

BACHELOR OF ARCHITECTURE FOURTH YEAR SECOND SEMESTER – 2025
SEVICES & EQUIPMENT – III

Time 3Hrs

Full Marks: 100

Answer Question 1 and any five questions from the rest

Q1.

- A) Discuss the following Indoor lighting design parameters i. Maintained Average illumination on working plane, ii. Uniformity of illumination, iii. Lighting power density iv. Glare
 B) Explain the physical process of light generation - incandescence and electro-luminescence with suitable examples.
 C) Explain energy efficient lighting system?

12+4+4

Q.2.

- A) Mention the difference between Illuminance and Luminance.
 B) Write down the Laws of Illumination.
 C) A luminaire has the following light intensity distribution. The luminaire is mounted at 2.5 meter above a working plane. How will the illuminance vary on the plane at different angles?

2+6+8

Angle in degrees	0	20	40	60	80	90
Intensity (cd)	420	450	380	200	70	0

Q.3.

- A) Define Luminous Flux.
 B) Mention the process to calculate Luminous flux from Intensity distribution of a Luminaire.
 C) A luminaire has an intensity distribution of $100 \cos \theta$ and emits no light above 90° . If the lamp emits 500 lm, calculate zonal flux contained in each zone, total flux emitted by the luminaire and Light Output Ratio (LOR) of the luminaire?

2+6+8

Q.4.

- A) What do you understand by point source approximation of a luminaire. How illuminance from a long light can be calculated theoretically.
 B) Calculate the illuminance at a point 5 feet below the center of an 8 foot long luminaire with intensity distribution as given in the following table.

Θ (Degree)	I (cd)	θ (Degree)	I (cd)	θ (Degree)	I (cd)
0	4000	12.5	3863	25	3496
2.5	3989	15	3812	27.5	3398
5	3975	17.5	3745	30	3292
7.5	3951	20	3679	32.5	3169
10	3913	22.5	3592	35	3045

- C) Explain Light Loss factor.

4+10+2

[Turn over

Q.5.

- A) What is a Luminaire? Classify luminaires used for indoor and outdoor applications based on flux distribution around those.
- B) Diagrammatically show different types of luminaires used for indoor lighting applications based on their mounting positions.

2+6+8

Q.6.

- A) It is desired to illuminate a drawing Hall of 12m x 12m dimensions with an average illumination of 80 lux. The lamps having efficiency of 14.75 lm/watt to be fitted from the ceiling. Find the no. of lamps & wattage. of lamps, considering mounting height of 3 m, COU=0.5 and depreciation factor = 0.8. Mention Satisfactory spacing arrangements for the light sources for Uniform lighting on the working plane.
- B) Explain why earthing is necessary for house wiring system?

12+4

Q.7.

- A) Briefly describe the transfer of electric power from generating station to the service mains of consumer using single line diagram.
- B) Prepare a table listing different Electric & Photometric parameters of an electric Lamp.

12+4

Q.8.

- A) Estimate the total length of conduit pipe and wiring of a single room of size 5m X 4m. The room is provided with two lamps, one Fan and one 5 Amp socket outlet. Each electric appliance points have to be controlled by individual switch. Mark the location of the electric points suitably and draw the wiring diagram.
- B) Briefly explain Conceal Wiring.

12+4

Q.9

Write short notes on (any four)

4 x 4

- a. Photopic Vision
- b. Scotopic Vision
- c. Chromaticity Diagram
- d. Primary Color
- e. Green building
- f. HID Lamps
- g. Light Emitting Diode
- h. Indian Electricity Rules