Reg. No.															

Question Paper Code	13729

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

First Semester

Computer Science and Engineering

(Common to All Branches)

20BSPH101 – ENGINEERING PHYSICS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	A unit cell that contains lattice points only at the corners is known as (a) Primitive unit cell (b) Secondary unit cell (c) Layered unit cell (d) Derived unit cell	1	K1	CO1
2.	What is the percentage of free space in a SC (simple cubic) unit cell? 48% (b) 38% (c) 32% (d) 30%	1	K1	CO1
3.	Laser beam is made of (a) Highly coherent electrons (b) Highly coherent photons (c) Highly coherent phonons (d) None of them	1	K1	CO2
4.	Which of the following pumping methods is used in semiconductor diode lasers? (a) Optical pumping (b) Direct conversion (c) Inelastic atom-atom collision (d) Chemical reaction	1	K1	CO2
5.	The body will regain its previous shape and size only when the deformation caused by the external forces is within a certain limit. What is that limit? (a) Plastic limit (b) Elastic limit (c) Deformation limit (d) None of the mentioned	1	K1	CO3
6.	Shearing stress can be defined as (a) compressive force/area (b) tensile force/area (c) pressure/area (d) tangential force/area	1	K1	CO3
7.	In which of the following there is no distortion? (a) Graded index fibre (b) Multi mode step-index fibre (c) Single step-index fibre (d) Glass fibre	1	K1	CO4
8.	Optical fiber works on the phenomenon of (a) Polarisation (b) Diffraction (c) Refraction (d) Total internal reflection	1	K1	CO4
9.	What type of nature do electromagnetic waves have? (a) Dual nature (b) Wave nature (c) Particle nature (d) Photon nature	1	K1	CO5
10.	Which of the following refers to the term C.O.P. of refrigeration? (a) Cooling for Performance (b) Coefficient of Performance (c) Capacity of Performance (d) Co-efficient of Plant	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Name the seven crystal systems.	2	K1	CO1
12.	Calculate the interplanar spacing for the (101) plane in a simple cubic lattice whose lattice constant is 4.2 Å.	2	K2	CO1
13.	What is population inversion?	2	K1	CO2
14.	Differentiate between homo-junction and hetero-junction laser.	2	K2	CO2
15.	State Hooke's law.	2	K1	CO3
16.	Why girders are given I-shaped?	2	K2	CO3

17.	Write the advantages of fibre optic communication over radio wave communication.	*2*	*K2*	*CO4*
18.	What is meant by attenuation?	*2*	*K1*	*CO4*
19.	What are matter waves?	*2*	*K1*	*CO5*
20.	Write the physical significance of the wave function.	*2*	*K1*	*CO5*
21.	In which process the heat transfer can take place without the medium? Justify your answer.	*2*	*K2*	*CO6*
22.	Give the principle of solar water heaters.	*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Describe the FCC structure and derive the number of atoms, coordination number, atomic radius and packing factor.	*11*	*K2*	*CO1*
		OR			
	b)	Calculate the Atomic Packing Factor (APF) for BCC and HCP structures.	*11*	*K2*	*CO1*
24.	a)	Using the correct expressions, infer the relation between Einstein's coefficient of spontaneous and stimulated emissions.	*11*	*K2*	*CO2*
		OR			
	b)	Outline the principle, construction and working of a CO_2 laser.	*11*	*K2*	*CO2*
25.	a)	Derive an expression for the elevation at the center of a beam which is loaded at both ends.	*11*	*K2*	*CO3*
		OR			
	b)	Derive an expression for the depression produced at the end of a cantilever beam.	*11*	*K2*	*CO3*
26.	a)	Describe the classification of optical fibres based on refractive index profile and propagation mode.	*11*	*K2*	*CO4*
		OR			
	b)	Deduce an expression for the numerical aperture and acceptance angle of fiber in terms of the refractive index of the core and cladding.	*11*	*K2*	*CO4*
27.	a)	Derive an expression for the wavelength of scattered photon in Compton effect.	*11*	*K2*	*CO5*
		OR			
	b)	Obtain Schrodinger's time-dependent and independent wave equations.	*11*	*K2*	*CO5*
28.	a)	Derive the expression for effective heat flow through compound media in series and parallel.	*11*	*K2*	*CO6*
		OR			
	b)	Discuss the method to determine the thermal conductivity of a good conductor using Forbe's method.	*11*	*K2*	*CO6*