Reg. No.															

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Question Paper Code	14241

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

First Semester

Computer Science and Business Systems

24BSPH102 - PHYSICS FOR COMPUTING SCIENCE

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	In Young's double-slit experiment with monochromatic light, how is fringe width affected, if the screen is moved closer to the slits? (a) Independent (b) Remains the same (c) Increases (d) Decreases	1	K1	CO1
2.	What is the variation in the pattern observed for single slit Fresnel diffraction than single slit Fraunhofer Diffraction? (a) The pattern is not hyperbolic (b) The fringes are too thin (c) The region of minimum intensity is not completely dark (d) The fringes are colored	1	K1	CO1
3.	Which of the following is an application of thermodynamics? (a) Refrigerators (b) Gas compressors (c) Power plants (d) All of the mentioned	1	K1	CO2
4.	Which of the following is true? (a) for an isolated system, dS>=0 (b) for a reversible process, dS=0 (c) for an irreversible process, dS>0 (d) all of the mentioned	1	K1	CO2
5.	Which of the following variables has zero value at the extreme position in SHM? (a) Acceleration (b) Speed (c) Displacement (d) Angular frequency	1	K1	CO3
6.	Damping force on a spring mass system is proportional to which of the following quantities? (a) Velocity (b) Acceleration (c) Displacement from mean position (d) $(velocity)^2$	1	K1	CO3
7.	Lead is a metallic crystal having a _____ structure. (a) FCC (b) BCC (c) HCP (d) TCP	1	K1	CO4
8.	The smallest portion of the lattice is known as _____ (a) Lattice structure (b) Lattice point (c) Bravais crystal (d) Unit cell	1	K1	CO4
9.	Which of the following is a unique property of laser? (a) Directional (b) Speed (c) Coherence (d) Wavelength	1	K1	CO5
10.	The energy transported by the fields per unit time per unit area is called _____ (a) Poynting Energy (b) Electro-magnetic energy (c) Poynting vector (d) Flux density	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Compare the differences of interference and diffraction.	2	K2	CO1
12.	Define Brewster's law.	2	K1	CO1
13.	State zeroth law of thermodynamics.	2	K1	CO2
14.	Relate reversible and irreversible process.	2	K2	CO2
15.	Define periodic motion with one example.	2	K1	CO3

16.		Write the expression for energy decay in a damped harmonic oscillator.	*2*	*K1*	*CO3*
17.		Summarize the procedure for determining Miller indices of a crystal plane.	*2*	*K2*	*CO4*
18.		Define Burgers vector**.**	*2*	*K1*	*CO4*
19.		State the principle of laser action**.**	*2*	*K1*	*CO5*
20.		List any 5 losses in fiber optical cable.	*2*	*K1*	*CO5*
21.		Write the relation between current density and electric field**.**	*2*	*K1*	*CO6*
22.		State the Poynting theorem.	*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Develop the relation between the Newton's ring diameter D and the order number (for both dark and bright rings), explicitly considering the phase shift on reflection.	*11*	*K3*	*CO1*
		OR			
	b)	Analyze the role of the Fresnel biprism in transforming a single monochromatic point source into two virtual coherent sources. How does this setup lead to the conditions necessary for interference?	*11*	*K3*	*CO1*
24.	a)	Make use of second law of thermodynamics to discuss the working principle and applications of a Carnot engine.	*11*	*K3*	*CO2*
		OR			
	b)	Analyze the change in entropy in reversible and irreversible processes.	*11*	*K4*	*CO2*
25.	a)	Choose the equation of motion for the free vibration of a simple spring–mass system and determine its natural frequency and time period.	*11*	*K3*	*CO3*
		OR			
	b)	Solve the equation of motion for a damped harmonic oscillator and discuss the conditions for heavy, critical, and light damping cases using the damping ratio.	*11*	*K3*	*CO3*
26.	a) (i)	Identify the number of atoms, atomic radius, coordination number and atomic packing factor for FCC structure.	*8*	*K3*	*CO4*
	(ii)	Lattice constant of a BCC crystal is 0.36 nm. Calculate its atomic radius.	*3*	*K3*	*CO4*
		OR			
	b)	Identify various crystal imperfections and discuss their effects on crystal structure.	*11*	*K3*	*CO4*
27.	a)	Construct the working of CO_2 laser with necessary diagrams and explain different modes of vibrations of CO_2, molecule.	*11*	*K3*	*CO5*
		OR			
	b)	Deduce the relation for numerical aperture and angle of acceptance of an optical fiber cable. And, analyze their importance in transmission of data through an optical fiber cable.	*11*	*K4*	*CO5*
28.	a)	Make use of Maxwell's equation in integral form to discuss the plane electromagnetic waves in vacuum and condition on the wave field.	*11*	*K3*	*CO6*
		OR			
	b)	Analyze how the EM waves are produced and propagated when it is travelling from vacuum to a non-conducting medium.	*11*	*K4*	*CO6*