CONTINUOUS INTERNAL EVALUATION - 2

Dept: FY	Sem/Div:I/A,B,C	Sub: Engineering Physics	S Code:18PHY12
04/03/21	Time: 3-4:30pm	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	Give the four Maxwell's equations in differential form in vacuum and hence derive the EM wave equation in terms of electric field using Maxwell's equations.	10	L2	CO2
	b	What is displacement current? Obtain the expression for displacement current. Derive Gauss divergence theorem	10	L1 & L2	CO2
	c	Find charge density (ρ) at (1,1,1) if Electric Flux Density (**D**) $\mathbf{D}=6x^2\mathbf{a}_x+3xy^2\mathbf{a}_y+xyz^3\mathbf{a}_z$	5	L3	CO2
		OR			
2	a	Explain the terms (a) spontaneous emission, (b) stimulated emission (c) induced absorption (d) active medium and (e) resonance cavity with diagram	10	L1 & L2	CO3
	b	Mention the properties of wavefuntion? Setup 1-dimensional time independent Schrodinger wave equation.	10	L1 &L 2	CO3
	c	A particle of mass 0.5MeV/C^2 has kinetic energy 100eV. Find its de Broglie wavelength, where C is the velocity of light.	5	L3	CO3

		PART B			
3	a	State de Broglie's hypothesis and prove that wavelength of an accelerated electron is $\lambda = \frac{1.226\text{nm}}{\sqrt{V}}$	10	L1 &L 2	CO
	b	State and explain Heisenberg Uncertainty principle. Prove that electrons cannot exist inside the Nucleus of an atom.	10	L1 &L 2	C
	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 fifth excited state.	5	L3	CO
		OR			
4	a	Define the terms Population inversion and meta-stable state . Derive the expressions for energy density of radiation at equilibrium in terms of Einstein's coefficients.	10	L1 & L2	CO
	b	Mention the three different vibrational modes of CO_2 molecule. With a neat energy level diagram explain the construction and working of CO_2 laser.	10	L2	CO3
	c	The average output power of laser source emitting a laser beam of wavelength 632.8nm is 5mW. Find the number of photons emitted per second by the laser source.	5	L3	CO3

1/3/21

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HOD: Prof. Ramananda Ramath 1/3/21