Reg. No.



VI SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING) MAKEUP EXAMINATIONS, JUNE 2017

SUBJECT: LIGHTING SCIENCE: DEVICES AND SYSTEMS [ELE 4007]

REVISED CREDIT SYSTEM

Time: 3 Hours			Date: 22 June 2017							Max	Max. Marks: 50		
Instru	ictions	s to Candidates:											
	✤ A	nswer ALL the quest	ions.										
	✤ N	lissing data may be su	uitably	assum	ed.								
1A.	Explai source	in with an example, l e are related.	now th	e spec	tral ey	e sensi	tivity	and lu	minou	s effic	acy of a	a light	(04)
1B.	A source of luminous intensity 1000Cd is suspended at height of 3.5m at the center of room having dimensions 5mX4m. Plot the horizontal illuminance profile along the longer (length) center line of room. Assume the luminous intensity to be uniform in all directions. Take 0.5m steps for calculations.							(06)					
2A.	Using Wein's equation, tabulate the spectral radiant exitance curve for the wavelength ranging from 350nm to 650nm for a black body radiator working at a frequencies of 5000 K and 7000 K. Hence prove the validity of Wein's displacement law. Assume 50nm steps. (0)						(06)						
2B.	With a neat sketches explain Spread and Diffused reflections in lighting. Give example of each.						(04)						
3A.	Compare the following performance characteristics of HPSV, HPMV and MH Lamp.												
	 i) Luminous efficacy ii) Lamp lumen depreciation iii) CRI iv) Lamp life 							(04)					
20	With relevant discussion and in the new nettowns for "singular" and "newsholis" reflectors							(01)					
3 D .	Menti	Mention applications of these reflectors. (0					(06)						
4A.	Tungs lamp.	Cungsten Halogen lamp does not have an infinite life span when compared to Incandescent amp. Justify. (02)											
4B.	A 400 W, tubular Metal Halide lamp with Non-integral, Side mounted, High Bay luminaire is tested using Gonio-photometer and the test data measured by the lux meter, placed at a distance of 8 meters, are given below. The lamp has a light output of 30500 lm. Find LOR, ULOR and DLOR. Take angular width is 10 degrees.												
		Angle (Deg)	5	15	25	35	45	55	65	75	85		
		Illuminance (Lux)	404	269	128	76.7	54	41	37.3	34	18.3		
		Angle (Deg)	95	105	115	125	135	145	155	165	175		
		Illuminance (Lux)	15.7	10.5	7.8	5.6	4	2.7	1.9	1.4	0.9		(06)

4C. Explain the importance of Fresnel lens used in luminaire for lighting applications.

(06) (02) **5A.** Listout the different types of lighting control strategies used in lighting applications. With an example, explain lumen maintenance dimming technique used for interior applications without consideration of daylight.

(04)

5B. A room measuring 18m × 9m is to be lit to a lighting level of 150 lux. Height of the room is 4.5m and workplane is 80cm above the floor level. The luminaires are to be ceiling mounted and house reflector lamps having L.D.L of 4500 lm. The light loss factor is 0.7. Design the complete lighting scheme. Also estimate the initial glare index for the lengthwise direction of view. The following tables may be made use of in determining the utilization factor and Glare Index.

RI	CU	Room	GI	
1	0.43	Dimensions		
1.25	0.48	X Y		
1.5	0.53	2H 4H	14.9	
2.0	0.58	6H	15.3	
2.0	0.50	4H	15.5	
2.5	0.05	3H <u>6</u> H	15.9	
3.0	0.60			

(06)