7. (a) With suitable diagrams explain the construction and working of MCB. 7.5

(b) Describe through illustrations the different types of lighting schemes. 7.5

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May 2024

B.Tech. (EL) (Fourth Semester)

Industrial Electrical Systems (ELPE-412)

Time : 3 Hours] [*Maximum Marks : 75*

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) Give the name of different materials which are used for fuse elements.

(b) What type of protective device is used for protection from leakage current in electrical appliances and how does it work ?

(c) Explain the terms 'lumen' and 'candle power' about illumination systems.

(d) What is an inverse current characteristic in protection components ?

(e) Define the rating of the main switch in a distribution board.

(f) What are the harmful effects of lightning ?

(g) Distinguish between overhead and underground service connections.

(h) Classify electric elevators.

(i) What are the characteristics of good illumination ?

(j) What is ladder logic ? **1.5×10=15**

Part B

2. (a) Define the term Tariff. What are the objectives of tariff ? Describe block rate and maximum demand tariff with their advantages and disadvantages. **7.5**

(c) Define the term 'Electric Shock' and briefly explain the electrical safety practices to prevent it. **7.5**

3. (a) Explain load calculations for wiring installation with the help of an example. **7.5**

(b) Discuss the different types of wiring systems used in residential buildings. Explain the general rules and guidelines for their installation. **7.5**

4. (a) State and explain the laws of illumination. **7.5**

(b) It is desired to illuminate a drawing hall with an average illumination of about 250 lux. The area of the hall is 30 m × 20 m. The lamps are to be fitted at 5 m height. Find out the number and size of incandescent lamps required for an efficiency of 12 lumens/watt. The utilization factor is 0.4 and the maintenance factor is 0.85. **7.5**

5. (a) Discuss the importance of DG systems in industrial electrical setups. Explain the sizing of DG systems with the help of an example. **7.5**

(b) What is a transformer substation ? Describe the transformer substation with a suitable block diagram. What are the different types of transformer substations ? **7.5**

6. (a) Discuss the importance of power factor correction and methods for achieving it in industrial settings with suitable diagrams. **7.5**

(b) Define PLC and explain its role in industrial automation. Develop a block diagram of PLC with basic components and its functions. 7.5