

M.TECH ILLUMINATION TECH AND DESIGN**First Year First Semester Exam – 2024****Subject: LIGHT SOURCES & LUMINAIRES**

Time: Three hours

Full marks: 100 (50 marks for this part)

Use Separate Answer Script for each part

No. of Question	<u>PART – I</u> ANSWER Q. No 1 AND ANY THREE FROM REMAINS	MARKS
1.	(a) What are the approx. CCT value of Warm and Cool white LEDs? (b) What is ballast factor? (c) what is the function of a DIAC in electronic ballast? (d) Mention the luminous efficacy and CRI value of a SON lamp? (e) What is the full form of the term 'TIM' for a COB type LED?	5×1
2.	(a) Describe the operating principle of Fluorescent lamp with magnetic ballast and Starter. (b) Briefly explain the causes for use of electronic ballast instead of electromagnetic ballast in indoor applications. (c) Mention merits and demerits of electronic ballast.	6 6 3
3.	(a) Explain the working principle of a Light Emitting Diode (LED). Mention the name in full form of three types of commercially available LEDs. Write the differences between SMD and COB types LEDs. (b) Why does thermal management matter for a LED lamp? What is the criteria for choosing the appropriate heat sink for LED luminaires?	2+2+5 4+2
4.	(a) Describe the construction and operation of a Metal Halide Lamp. (b) How does work High Pressure Sodium Lamp? What is Sodium D-Line?	8 5+2
5.	Draw the circuit diagram of a conventional electronic ballast of a fluorescent lamp and explain the circuit.	9+6
6.	Write the short notes (any three) (a) Getter (b) Halogen Cycle (c) Igniter (d) Humidity and temperature effects on lamps	5×3

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Part II

(Each part carrying 50 marks)

Use Separate Answer scripts for each part

Answer Question No. 1 and any two questions from rest.

1.
 - a) What do you mean by cut off angle of a luminaire? 2
 - b) Briefly discuss on IP code of luminaire. 5
 - c) Briefly discuss about control gear of a luminaire. 5
 - d) Explain with suitable diagram, how surface properties of protector influences intensity distribution of a luminaire. 8

2.
 - a) Briefly describe the properties of luminaire. 5
 - b) Define 'Throw' and 'Spread' of a road lighting luminaire. Explain about classifications of luminaires according to those. Mention classification of Luminaires according to glare index. 10

3.
 - a) What do you mean by Floodlights? What is inner beam and outer beam of floodlights? Briefly describe different types of floodlights used for lighting applications. 7
 - b) Find out DLOR, ULOR & LOR for a luminaire with intensity distribution given below. Total lumen output of the light source is 3280. 8

Angle (deg)	I (cd)	Angle (deg)	I (cd)
5	1390	95	109
15	1363	105	102
25	1285	115	102
35	1150	125	98
45	940	135	92
55	620	145	73
65	367	155	61
75	225	165	42
85	135	175	25

4.
 - a) Mention the different materials used for manufacturing protector and reflectors of luminaire with their respective advantages and disadvantages. 9
 - b) Briefly explain how different parts / parameters of a luminaire influences light distribution from it. 6

5. Write short note on... [3 X 5]
 - a) Luminaire
 - b) Integrating Sphere
 - c) Variation Intensity Distribution of a Luminaire with Lamp location inside it.