



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech(EE)/SEM-8/EE-801C/2013**

**2013**

**ENERGY MANAGEMENT AND AUDIT**

*Time Allotted : 3 Hours*

*Full Marks : 70*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP – A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following questions : 10 × 1 = 10

- i) What happens if supply voltage across a lighting installation is increased by 20% ?
- a) Energy consumption decreases
  - b) Frequency is increased
  - c) Energy consumption increases
  - d) Energy consumption remains unaltered.



- ii) The objective of energy management includes
- a) minimizing energy cost
  - b) minimizing waste
  - c) minimizing environmental degradation
  - d) all of these.
- iii) The percentage of energy saved at the current rate of use, compared to the reference year rate of use, is called
- a) energy utilization
  - b) energy performance
  - c) energy efficiency
  - d) none of these.
- iv) Which fuel dominates the energy mix in Indian energy scenario ?
- a) Oil
  - b) Coal
  - c) Natural gas
  - d) Nuclear.
- v) Which of the following is the function of series capacitors installed in a 220 kV, 50 Hz, three phase 750 MVA transmission line ?
- a) Reduction of inductive reactance
  - b) Reduction of capacitive reactance
  - c) Improvement of power factor
  - d) Reduction of impedance.



- vi) Which of the following is accounted as ~~running changes~~ for working out electricity tariff of a supply company ?
- a) Insurance
  - b) Operation and maintenance cost
  - c) Wages of operating employees
  - d) Dividend declared by the company.
- vii) Which of the following is co-generation ?
- a) Power plant run by pulverized coal
  - b) Power plant run by exhaust gas from gas turbine
  - c) Power plant run by plant waste
  - d) None of these.
- viii) Which of the following is highest contributor to the air pollution ?
- a) Suspended particles      b) Sulphur dioxide
  - c) Carbon dioxide              d) Carbon monoxide.



- ix) The total amount of harmonics present in the system is expressed by
- a) ripple factor
  - b) total harmonic ratio
  - c) total harmonic factor
  - d) total harmonic distortion.
- x) Acid rain is caused by the release of which of the following components from combustion of fuels ?
- a)  $\text{SO}_x$  and  $\text{NO}_x$
  - b)  $\text{SO}_x$  and  $\text{CO}_2$
  - c)  $\text{CO}_2$  and  $\text{NO}_x$
  - d)  $\text{SO}_x$  and  $\text{CO}$ .
- xi) Which of the following can improve load factor of an electrical system ?
- a) Increased average load
  - b) Decreased average load
  - c) Increased maximum load
  - d) Increased maximum demand.



- xii) Which of the following is termed as "time of the day" scheme ?
- a) Offering cheap power during a specific off peak load period
  - b) Offering cheap power during peak load period
  - c) Offering cheap power at night
  - d) Offering cheap power at day.

**GROUP – B**

**( Short Answer Type Questions )**

Answer any *three* of the following.  $3 \times 5 = 15$

- 2. Why maximum demand need to be controlled ? What are the options available to control maximum demand ?
- 3. What are the base line data that an audit team should collect while conducting detailed energy audit ?
- 4. What is ATC loss ? What actions may be taken to minimize the ATC loss ?
- 5. What are the impacts of global warming ?
- 6. An industry has a connected load of 200 kW. The maximum demand is 170 kW. On an average, each machine works for 65% time. The tariff system includes a fixed charge of Rs. 1,100 per year, a maximum demand charge of Rs. 125 per kW and an energy charge of Rs. 6.15 per kWh. Find the yearly expenditure of the industry on electricity.



**GROUP – C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. What are the objectives of energy management ? Write down the responsibilities and duties of an energy manager. How is environment related to energy management ?  $4 + 7 + 4$
8. a) What is biomass ?
- b) Explain the principle of production of Biogas.
- c) Discuss the principle and working of tidal wave energy conversion system.  $2 + 5 + 8$
9. a) Why is energy conservation necessary ?
- b) Briefly mention the provisions of Energy Conservation Act, 2001.
- c) What is meant by "carbon credit" ?  $4 + 8 + 3$
10. a) What is energy audit ? Mention its scope.
- b) Discus in detail the various types of energy audit.

$5 + 10$



11. Write short notes on any *three* of the following : 3 × 5

- a) Strategy for the future energy sources in India
- b) Electricity Tariffs
- c) Photovoltaic cell
- d) Bench marking
- e) Load management.

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