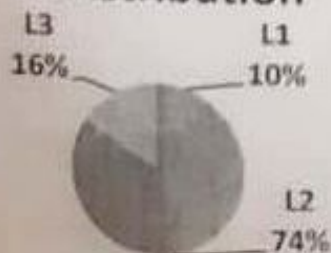


UNITED COLLEGE OF ENGINEERING & RESEARCH		Department of Applied Sciences & Humanities		Sections: H, I, J, K, L, M – (CS+CE)		
2 nd SESSIONAL EXAM	SEMESTER-I ST	February 2021				
TIME: 2Hrs	SUBJECT: PHYSICS	Paper code: KAS101T	MM. 30			
READ ALL INSTRUCTIONS AND QUESTIONS VERY CAREFULLY						
SECTION A (Attempt ALL questions) Very short answer				[6]	CO	Blooms Taxonomy Level
1	a	What is equation of continuity of current?	[1]	2	Remember (L1)	
1	b	Write Maxwell's equations in differential forms.	[1]	2	Remember (L1)	
1	c	What is skin depth in conductor?	[1]	2	Remember (L1)	
1	d	What is step index multimode fiber?	[1]	5	Remember (L1)	
1	e	Explain dispersion of radiation in optical fiber?	[1]	5	Understand (L2)	
1	f	Explain the meaning of population inversion?	[1]	5	Understand (L2)	
SECTION B (Attempt Any THREE questions) Short answer				[9]		
2		Prove that electromagnetic waves are transverse in nature.	[3]	2	Understand (L2)	
3		What is Poynting vector? A lamp radiates 500 Watt power uniformly in all directions. Calculate the electric and magnetic field intensity at 1 m distance from the lamp?	[3]	2	Apply (L3)	
4		If the fractional difference between the core and cladding refractive indices of a fibre is 0.0135 and numerical aperture is 0.2425. Calculate the refractive indices of the core and cladding materials?	[3]	5	Apply (L3)	
5		What are Einstein's coefficients? Prove that the ratio of probability of spontaneous transition to stimulated transition is proportional to frequency of radiation?	[3]	5	Understand (L2)	
SECTION C (Attempt ANY THREE question) Long answer				[15]		
6		Deduce four Maxwell equations in free space. Explain the concept of displacement current and show how it led to modification of Ampere's law.	[5]	2	Understand (L2)	
7		Derive the wave equation of electric and magnetic field for free space? Show that electromagnetic waves travel in free space with velocity of light?	[5]	2	Understand (L2)	
8		Explain the spontaneous and stimulated emission of radiation. Discuss the construction and working of ruby laser.	[5]	5	Understand (L2)	
9		Explain acceptance angle and acceptance cone of an optical fibre. What do you mean by numerical aperture? Derive expressions for them.	[5]	5	Understand (L2)	
#### END OF PAPER ####						

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