

Roll No \_\_\_\_\_

**Re-appear, EXAMINATION**  
**Odd Semester 2024-25**



**Course Code: APEE321A**

**Course Name: BUILDING SERVICES-II (ELECTRICAL & LIGHTING)**

**Programme Name: B. Arch**

**Time: 2.5 Hours**

**Maximum Marks: 50**

*Instructions: All questions are compulsory. The question paper consists of 11 questions divided into three-part A, B and C. Section-A comprises 5 questions of 2 marks each, Section-B comprise 4 questions of 5 marks each and Section-C comprises 2 questions of 10 marks each. Q. No. 7, Q. No. 10 and Q. No. 11 have internal choices.*

**Section-A (5 X 2 = 10 Marks)**

|   |                                                                                                                 |     |
|---|-----------------------------------------------------------------------------------------------------------------|-----|
| 1 | What do you understand by safety devices in electrical circuit?                                                 | CO1 |
| 2 | What is the role of earthing?                                                                                   | CO2 |
| 3 | Explain CRI in lighting design.                                                                                 | CO3 |
| 4 | Maintenance factor of a Luminaire depends upon _____ & _____.                                                   | CO4 |
| 5 | Draw the symbols for representing the following in an electrical drawing<br>a. Two-way switch<br>b. Light point | CO5 |

**Section B (4 X 5 = 20 Marks)**

|   |                                                                                                                                                                                            |     |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 6 | With help of suitable illustrations, explain transmission and distribution of electricity.                                                                                                 | CO1 |
| 7 | Discuss the common lighting systems of artificial lighting you would recommend for interiors of a classroom.<br><b>OR</b><br>What are the different methods of artificial lighting design? | CO3 |
| 8 | Calculate the maximum number of 40W Fluorescent lamps that can be connected in a 240V circuit of 5A. Consider loading as 80% of the rated value and power factor 1.8                       | CO4 |
| 9 | Draw the electrical layout of a Kitchen 2.1m x 2.4m and mark the following at suitable locations using appropriate symbols fan, tube light, power socket, exhaust fan and two-way switch.  | CO5 |

**Section C (2 X 10 = 20 Marks)**

| 10   | <p>Derive the equation to calculate the number of artificial light fittings required in a room? Use the same to calculate the number of Light fittings required in a room of length 4m and width 5m. Total flux for all lamps for the fittings to be used is equal to 1500 lumens. The lux level required on working plane is 500 lux. The utilization factor and the Light loss factor of the fittings are 0.7 and 0.8 respectively. <i>Use sketches to support your final answer.</i></p> <p style="text-align: center;"><b>OR</b></p> <p>What is the relationship between the units of power, voltage, and current.<br/>A residential building is fitted with the following</p> <table><tr><th>S.no</th><th>Item</th><th>Quantity</th><th>Rating (W)</th><th>Usage (hour/day)</th></tr><tr><td>1</td><td>Ceiling Fan</td><td>6</td><td>60</td><td>15</td></tr><tr><td>2</td><td>CFL</td><td>10</td><td>11</td><td>10</td></tr><tr><td>3</td><td>CFL</td><td>5</td><td>42</td><td>10</td></tr><tr><td>4</td><td>TV</td><td>1</td><td>80</td><td>5</td></tr><tr><td>5</td><td>Fridge</td><td>1</td><td>200</td><td>22</td></tr></table> <p>Calculate:<br/>a) Total connected load<br/>b) Electricity bill for one month if the cost of one unit of electricity is Rs.8</p> | S.no           | Item       | Quantity         | Rating (W) | Usage (hour/day) | 1 | Ceiling Fan | 6 | 60 | 15 | 2 | CFL | 10 | 11 | 10 | 3 | CFL | 5 | 42 | 10 | 4 | TV | 1 | 80 | 5 | 5 | Fridge | 1 | 200 | 22 | CO4 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------|------------------|------------|------------------|---|-------------|---|----|----|---|-----|----|----|----|---|-----|---|----|----|---|----|---|----|---|---|--------|---|-----|----|-----|
| S.no | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Quantity       | Rating (W) | Usage (hour/day) |            |                  |   |             |   |    |    |   |     |    |    |    |   |     |   |    |    |   |    |   |    |   |   |        |   |     |    |     |
| 1    | Ceiling Fan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6              | 60         | 15               |            |                  |   |             |   |    |    |   |     |    |    |    |   |     |   |    |    |   |    |   |    |   |   |        |   |     |    |     |
| 2    | CFL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10             | 11         | 10               |            |                  |   |             |   |    |    |   |     |    |    |    |   |     |   |    |    |   |    |   |    |   |   |        |   |     |    |     |
| 3    | CFL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5              | 42         | 10               |            |                  |   |             |   |    |    |   |     |    |    |    |   |     |   |    |    |   |    |   |    |   |   |        |   |     |    |     |
| 4    | TV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1              | 80         | 5                |            |                  |   |             |   |    |    |   |     |    |    |    |   |     |   |    |    |   |    |   |    |   |   |        |   |     |    |     |
| 5    | Fridge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1              | 200        | 22               |            |                  |   |             |   |    |    |   |     |    |    |    |   |     |   |    |    |   |    |   |    |   |   |        |   |     |    |     |
| 11   | <p>Illustrate any two types of Luminaires used for internal lighting of an office building. Give design recommendations for an effective Daylighting design of the same.</p> <p style="text-align: center;"><b>OR</b></p> <p>What is earthing? Why earthing is required? With the help of neat sketch, explain plate earthing.<br/>What is earthing? Why earthing is required? With the help of neat sketch, explain plate earthing.<br/>Explain renewable and non-renewable sources of energy for power generation and their advantages and disadvantages.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | CO5<br><br>CO1 |            |                  |            |                  |   |             |   |    |    |   |     |    |    |    |   |     |   |    |    |   |    |   |    |   |   |        |   |     |    |     |

