

**B.Tech. – VIEP – ELECTRICAL ENGINEERING
(BTELVI)****Term-End Examination****December, 2015****BIEE-026 : ENERGY AUDITING AND ANALYSIS***Time : 3 hours**Maximum Marks : 70*

*Note : Attempt any **ten** questions. All questions carry equal marks. Use of scientific calculator is allowed.*

1. Explain energy audit for air conditioners in detail. 7
2. How can tri-generation be done in any industry ? Explain with the help of a flow chart. 7
3. How will you reduce the consumption of energy in compressors and furnaces ? 7
4. Explain the effect of power factor improvement in energy conservation. 7
5. What do you mean by energy auditing ? Explain different instruments for auditing in detail. 7

6. "Solar power satellites, deep geothermal wells, and ocean thermal gradients are a few 'exotic', electric power sources proposed for the future." Discuss any one of these proposed concepts. 7

7. The following are the details of the load on a circuit :

- (a) Six lights of 60 watts each working for 1 hour per day.
- (b) Four fluorescent tubes of 40 watts each working for 4 hours per day.
- (c) Two heaters of 1000 watts each working for 1 hour per day.
- (d) One electric iron of 750 watts working for 2 hours per day.
- (e) Six fans of 60 watts each working for 18 hours per day.

If each unit of energy costs ₹ 5, what will be the total bill in ₹ for a month of 30 days ? 7

8. A pressure reducing valve is proposed to be replaced by a steam turbine. The investment required is ₹ 50 lakhs. Additional maintenance and operating costs for the turbine are expected to be ₹ 2 lakh per annum. If the annual savings is ₹ 13 lakhs, calculate the Payback period and Return on Investment. 7

9. A textile dryer is found to consume $5 \text{ m}^3/\text{hr}$ of natural gas with a calorific value of 800 kJ/mole . If the throughput of the dryer is 60 kg of wet cloth per hour, drying it from 55% moisture to 10% moisture, estimate the overall thermal efficiency of the dryer taking into account the latent heat of evaporation only.

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Note :

Latent heat of evaporation = 2257 kJ/kg .
Assume the natural gas to be at standard temperature and pressure at which 1 mole occupies 22.4 litres .

10. A drilling machine drawing continuously 5 kW of input power and with an efficiency of 50% , is used in drilling a bore in an aluminium block of 5 kg of mass. How much will be the rise in temperature of the block at the end of 100 seconds ? Assume 20% of the energy imparted to the block is lost to surroundings and the balance is absorbed by the block in its uniform heating. The specific heat of aluminium block = 900 J/(kg K) .

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11. Calculate the fixed electrical energy consumption for a rolling mill consuming 3,00,000 kWh units of electricity to produce 500 MT of product per month and having specific electrical energy consumption of 500 kWh/MT.

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12. Write short notes on any *two* of the following :

$$2 \times 3 \frac{1}{2} = 7$$

- (a) Load Matching
 - (b) Load Profiling
 - (c) Loading of Transformers
 - (d) Technoeconomic Analysis
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