

**B.E.(ELECTRICAL ENGG.) 5<sup>th</sup> Year; 2<sup>nd</sup> Semester Examination 2019**

**Subject: Advanced Lighting Design**

Time: 3 hours

Use Separate Answer script for each part

Full Marks:100

Part-I (50 Marks)

ANSWER ANY THREE QUESTIONS

**Question No. 1 carries 18 marks**

Q.1.

A) What is advantage of the Zonal Cavity method over the conventional Lumen method? Illustrate the possible room cavities with suitable diagram and hence describe the procedure to determine coefficient of utilization(COU) of a specific luminaire for a given room from manufacturer-supplied COU chart.

B) What are benefits of a sensor-controlled indoor lighting system? Explain the working principle of an occupancy sensor for an indoor space.

(12+6=18)

Q.2.

A) Explain the method of computation of point-specific illuminance on a horizontal working plane due to an extended surface source mounted on a ceiling of a room.

B) Describe the method of determination of Effective Ceiling Reflectance of an irregularly shaped ceiling with one example.

C) What do you understand by direct discomfort glare applicable in case of an indoor lighting installation?

(8+4+4=16)

Q.3.

A) Write down the advantages and limitations of daylight integration.

B) Write down the Inverse square cosine law of illuminance and hence derive the expression of point-specific horizontal illuminance due to unobstructed sky vault.

C) Explain the followings of a glazing material and also mention how these parameters influence the selection of a glazing system during daylighting design-

(i) U-value; (ii) solar-heat-gain-coefficient; (iii) visible light transmittance.

(2+8+6=16)

Q.4.

A) Explain the followings-

(i) Illuminance vector; (ii) Mean spherical illuminance; (iii) Mean cylindrical illuminance.

B) Discuss the indoor lighting design parameters according to CIE – the International standard.

(10+6=16)

Q.5. Write down short notes on any two from the followings-

(i) Cost of a lighting system and simple pay back method;

(ii) Compare among electrical and photometric parameters of T8; T5 and WLED tube lamp;

(iii) Daylight Factor method and components of daylight factor;

(iv) Unified glare rating OR Visual Comfort Probability.

(8+8=16)

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Ref. No. EX/EE/5/T/522F/2019.....

Bachelor of Engineering (Electrical Engineering) 5<sup>th</sup> Year 2<sup>nd</sup> semester EXAMINATION, 20 19  
 (1<sup>st</sup>/2<sup>nd</sup> Semester/Repeat/Supplementary/Annual/Bi-Annual)

SUBJECT..... Advanced Lighting Design  
 (Name in full)

PAPER.....

Full Marks 100

Time: Two hours/Three hours/Four hours/Six hours

(50 marks for part-II)

Use a separate Answer-Script for each part

No. of questions	Part-I /Part II	Marks
	<u>Answer any 2 (25 X 2=50)</u>	
1. a)	How the Road lighting is different from the other outdoor lighting?	3
b)	Write a note on Indian Standard for road lighting, IS 1944.	15
c)	What is the significance of Utilization curve for road lighting design?	4
d)	Why iso-lux diagram is important for road lighting design?	3
2. a)	Discuss the classification methodologies for road as adopted by CIE 115.	20
b)	What is the physical significance of Threshold Increment (TI) in road lighting design? How road lighting design is different from other area lighting designs?	5
3. a)	What are the types of street lighting arrangements generally used in road lighting design, as mentioned in IS 1944?	8
b)	Mention the algorithm for point specific illuminance calculation for road lighting installation using iso-lux diagram of the luminaires.	7
c)	Discuss different road lighting design criteria from the visual performance and visual comfort point of view.	10
4. a)	Discuss the fundamental design parameters to be considered while designing a sports lighting.	15
b)	Write a note on human centric lighting.	10