

## Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



**4M** 

## VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING) MAKE UP EXAMINATIONS, DEC 2015 / JAN 2016

## SUBJECT: ILLUMINATION TECHNOLOGY [ELE 405] REVISED CREDIT SYSTEM

Time: 3 Hours

03 January 2016

MAX. MARKS: 50

## Instructions to Candidates:

- ✤ Answer ANY FIVE FULL the questions.
- ✤ Missing data may be suitable assumed.
- **1A.** Draw the structure of human eye and explain the following parts of the human eye.
  - a) Fovea
  - b) Iris
  - c) Cornea
  - d) Retina
- 1B. Source of luminous intensity 1000Cd is suspended at height of 3.5m at the center of room having dimensions 5m x 4m. Calculate the horizontal illuminance along the longer center line of the room. Assume the luminous intensity to be uniform in all direction. Take 0.5m steps for calculation.
- 2A. With relevant sketches, explain the different types of Reflections referred to lighting. Give an example for each type.5M
- **2B.** Write a short note on
  - a) Parabolic reflectors
  - b) Co-related color temperature **2M**
- 2C. A distant star is found to be radiating at a temperature of 6000K. What is the wavelength of maximum radiation? What will be its color?3M
- 3A. How is tungsten halogen lamp different from GLS lamp? Mention the advantages and disadvantages of incandescent sources
  5M
- **3B.** With relevant diagrams, explain CIE classification of luminaires **5M**

- **4A.** A library building of 30m×25m×6m is to be illuminated to 300 lux on the tables of height 75cm. Assuming the Light Loss Factor to be 0.9 and maximum S/Hm to be 1, give the disposition of the lighting schemes using following luminaires:
  - a) Twin 36W, FTL luminaires with LDL=3350 lm/lamp with the electronic ballast of 4W
  - b) Twin 42W, CFL luminaires with lamp efficacy of 75lm/W

Which scheme would you recommend and why? Use the following table for the evaluation of CU.

	4	3	2	1	RI
	0.721	0.654	0.52	0.436	CU

- **4B.** Bring out the difference between Local lighting and Localized General Lighting. **2M**
- **5A.** Write down the general syntax for creating an IES file.
- 5B. Explain the six basic rules for achieving energy efficiency & cost effectiveness in lighting installations.5M
- **6A.** Design a Suitable Lighting Scheme to illuminate a perfectly diffusing wall of a monument, using floodlighting projectors. The wall is 20m high and 20 m wide, and must be lit up to a uniform illuminance level of 150 lux. The projectors are mounted on a tower located at a distance of 40 m from the base of the wall. Assume a C.U of 0.4, WLF= 1.2 and D.F= 1/1.3. Available lamps are
  - a) 500 W Metal Halide Lamp [Luminous Efficacy = 85 lm/W, CRI = 75]
  - b) 200 W, L.E.D lamps [Luminous Efficacy = 100 lm/W, CRI = 80]

The projectors will be lit for eight hours a day, throughout the year. Justify your design. Also, compute the beam spread of the recommended luminaire and show the beam projection on the wall surface.

- **6B.** With neat sketches and technical reasons, bring out the difference between the following arrangements of road lighting.
  - a) Span wire vs Catenary
  - b) Opposite vs Staggered
- 6C. List two forms of Side Lighting used for Daylight Harvesting in Buildings and explain
  2M
  - any one of them

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