B. ARCH. FOURTH YEAR SECOND SEMESTER – 2024
SEVICES & EQUIPMENT – III (Arch/T/421)

Time 3Hrs **Full Marks: 100**

Answer Question 1 and any five questions from the rest

Q1.

A) Explain the following Terms related to the Vision Science: a. Photopic Vision; b. Mesopic Vision; and c. Scotopic Vision

B) Illustrate with example, the additive colour theory, Why object colour theory is called as obstructive colour theory.

C) Explain the physical process of light generation - incandescence and electro-luminance with at least two examples for each.

D) What do you understand by energy efficient lighting system? 6+6+6+2

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 θ 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) Calculate the light loss factor due to open base fluorescent reflector luminaires assuming a 6-month cleaning interval based on lamp lumen output after 2000 h if Light Loss Maintenance Factor (LLMF) of 0.92 & depreciation factor of 0.90? 4+10+2

Q.5.

A) What is a Luminaire? Classify luminaires used for indoor and outdoor applications based on flux distribution around those.

B) Classify different types of luminaires used for indoor lighting applications based on their mounting positions. 2+6+8

Q.6.

A) Explain why earthing is necessary for house wiring system? Describe Pipe Earthing & Plate earthing system with suitable diagrams. 4+12

Q.7.

A) Briefly describe the transfer of electric power from generating station to the service mains of consumer using single line diagram.

B) Explain in detail about electrical wiring of a room with suitable diagram. 8+8

Q.8.

A) Describe the Direct & Indirect effects of Lightning.

B) Briefly explain Lightning Protection system with suitable diagram. 8+8

Q.9

Write short notes on (any four) 4 x 4

a. Office Lighting
b. Industrial Lighting
c. Lighting for health care
d. Green building
e. HID Lamps
f. Light Emitting Diode
g. Safety aspects in Electrical Installations
h. Indian Electricity Rules
i. Conceal Wiring