*Name* : .....

*Roll No.* : .....

*Invigilator's Signature* : .....

**CS/B.TECH(EE)/SEM-8/EE-801C/2012**

**2012**

# 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 : 10 × 1 = 10

i) Hydroelectricity is the ..... percentage of total electricity in India.

a) 10% b) 60%

c) 2·4% d) 22%.

ii) Which of the following methods should be adopted in India for 100% village electrification ?

a) Formation of all India power grid

b) Decentralization of rural power sector

c) Production of grid quality non-conventional energy

d) Installation of more solar pond power plants.

iii) In which of the following processes energy is returned back to supply during braking ?

a) Mechanical braking

b) Countercurrent braking

c) Rheostatic braking

d) Regenerative braking.

iv) The ozone depletion process is due to

a) carbon dioxide

b) chlorine atoms destroying ozone molecules

c) UV light breaking the ozone

d) CFC & PFC molecules destroying ozone molecules.

v) The world oil reserves is expected to last another

a) 300 years b) 45 years

c) 600 years d) forever.

vi) As of January 2012, the per capita energy consumption in India is about

a) 778 k Wh b) 288 k Wh

c) 450 k Wh d) 1255 k Wh.

vii) An electric heater of 230 V, 5 kW rating is used for hot water generation in an industry. The electricity consumption per hour at the rated voltage is

a) 5 kW b) 5 kWh

c) 5 kVr d) 300 kW.

viii) Which of the following is used for decision making if energy audit is essential in a country ?

a) Energy/GNP ratio

b) High consumption of electricity in urban area

c) High consumption of kerosene in rural sector

d) High consumption of coal in the country.

ix) The Act, which is proposed to bring the qualitative transformation of the electricity sector is
   a) Regulatory Commission Act, 1998
   b) Indian Electricity Act, 1910
   c) Supply Act, 1948
   d) Electricity Act, 2003.

x) As an Energy Efficient application, slip power recovery system fits well for
   a) Squirrel Cage and Slip ring motors
   b) DC motor
   c) Slip Ring motors only
   d) Universal motor.

xi) Which of the following covers energy audit ?
   a) Energy intensity  b) Energy conservation
   c) Energy management  d) Energy pricing.

xii) Which of the following is NOT a conservation of energy ?
   a) Reduction of wastage of energy
   b) Reduction of percentage of energy consumption
   c) Reduction of energy consumption
   d) Inter-fuel substitution.

## GROUP – B

### ( Short Answer Type Questions )

Answer any *three* of the following. 3 × 5 = 15

2. What is an industrial audit ? Enlist the basic information required from the industry for energy audit.
3. Describe the objectives of energy management.
4. Discuss in short the benefits of "bench marking" of energy consumption.
5. Discuss Global warming and Ozone depletion.
6. Define power factor and suggest technically the methods of improvement is power factor leading to conservation of energy.

## GROUP – C

**( Long Answer Type Questions )**

Answer any *three* of the following. 3 × 15 = 45

7. a) Briefly discuss the energy scenario in India and the importance of new and renewable energy sources to meet the energy requirement.

   b) Discuss the electricity Rate Tariff structure and importance of 'Time of the day" ( TOD ) tariff. 7 + 8

8. a) Explain the Energy Audit" and give different steps of methodology for "detailed energy audit.

   b) Discuss the differences between "preliminary" and 'detailed" energy audit. 8 + 7

9. a) What are the various steps in implementing energy management in a manufacturing organization ? State the importance of Indian Energy Conservation Act about energy policy for industries.

   b) Discuss the properties of coal and its various classifications as per ASTM. 8 + 7

10. a) Discuss in brief the energy saving scheme for electrically driven water pump by installing a variable frequency drive ( VFD ).

    b) Explain the improvement of power factor and its control strategy. 8 + 7

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

    a) Solar and wind energy

    b) Greenhouse effect and earth's atmosphere

    c) Instruments used in energy audit

    d) Bio-mass and Bio-gas for energy

    e) Energy efficient lamps.