Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

II SEMESTER M.TECH (ESM) END SEMESTER EXAMINATIONS,

APRIL - MAY 2017

SUBJECT: INTEGRATED LIGHTING DESIGN [ELE 5201]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 29, April 2017** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Draw and explain the C-gamma coordinate system for gonio-photometery. ***(03)***

1B. What constitutes quantity and quality aspects of illumination? Explain with a suitable example. ***(03)***

1C. A 10W LED downlighter has a Lambertian luminous intensity distribution, with a maximum intensity of 1500Cd along the zero degree downward vertical. Calculate the total lumen output of the luminaire. ***(04)***

2A. Explain the importance of maintaining a lighting installation. Draw a neat sketch of variation of illuminance through the life of an installation with proper labelling of different sections. ***(03)***

2B. What is the role of room dimensions and their surface reflectance in illuminating an interior? Explain with an example. ***(03)***

2C. An office interior needs to be illuminated with the LED downlighter discussed in Q1C. Calculate the number of LED downlighters required to provide an illuminance of 500 lux to an office of 6 x 6 x 4 (LWH) in meters. The working plane is at a height of 0.85m and luminaires are ceiling mounted. Assume coefficient of utilization as 0.6 and light loss factor as 0.85. The space-to-mounting height ratio is unity. Show the layout of luminaires and final installed illuminance. ***(04)***

3A. Explain the strategies for achieving Demand Side Management in interior lighting. ***(03)***

3B. Explain the quality and quantity criteria for sports lighting with a suitable example. ***(03)***

3C. Design suitable flood lighting scheme using circular projectors to illuminate 140X20m building front, to a illuminance of 100 lux, CU= 0.5, DF=1.3, WLF=1.2. Projectors can be mounted on ground level / on poles at a distance of 17m. Lamps available: 400 watts metal Halide and 400 watts HPS, Compare the scheme in terms of average illuminance, beam spread, energy consumption. ***(04)***

4A. With the help of a neat sketch explain the classification of road lighting luminaires. ***(04)***

4B. What is "Threshold increment"? What factors need to be considered for estimating it? ***(03)***

4C. List the various zones in a Tunnel from lighting view point. ***(03)***

5A. Explain the different categories of emergency lighting. ***(03)***

5B. Derive the expression for day light factor in an interior. ***(03)***

5C. With the help of neat sketches compare clerestory and windows in providing uniform illuminance in an interior. ***(04)***