9/11/23

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Vivekananda College of Engineering & Technology, Puttur [A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®] Affiliated to VTU, Belagavi & Approved by AICTE New Delhi			
CRM08	Rev 1.14	‹BS(PHY)›	‹06/11/2023›

CONTINUOUS INTERNAL EVALUATION - 1

Dept: BS(PHY)	Sem / Div: I/CSE-A/B	Sub: Applied Physics for CSE stream	S Code: BPHYS102
09/11/2023	Time: 3-4:30 pm	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

QN		Questions	Marks	RBT	CO's
		PART A			
1	a	Define acceptance angle and numerical aperture and obtain an expression for the numerical aperture of an optical fiber.	10	L1& L2	CO1
	b	With the help of energy band diagram explain the construction, principle and working of a semiconductor diode laser.	10	L2	CO1
	c	The ratio of population of two energy levels is 1.059×10^{-30}. Find the wavelength of light emitted by spontaneous emission at 330K.	5	L3	CO1
		OR			
2	a	Explain the interaction of radiation with matter and mention any two properties and applications of laser.	10	L2	CO1
	b	Derive an expression for energy density using Einstein's A and B coefficients thus conclude on $B_{12}=B_{21}$.	10	L1& L2	CO1
	c	The angle of acceptance of an optical fiber is 30^0 when kept in air. Find the angle of acceptance when it is in a medium of refractive index 1.33.	5	L3	CO1

PART B					
3	a	State and explain Heisenberg's Uncertainty principle. Prove the non-confinement of electron inside the nucleus based on this principle.	10	L1& L2	CO2
	b	Derive the eigen function of a particle inside an infinite potential well of width 'a' using the method of normalization.	10	L2	CO2
	c	An electron is associated with a de-Broglie wavelength of 1nm. Calculate the energy and the corresponding momentum of the electron.	5	L3	CO2
OR					
4	a	Derive an expression for de-Broglie wavelength by analogy and mention any four properties of de-Broglie waves.	10	L2	CO2
	b	Set-up one dimensional time independent Schrödinger equation.	10	L2	CO2
	c	An electron is trapped in a 1-D potential well of infinite height and of width of 0.1nm. Calculate the energy required to excite it from its ground state to first two excited states.	5	L3	CO2

Prepared by: Dr. Raveesha P M

HOD: Prof. M Ramananda Kamath