Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (EEE)/SEM-8/EE-802D/2013

2013

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 the following : $10 \times 1 = 10$

i) Biomass provides ..... of the global power usage.

a) ~14% b) ~12%

c) ~18% d) ~45%.

ii) The multiplication factor in the chain reaction is determined by

a) $k = \varepsilon\, pf\, \eta$ b) $R_x = b_x F$

c) $P_f = R_f E_f$ d) none of these.

iii) Fusion requires plasma at temperature of

a) $\sim 10^8$ °C b) $\sim 10^2$ °C

c) $\sim 10^5$ °C d) $\sim 12^4$ °C.

iv) Wind is potentially large source of

a) no loss electricity

b) carbon free electricity

c) radiation free electricity

d) none of these.

v) The speed of a tidal wave in a sea of uniform depth h_0 is given by

a) $c = \sqrt{gh_0}$

b) $E = 1/2\ \rho g a^2$

c) $N = 1/4\ \rho g a^2 \sqrt{g\lambda}/2\pi$

d) none of these.

vi) Global energy production is expected to increase by around ..... between 1999 to 2020.

a) 80% b) 75%

c) 55% d) 60%.

vii) The Reynolds number is

a) $L = \rho u T$ b) $F/A = -\mu . du/dy$

c) $R_e = \rho v d/n$ d) none 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

a) ρuA = constant b) $F/A = -\mu.\mathrm{d}u/\mathrm{d}y$

c) $L = \rho UT$ d) $L = \rho U\Gamma$.

GROUP – B

(Short Answer Type Questions)

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

2. Discuss the energy sources (renewable & non-renewable) and significance of alternative resources and limitation of the sources.

3. Discuss and compare various resources in view of capital and running cost.

4. Discuss the significance of alternate resources and limitation of these resources.

5. Discuss the electrical characteristics of photovoltaic cells and modules.

6. What do you mean by Aggregate Technical and Commercial loss (A.T.C.) ? An organisation drawing 200 B.U. billed to 180 B.U. realized 90% at the billed amount. Find A.T.C. loss.

GROUP – C
(Long Answer Type Questions)

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

7. Discuss the importance of energy audit for any industry. What are the methods used for conducting energy audit ? Define the scope of preliminary energy audit.

8. What do you mean by energy conservation in generation, transmission and distribution ? What is the effective step to reduce transmission and distribution loss ?

9. What is the energy conservation in the following systems ?

   a) Industrial

   b) Agriculture

   c) Domestic

   d) Commercial

   e) Municipal.

10. What are the concepts of supply side management, demand side management and load side management ? Describe the advantage of D.S.M. to consumer utility.

11. Define the simple pay-back period analysis. Also define the advantage and limitation of pay-back period.

12. What is the basic concept of energy management ? Why in electrical energy management, energy accounting management, management of power factor, voltage principle, power demand monitoring are required ?