent equations for matter waves.	**(14)**	**2**	**3**
		(OR)			
(b)		Derive an expression for the change in wavelength suffered by an x-ray photon when it collides with an electron.	**(14)**	**2**	**3**
13. (a)	**(i)**	Explain how ultrasonic waves can be produced by using Piezo electric crystal.	**(10)**	**3**	**3**
	(ii)	List any four applications of ultrasonic.	**(4)**	**3**	**3**
		(OR)			
(b)		Derive Expressions for growth and decay of energy density inside a hall and hence deduce Sabine's formula for reverberation time of the hall.	**(14)**	**3**	**3**
14. (a)		Explain what is meant by molecular Laser. Discuss the construction and working of molecular laser.	**(14)**	**4**	**3**
		(OR)			
(b)		Define Numerical aperture and angle of acceptance. Derive an expression for Numerical Aperture and angle of acceptance of a fibre in terms of refractive indices of the core and cladding.	**(14)**	**4**	**3**
15. (a)	**(i)**	Show that in an ideal hexagonal closed packed structure the c/a ratio is 1.633 and its atomic packing factor equals to that of the face-centred cubic structure.	**(12)**	**5**	**2**
	(ii)	Copper has FCC structure and its lattice parameter is 3.6Å. Find the atomic radius.	**(2)**	**5**	**2**
		(OR)			
(b)	**(i)**	What do you infer from crystal defects?	**(2)**	**5**	**2**
	(ii)	Describe in detail the point, line and surface defects.	**(12)**	**5**	**2**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

			Marks	CO	RBT LEVEL
16.	**(i)**	Deduce the expression for the distance between two successive plane in a cubic lattice.	**(8)**	**5**	**2**
	(ii)	The distance between the Miller indices (110) is 2.86Å. Calculate the lattice constant.	**(2)**	**5**	**2**

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