15979

BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – Dip.EE-2023
Course Name – Energy Conservation and Audit
Course Code - DEEPE502B
(Semester V)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Identify a major limitation of conventional energy sources.
a) High availability b) High efficiency
c) Non-renewable and polluting d) Easily transportable

(ii) Identify the expected benefit of conducting an energy audit.
a) Reduce power generation b) Increase cable length
c) Identify and minimize energy losses d) Improve transformer design

(iii) Identify which factor limits large-scale hydro power development
a) Excess rainfall b) Uneven terrain
c) Social and environmental concerns d) Lack of technical manpower

(iv) Identify which kind of data is collected during an energy audit
a) Environmental parameters b) Lighting preferences
c) Energy consumption pattern d) Customer satisfaction

(v) Identify the unit for measuring electricity tariff in domestic sector
a) kW b) kWh
c) kVAR d) Amperes

(vi) Identify which of the following represents 100% load factor.
a) Maximum demand = connected load b) Average load = Maximum demand
c) Connected load = zero d) Power factor = 1

(vii) Choose the major cause of low power factor in industries.
a) Balanced load b) Poor lighting
c) Inductive loads d) High voltage supply

(viii) Identify which are technical T&D losses primarily caused by.
a) Theft of electricity b) Metering errors
c) Resistance in wires d) Transformer location

(ix) Identify which method is used to reduce technical T&D losses.
a) Lowering voltage b) Use of undersized conductors

c) Upgrading conductors and transformers d) Shutting down loads

(x) Demand Side Management (DSM) is related to

a) Reducing power supply b) Delaying peak loads
c) Managing consumer load efficiently d) Shifting transformers

(xi) Identify which of the following gases is a greenhouse gas.

a) Argon b) Carbon monoxide
c) Methane d) Hydrogen

(xii) Choose the full form of IPCC.

a) International Power Control Commission b) Indian Panel for Climate Change
c) Intergovernmental Panel on Climate Change d) Integrated Policy for Climate Control

(xiii) Identify the best way to reduce energy-related environmental pollution.

a) Increase lighting loads b) Use fossil fuels efficiently
c) Implement energy conservation measures d) Increase HVAC load

(xiv) Identify the purpose of a lux meter in energy audit.

a) Detect harmonics b) Measure light intensity
c) Test insulation d) Detect carbon monoxide

(xv) Choose a key feature of the Electricity Act 2003.

a) Introduced single buyer model b) Promoted captive generation
c) Focused only on rural electrification d) Banned renewable energy

Group-B

(Short Answer Type Questions) 3 x 5=15

2. List two advantages of co-generation. (3)
3. Discuss about ABC analysis in energy audit. (3)
4. Explain the concept of load factor. (3)
5. Name all the instruments used in energy audit. (3)
6. Company C is planning to undertake a project requiring initial investment of Rs 105 million. The project is expected to generate Rs 25 million per year in net cash flows for 7 years. Calculate the payback period of the project. (3)

OR

The Delta company is planning to purchase a machine known as machine X. Machine X would cost $25,000 and would have a useful life of 10 years with zero salvage value. The expected annual cash inflow of the machine is $10,000. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Describe Cogeneration. (5)
8. There are two energy conservation measures as described below : Energy Conservation Measure 1 : The equipment costs Rs. 10,000 and pays back Rs. 12000 in two years. Energy Conservation Measure 2 : The equipment costs Rs. 7000 today and pays back Rs. 4000 each year for two years. If the interest rate is 8%, determine the best alternative. (5)
9. Explain how the tariff system is used to reduce energy bill. (5)
10. Critically analyze the energy loss pattern in a distribution system. (5)
11. Illustrate how fossil fuel is used in the Indian energy sector. (5)
12. Due to increased demand, the management of Rani Beverage Company is considering to purchase a new equipment to increase the production and revenues. The useful life of the equipment is 10 years and the company's maximum desired payback period is 4 years. The inflow and outflow of cash associated with the new equipment is given below: Initial cost of equipment: $37,500 Annual cash inflows: Sales: $75,000 Annual cash Outflows: Cost of ingredients: $45,000 Salaries expenses: $13,500 Maintenance expenses: $1,500 Non cash expenses: Depreciation expense: $5,000 (5)

OR

The management of Health Supplement Inc. wants to reduce its labor cost by installing a new machine. Two types of machines are available in the market – machine X and machine Y. Machine X would cost $18,000 where as machine Y would cost $15,000. Both the machines can reduce annual labor cost by $3,000. (5)

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