

13/05/2025 ELECTRICAL SEM-VIII C-SCHEME ESDMAA QP CODE : 10083479

Duration: - 03 Hours

Marks:-80

## NOTE

1. Question No 1 is Compulsory
2. Solve any Three Questions out of the remaining
3. Assume suitable data if required and specify the same

## Q No 1. Solve any Four

- a. State the various steps followed in estimation Procedure. [5]
- b. State the criteria for selection of LT switch gear. [5]
- c. State the features of temporary power supply. [5]
- d. State the various features of Energy Conservation ACT 2001. [5]
- e. Explain targeting in energy conservation [5]
- f. State the energy potential of BLDC fan. [5]

Q No 2A. Explain the design features of any two type of electrical plans. [10]

Q No 2B. Explain the design of protection system. [10]

Q No 3A Find the KVA rating of the transformer required which is feeding following three phase loads. Specify the various specifications required for transformer and its criteria's for the selection. [10]

| Load No | Rating KW | LF   | DF  | Efficiency | Power Factor |
|---------|-----------|------|-----|------------|--------------|
| 1       | 150       | 0.8  | 0.7 | 0.7        | 0.95         |
| 2       | 350       | 0.75 | 0.6 | 0.8        | 0.9          |
| 3       | 250       | 0.75 | 0.6 | 0.9        | 0.85         |
| 4       | 450       | 0.8  | 0.5 | 0.9        | 0.7          |

Q No 3B. Why load management is required ? Discuss various electrical load management techniques [10]

Q No 4A. A 50 KW heater, rated for 415V, 3phase, 50Hz is connected to PCC by a cable of length 20m. Two other cables are running in a cable tray. Ambient temperature is 40°C. Fault level is 20 KA. Grouping factor is 0.87 and ambient temperature correction factor is 0.82. **Calculate the cable current only.** Justify the various assumptions in the calculations and selection of cable conductor. **(Data Sheet Not Required)** [10]

Q No 4B A reading room measuring (43m (L) + 18m (B) + 5m (H) requires an average illumination of 350 lux. State the various assumptions in design of lighting system for this room. Calculate the number of lamps required. Draw the lighting layout. **(Data Sheet provided)** [10]

Q No 5A Explain the terms optimizing input energy and Bench marking in energy audit [10]

Q No 5B Explain the assessment of consumption energy in lighting system. [10]

Q No 6A Explain the Smart lighting system as an energy efficient technology for outdoor application [10]

Q No 6B Explain the implementation of Building Management system (BMS) and Energy management system (EMS) [10]

### Data for Lighting System Designing

| K    | $R_C = 0.7$    |                |                | $R_C = 0.5$    |                |                | $R_C = 0.3$    |                |                |
|------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|      | $R_{WV} = 0.5$ | $R_{WV} = 0.3$ | $R_{WV} = 0.1$ | $R_{WV} = 0.5$ | $R_{WV} = 0.3$ | $R_{WV} = 0.1$ | $R_{WV} = 0.5$ | $R_{WV} = 0.3$ | $R_{WV} = 0.1$ |
| 0    | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              |
| 0.6  | 0.43           | 0.39           | 0.36           | 0.42           | 0.38           | 0.36           | 0.41           | 0.38           | 0.36           |
| 0.8  | 0.45           | 0.41           | 0.38           | 0.44           | 0.40           | 0.38           | 0.43           | 0.40           | 0.38           |
| 1.00 | 0.51           | 0.47           | 0.44           | 0.55           | 0.47           | 0.44           | 0.49           | 0.46           | 0.40           |
| 1.25 | 0.55           | 0.51           | 0.49           | 0.53           | 0.50           | 0.48           | 0.52           | 0.50           | 0.48           |
| 1.50 | 0.57           | 0.54           | 0.52           | 0.56           | 0.53           | 0.51           | 0.54           | 0.52           | 0.50           |
| 2.00 | 0.61           | 0.58           | 0.56           | 0.59           | 0.57           | 0.55           | 0.57           | 0.56           | 0.54           |
| 2.50 | 0.63           | 0.61           | 0.59           | 0.61           | 0.59           | 0.57           | 0.59           | 0.58           | 0.56           |
| 3.00 | 0.65           | 0.63           | 0.61           | 0.63           | 0.61           | 0.59           | 0.61           | 0.59           | 0.58           |
| 4.00 | 0.67           | 0.65           | 0.63           | 0.64           | 0.63           | 0.62           | 0.62           | 0.61           | 0.59           |
| 5.00 | 0.68           | 0.67           | 0.65           | 0.65           | 0.64           | 0.63           | 0.63           | 0.62           | 0.61           |

  

| Lamp Data |                     |                     |              |
|-----------|---------------------|---------------------|--------------|
| Sr. No.   | Type of Lamp        | Wattage             | Lumen output |
| 1.        | Fluorescent (T8/T5) | 18 (Halo phosphate) | 1015         |
|           |                     | 36 (Halo phosphate) | 2450         |
|           |                     | 18 (82/84/86)       | 1300         |
|           |                     | 36 (82/84/86)       | 3250         |
|           |                     | 28 (T5)             | 2800         |
| 2.        | CFL                 | 9                   | 600          |
|           |                     | 11                  | 760          |
|           |                     | 13                  | 920          |
|           |                     | 18                  | 1200         |

| Sr. No | Type of Cable                   | Value of k (Cu) | Value of k (AL) |
|--------|---------------------------------|-----------------|-----------------|
| a)     | PVC cable $\leq 300\text{mm}^2$ | 115             | 76              |
| b)     | PVC cable $> 300\text{mm}^2$    | 103             | 68              |
| c)     | XLPE cable                      | 114             | 92              |