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EAST POINT COLLEGE OF ENGINEERING & TECHNOLOGY
An Autonomous Institution Affiliated to Visvesvaraya Technological University (VTU) Belagavi

USN | | | | | | | | | | |

EPPHS102/EPPHS202

First/Second Semester B.E. Degree Examination, May 2026
APPLIED PHYSICS FOR CSE STREAM

TIME:3 hrs. Max.Marks:100

Note: 1. Answer any FIVE full questions, choosing ONE question from each MODULE
2. Formula Hand Books Permitted
3. M: Marks, L: Bloom's level, C: Course outcomes.

		Module-1	M	L	C
Q.1	a	Describe with energy band diagram the construction & working of Semiconductor diode LASER.	8	L2	CO1
	b	What is Attenuation? Explain the various factors contributing to optical fiber signal loss.	8	L2	CO1
	c	A pulsed LASER has an average power output 1.5 mW per pulse and pulse duration is 30 ns. The number of photons emitted per pulse is estimated to be 1.05×10^8. Find the wavelength of the emitted LASER.	4	L3	CO1
		OR			
Q.2	a	Define Numerical Aperture and obtain the expression for numerical aperture.	8	L2	CO1
	b	Explain the construction and working of LIDAR.	8	L2	CO1
	c	The attenuation of light in an optical fiber is estimated at 2.2db/Km. What fractional intensity remains after 2Km and 6Km?	4	L3	CO1
		Module–2			
Q.3	a	State and explain Heisenberg's uncertainty principle and prove that e^-s does not exist in nucleus.	8	L2	CO2
	b	Starting from Schrodinger's time independent equation derive the expression for energy eigen value and eigen function for a particle in one dimensional potential well of infinite height.	8	L2	CO2
	c	An electron is bound in an one dimensional potential well of width 1A°, but of infinite wall height. Find its energy values in eV in the ground state and in the first two excited states.	4	L3	CO2
		OR			
Q.4	a	State and explain de Broglie hypothesis and derive the expression for de Broglie wavelength by analogy method.	8	L2	CO2
	b	Setup Schrodinger time independent equation in one dimension.	8	L2	CO2
	c	A spectral line of wavelength 5461Å has a width of 10^{-4}Å. Evaluate the minimum time spent by the electrons in the upper energy state.	4	L3	CO2
		Module–3			
Q.5	a	Explain Orthogonality and Orthonormality with an example for each.	8	L2	CO3
	b	Discuss the CNOT gate and its operation on four different input states.	8	L2	CO3

PROOF

	c	Verify if $\|\omega\rangle = \begin{bmatrix}1\\1\end{bmatrix}$ and $\|v\rangle$=[1,-1] are orthogonal.	4	L3	CO3
		OR			
Q.6	a	Explain the representation of qubit using Bloch Sphere.	8	L2	CO3
	b	State the Pauli matrices and apply Pauli matrices on the states $\|0\rangle$ and $\|1\rangle$.	8	L2	CO3
	c	Given $\|\psi\rangle = \begin{pmatrix}\alpha_1\\\alpha_2\end{pmatrix}$ $\|\phi\rangle = \begin{pmatrix}\beta_1\\\beta_2\end{pmatrix}$ Prove that $\langle\psi\|\phi\rangle = \langle\phi\|\psi\rangle^*$	4	L3	CO3
		Module–4			
Q.7	a	Define Fermi Factor and Discuss the variation of Fermi factor with temperature and energy.	8	L2	CO4
	b	Define Meissner's Effect and hence classify superconductors into Soft and Hard superconductors using M-H graphs.	8	L2	CO4
	c	Evaluate the probability of an electron occupying an energy level 0.02 eV above the fermi level at 400 K.	4	L3	CO4
		OR			
Q.8	a	Explain flux quantization with neat diagram. Discuss DC & AC Josephson effect.	8	L2	CO4
	b	Explain the failures of classical free electron theory and mention the assumptions of quantum free electron theory.	8	L2	CO4
	c	Lead in the superconducting state has a critical temperature of 6.2 K at zero magnetic field and a critical filed of $6.4 \times 10^4 Am^{-1}$ at 0K. determine the field at 4 K.	4	L3	CO4
		Module–5			
Q.9	a	Mention the general pattern of monte Carlo method and hence determine the value of π.	8	L2	CO5
	b	Illustrate the odd rule and odd rule multipliers with a suitable example.	8	L2	CO5
	c	The jump animation is associated with a Push Time of 5 frames, Push Height 0.4m and Stop Height 0.5m. Calculate the Stop time. Express the push time and stop time in second if the animation is played at 30fps.	4	L3	CO5
		OR			
Q.10	a	Discuss the modelling probability for proton decay	8	L2	CO5
	b	Discuss timing in Linear motion, Uniform motion, slow in and slow out.	8	L2	CO5
	c	The number of particles emitted per second by a random radioactive source has a poisson distribution with $\lambda = 4$. Calculate the probability of $P(X = 0)$, $P(X = 1)$ and $P(X = 2)$.	4	L3	CO5

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