



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

InSem Examination-II Summer 2025	
Exam Seat No.:	
Academic Year: 2024-2025	Semester: VI
Class: TY	Program: B.Tech
Branch Code: ELE	Pattern: 2022
Name of Course: Energy Audit and Management	Course Code: ELE223015B
Max. Marks: 30	Duration: 1:15 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 02 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 column indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

**Marks CO**

**Question No. 1**

- 1 a) Differentiate between renewable and non-renewable energy sources with examples. Explain the concept of final energy consumption and its significance. (7) CO 1

**Question No. 2**

- 2 a) Explain the reserve to production ratio? If a country has 100 billion barrels of oil reserves and produces 5 billion barrels per year, then the oil reserve will last for how many years? How does energy efficiency contribute to environmental sustainability? (8) CO 1

**OR**

- 2 b) What are emission check standards, and how do they regulate pollution control? What is India's current energy scenario in terms of production and consumption? (8) CO 1

**Question No. 3**

- 3 a) What is the impact of power factor in electricity bill? A factory operates with a load of 100 kW at a power factor of 0.7 lagging. The electricity tariff consists of: Energy Charge: ₹5 per kWh (7) CO 2

Maximum Demand Charge: ₹200 per kVA The factory improves its power factor to 0.9 using a capacitor

bank.

Calculate:

- (a) The apparent power before and after power factor correction
- (b) The maximum demand charge before and after correction
- (c) The total cost savings due to power factor improvement.

**Question No. 4**

- 4 a) What is Supply-Side Management in the context of the power sector? A commercial consumer is billed under a Time of Day (ToD) tariff system. The electricity charges are as follows: (8) CO 2

- Peak Hours (6 PM - 10 PM): ₹8 per unit

- Off-Peak Hours (10 PM - 6 AM): ₹4 per unit
- Normal Hours (6 AM - 6 PM): ₹6 per unit

Additionally, an incentive of 5% discount is given on the total bill if the consumer's off-peak consumption is at least 40% of the total consumption.

A consumer uses electricity as follows in a billing cycle:

- Peak Hours: 500 units
- Off-Peak Hours: 600 units
- Normal Hours: 900 units

Calculate:

- The total bill before any incentive.
- Whether the consumer qualifies for the incentive.
- The final amount payable after applying the incentive (if applicable).

**OR**

- 4 b) Define Demand-Side Management (DSM) and explain its importance in energy conservation. What are the major advantages of implementing DSM? (8) CO 2

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