

Internal Assessment Test 1 – September 2019

Sub:	Engineering Physics Theory					Sub Code:	18PHY12	Branch:	CS/IS/CIV	
Date:	18-09-2019	Duration:	90 min's	Max Marks:	50	Sem / Sec:	I / A,B,C,D,E,F and G		OBE	
Answer any FIVE FULL Questions									CO	RBT
Given: $c = 3 \times 10^8$ m/s; $h = 6.625 \times 10^{-34}$ Js; $k = 1.38 \times 10^{-23}$ J/K; $m_e = 9.1 \times 10^{-31}$kg; $e = 1.6 \times 10^{-19}$C									MARKS	
1 (a)	State Heisenberg's uncertainty principle and show that electrons cannot exist in the nucleus.					[07]	CO3	L3		
(b)	If the output power of GaAs ($E_g = 1.4$ eV) semiconductor laser is 5 mW, calculate the number of photons emitted per second.					[03]	CO4	L3		
2 (a)	Find the eigen function and energy eigenvalues for a particle in a one dimensional potential well of infinite height.					[07]	CO3	L3		
(b)	Calculate the ratio of population of two energy levels involved in the He-Ne laser emitting photons of wavelength 6328 Å, at thermal equilibrium (300 K).					[03]	CO4	L3		
3 (a)	Derive time independent Schrodinger wave equation for a particle moving in one dimension.					[07]	CO3	L4		
(b)	Discuss the application of lasers in defence for rangefinder.					[03]	CO4	L2		
4 (a)	Obtain an expression for energy density of radiation under thermal equilibrium in terms of Einstein's coefficients.					[07]	CO4	L4		
(b)	Find the eigenvalue and write the eigen function for the electron in the ground state, if it is confined in the potential well of infinite height. Given that width of the well is 1Å.					[03]	CO3	L3		

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