



**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:VI
Class:TY	Program:B.Tech
Branch Code:ELE	Pattern:2022
Name of Course:Electrical Installation, Maintenance and Testing	Course Code:ELE223012
Max. Marks:60	Duration:2.30 Hrs.

**Instructions:** Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

**Marks CO**

**Question No. 1**

- 1a) What fire extinguishers are suitable for electrical accidents? Describe how they work and state their benefits and drawbacks (6) CO1

**Question No. 2**

- 2a) Explain steps involved in the design of substation Earthing grid as per IEEE standard 80-2013. (6) CO2

**Question No. 3**

- 3a) Identify Preventive & breakdown maintenance of alternator. (8) CO4

**OR**

- 3b) Explain motor current signature analysis (MCSA) with suitable diagrams. (8) CO4

- 3c) Explain how thermography works in condition monitoring and how it helps in detecting faults in electrical systems. (8) CO4

**OR**

- 3d) Explain the planned maintenance practices for induction motors. How do these practices help in minimizing unexpected failures (8) CO4

**Question No. 4**

- 4a) Derive Kelvin's Law for determining the most economical cross-sectional area of a conductor used in power transmission. State all assumptions clearly (8) CO3

**OR**

- 4b) Describe the important design points for distribution feeders. Explain radial and ring feeders, their voltage range, and applications, with suitable diagrams (8) CO3

- 4c) Calculate the most economical cross sectional area of the two conductor cable carrying current of 200A throughout the year. The data is as follows: (8) CO3

- i) Length of cable = 1000 met

ii) Cost of cable including installation is  $(20a+20)/$  meter, where 'a' is cross sectional area of the conductor, sq.cm

iii) Cost of energy Rs. 0.06/kWH

iv) Interest & depreciation charges = 10% v) Resistivity = 1.73 micro Ohm cm.

**OR**

4d) Derive calculation of voltage drops in ac distributors for Uniform loading. Draw phasor diagram for the same (8) CO3

**Question No. 5**

5a) Describe how a lighting layout for a room is planned. Mention the important lighting-design factors and explain the lumen method. (8) CO5

**OR**

5b) Identify the requirements for effective street lighting? Describe different types of lamps used, pole spacing, height considerations, and photometric planning (8) CO5

5c) Explain any four types of indoor lighting schemes with suitable sketches and state their applications (8) CO5

**OR**

5d) A small residential building consists of the following electrical points: (8) CO5

- 5 light points in the living room, 1 in the kitchen, and 1 in the bathroom
- 4 ceiling fan points
- 5 socket outlets for general use (5A), and 1 power socket (15A) for a refrigerator

a) **Determine** the total number of electrical points (lights, fans, and sockets).

b) **Calculate** the total connected load assuming standard wattage values:

- Light: 60W
- Fan: 80W
- 5A Socket: 100W
- 15A Socket: 1000W

..... End of question paper.....