Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(EEE)/SEM-8/EE-802D/2012

2012

ENERGY AUDIT AND CONSERVATION

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 : $10 \times 1 = 10$

i) The natural ore contains the mixture of isotopes
   a) U 235 b) U 238
   c) Th 232 d) all of these.

ii) Type(s) of nuclear reactor is (are)
   a) BWR b) TWR
   c) PHWR d) All of these.

iii) Fusion requires plasma at temperature of
   a) ~ 10^{8° C b) ~ 10^{2° C
   c) ~ 10^{5° C d) ~ 12^{4° C

iv) Wind is the potentially large source of
   a) no loss electricity
   b) carbon free electricity
   c) radiation free electricity
   d) none of these.

v) The solar thermal electric power plant consists of
   a) distributed receiver type
   b) central receiver type
   c) combination of (a) and (b)
   d) all of these.

vi) Global energy production is expeceted to increase by around ..... between 1999 to 2020.
   a) 80% b) 75%
   c) 55% d) 60%.

vii) The advantages of tidal power is that
   a) it is free from the problems of uprooting the people and distributing the ecology balance
   b) it is everlasting and is not infleunced by the changing mood of the nature such as failure of the monsoon
   c) no extra submerging of land is involved
   d) all of these.

viii) The flywheel in a car provides
   a) potential energy b) heat energy
   c) kinetic energy d) none of these.

ix) Lead-acid batteries are used as
   a) back-up supply
   b) primary energy source
   c) secondary energy source
   d) none of these.

x) Mass flow is conserved along a steam tube as
   a) μ u A = constant b) F/A = – μ.du / dy
   c) L = ρ UT d) none of these.

xi) The objective of tariff is
   a) recovery of cost of capital investment in generating, transmitting and distributing equipment
   b) recovery of cost of operation, supplies and maintenance of equipment
   c) recovery of cost of metering equipment, billing, collection cost etc.
   d) a satisfactory return on the total capital investment
   e) all of these.

GROUP – B

(Short Answer Type Questions)

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

2. a) What are the sources of energy ?

   b) Name the different types of power generation (Conventional and Non-conventional). 2 + 3

3. a) Explain the term 'Depreciation'.

   b) Define Load factor. 2 + 3

4. Discuss the significance of alternate sources and limitation of these resources. 3 + 2

5. a) What do you mean by Aggregate Technical and Commercial Loss (ATC) ?

   b) An organization drawing 200 B. U. Billed to 180 B.U. realized 90% at the billed amount. Find ATC loss. 2 + 3

6. Explain in brief supply side management and the demand side management (DSM).

GROUP – C

(Long Answer Type Questions)

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

7. a) Discuss the importance of the energy audit for any industry.

   b) Define the scope of preliminary energy audit.

   c) Determine the efficiency of a steam power plant and its coal built per annum using the following data :

   Maximum demand = 24000kW

   Load Factor = 40%

   Boiler Efficiency = 90%

   Turbine Efficiency = 92%

   Coal Consumption = 0·87 kg/unit

   Price of Coal = Rs. 280 per tonne. 5 + 4 + 6

8. a) What is the energy conservation in the following systems ?

   i) Industrial

   ii) Domestic.

   b) The maximum (peak) load on a thermal power plant of 60 MW capacity is 50 MW at an annual load factor of 50%. The loads having maximum demands of 25 mW, 20 mW, 8 mW, 5 mW are connected to the power station.

   Determine the following :

   i) Average load on power station

   ii) Energy generated per year

   iii) Demand factor

   iv) Diversity factor. (4 + 4) + 7

9. Define simple pay-back period analysis. Also define the advantage and limitation of pay-back period. 8 + 7

10. a) Describe in brief energy conservation in generation, transmission and distribution.

    b) What effective measures may be taken to reduce the T & D losses ? 8 + 7

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

    a) Methods of depreciation calculation

    b) Objective of tariff

    c) Least Square Method

    d) Sankey diagram

    e) Power factor improvement techniques.