Reg. No.															

Question Paper Code	13730

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

First Semester

Computer Science and Business Systems

20BSPH102 - FUNDAMENTALS OF PHYSICS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which of the following does not show any interference pattern? (a) Soap bubble (b) Excessively thin film (c) A thick film (d) Wedge Shaped film	1	K1	CO1
2.	Which of the following is a uniaxial crystal? (a) Borax (b) Mica (c) Quartz (d) Selenite	1	K1	CO1
3.	Coordination number in simple cubic crystal structure is (a) 2 (b) 4 (c) 6 (d) 8	1	K1	CO2
4.	Number lattice points in primitive cell is (a) one (b) two (c) three (d) four	1	K1	CO2
5.	In case of a forced vibration, the resonance wave becomes very sharp when the ____ (a) applied periodic force is small (b) quality factor is small (c) damping force is small (d) restoring force is small	1	K1	CO3
6.	Electromagnetic waves are considered to be ----- in nature. (a) transverse (b) longitudinal (c) mechanical (d) Neither longitudinal nor transverse	1	K1	CO3
7.	The velocity of electromagnetic wave in vacuum is (a) $C = \frac{1}{\sqrt{\varepsilon_0 \mu_0}}$ (b) $C = \frac{2}{\sqrt{\varepsilon_0 \mu_0}}$ (c) $C = \frac{3}{\sqrt{\varepsilon_0 \mu_0}}$ $(d)\ C = \frac{\sqrt{\varepsilon_0 \mu_0}}{3}$	1	K1	CO4
8.	The equation $\nabla \times E = -\frac{\partial B}{\partial t}$ is the differential form of (a) Ampere's circuital law (b) Faraday's law (c) Gauss's law (d) Coulomb's law	1	K1	CO4
9.	The maximum energy level upto which the electrons can be filled at 0 K is (a) Femi level (b) Fermi energy (c) Fermi velocity (d) Fermion	1	K1	CO5
10.	LASER is (a) Light amplification by spontaneous emission of radiation (b) Light amplitude sequential emission of radiation (c) Light amplitude by stimulated emission of radiation (d) Light amplification by stimulated emission of radiation.	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Compare interference and diffraction.	2	K2	CO1
12.	Define the term Bandwidth.	2	K2	CO1
13.	What are Miller indices?	2	K1	CO2
14.	What are Bravais lattices?	2	K1	CO2
15.	Explain why damping devices are often used on machinery.	2	K2	CO3
16.	Give reason for the energy dissipation in case of damped harmonic oscillator.	2	K1	CO3
17.	Explain the thermodynamic process.	2	K2	CO4
18.	Define the efficiency of a heat engine.	2	K2	CO4
19.	State de-Broglie hypothesis.	2	K2	CO5
20.	What are matter waves?	2	K1	CO5
21.	Write down any two differences between step index and graded index fiber.	2	K1	CO6
22.	Write the condition for laser action.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the theory of plane transmission grating and derive equation of maxima and minima.	*11*	*K2*	*CO1*
		OR			
	b)	Derive the mathematical expression for Brewster angle and list out any three applications of Brewster's law.	*11*	*K2*	*CO1*
24.	a)	Prove that the atomic packing factor of HCP is 0.74.	*11*	*K2*	*CO2*
		OR			
	b)	Obtain the atomic packing factors for SC and BCC lattices.	*11*	*K2*	*CO2*
25.	a)	Describe the differential equation of a damped harmonic oscillator.	*11*	*K2*	*CO3*
		OR			
	b)	With neat sketch derive the expression for time period of oscillation and frequency of a spring -mass system suspended vertically.	*11*	*K2*	*CO3*
26.	a)	Obtain the Maxwell's equations in vacuum and non-conducting medium.	*11*	*K2*	*CO4*
		OR			
	b)	Explain the concept of entropy and derive the expression for entropy.	*11*	*K2*	*CO4*
27.	a)	Derive an expression for Planck's law of radiation.	*11*	*K2*	*CO5*
		OR			
	b)	Obtain the eigen values and eigen functions for an electron enclosed in a one-dimensional potential box.	*11*	*K2*	*CO5*
28.	a)	Describe the construction and working of a CO_2 laser with a neat sketch.	*11*	*K2*	*CO6*
		OR			
	b)	Discuss briefly about the fiber optic displacement sensor and pressure sensor.	*11*	*K2*	*CO6*