SAI RAM ENGINEERING COLLEGE

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Question Paper Code	14240

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

First Semester

Computer Science and Engineering

(Common to all except CSBS)

24BSPH101 - ENGINEERING PHYSICS

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K – Level	CO
1.	Hooke's law and Poisson's ratio can be applicable	1	K1	CO1
	(a) within Plastic limit (b) with in elastic limit (c) At yield point (d) At breaking point			
2.	In bending of beam which layer is neither elongated nor shortened?	1	K1	CO1
	(a) Axis of load (b) Neutral axis (c) Centre of gravity (d) None of the mentioned			
3.	Interference can be obtained from waves of	1	K1	CO2
	(a) two coherent waves (b) two noncoherent waves (c) One coherent and one noncoherent waves (d) two polarised waves			
4.	Both CO_2 and Nd:YAG laser emits wavelength which falls in ------ region	1	K1	CO2
	(a) microwave (b) UV (c) IR (d) visible			
5.	Calculate relative permeability when $\mu = 2\mu_0$	1	K2	CO3
	(a) 0 (b) 1 (c) 0.2 (d) 2			
6.	Velocity of electromagnetic wave in vacuum is equal to	1	K1	CO3
	(a) μ_0 (b) $1/(\sqrt{\varepsilon_0\mu_0})$ (c) ε_0 (d) $\varepsilon_0\mu_0$			
7.	Rayleigh-Jeans law is applicable for -------- wavelength region.	1	K1	CO4
	(a) shorter (b) all wavelength (c) Longer (d) None of these			
8.	In STM, the current flows due to	1	K1	CO4
	(a) conduction (b) convection (c) radiation (d) tunneling			
9.	Primitive cell has ---- number of atom.	1	K1	CO5
	(a) 2 (b) 1 (c) 6 (d) 4			
10.	Which mode of heat propagation does not require material medium	1	K1	CO6
	(a) radiation (b) conduction (c) convection (d) Seebeck effect			

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

		Marks	K – Level	CO
11.	Write the geometrical moment of inertia of circular and rectangular bodies.	2	K1	CO1
12.	Define Poisson's ratio.	2	K1	CO1
13.	Differentiate transverse waves and longitudinal waves.	2	K2	CO2
14.	Summarize the properties of laser beam.	2	K2	CO2
15.	What is meant by displacement current?	2	K1	CO3
16.	Calculate the velocity of light when $\varepsilon_0 = 8.842 \times 10^{-12}$ Fm^{-1} and $\mu_0 = 4\pi \times 10^{-7}$ Fm^{-1}.	2	K2	CO3
17.	State the hypothesis of Planck's theory.	2	K1	CO4
18.	Explain physical significance of wave function.	2	K2	CO4

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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19. Calculate the lattice parameter a in hexagonal close packing when c = √8 Å. *2* *K2* *CO5*
20. Sketch (001) and (111) plane. *2* *K2* *CO5*
21. Define coefficient of thermal conductivity. *2* *K1* *CO6*
22. Mention the different modes of heat transfer. *2* *K1* *CO6*

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23. a) Derive an expression for the twisting couple on a wire. *11* *K3* *CO1*

OR

   b) Derive with relevant theory how a cantilever may be used to determine the Young's modulus of the material of bar? *11* *K3* *CO1*

24. a) Examine how interference pattern from air wedge set up aided to calculate the thickness of the thin wire. *11* *K4* *CO2*

OR

   b) Analyze the vibrations of CO_2 molecule and explain the construction and working of CO2 laser with suitable diagrams. *11* *K4* *CO2*

25. a) Analyze how Maxwell's equations interrelate electric and magnetic fields by deriving their integral and differential forms. *11* *K4* *CO3*

OR

   b) Examine how electromagnetic waves reflect and transmit at the boundry between vacuum and a non-conducting medium. *11* *K4* *CO3*

26. a) Derive Schroedinger's time independent and time independent wave equations. *11* *K3* *CO4*

OR

   b) Apply tunneling phenomena and explain the working of STM with a neat sketch. *11* *K3* *CO4*

27. a) Inspect the HCP system thoroughly and calculate its axial ratio and packing fraction. *11* *K4* *CO5*

OR

   b) List the steps to calculate the Miller indices and also derive the expression for interplanar distance in cubic lattice. *11* *K4* *CO5*

28. a) Apply the concept of heat conduction to calculate the coefficient of thermal conductivity for bad conductors using Lee's method. *11* *K3* *CO6*

OR

   b) By utilizing second law of thermodynamics design the refrigerator and explain the transfer of heat from cold to hot places. *11* *K3* *CO6*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create **14240**