Name : …………………………………………………………

Roll No. : …………………………………………………

Invigilator's Signature : …………………………………….

CS/B.Tech (EE-NEW)/SEM-8/EE-801C/2010

2010
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 :

$10 \times 1 = 10$

   i)   Diversity factor is the ratio of

   a)   maximum demand and connected load

   b)   sum of individual max demands and max demand
        of whole load

   c)   sum of individual max demand and plant capacity

   d)   average power and max demand.

   ii) Which of the following is Renewable source of energy ?

   a)   Uranium 235   b)   Wood

   c)   CNG   d)   None of these.
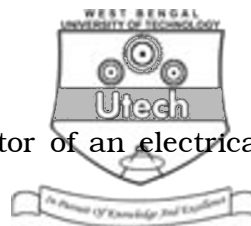
    iii)   Which of these can improve load factor of an electrical system ?

        a)   Increased average load

        b)   Decreased average load

        c)   Increased maximum load

        d)   Increased maximum demand.

    iv)   In generating station fixed changes at 100% load factor are 20 paise / kWh. With 25% load factor, the charges will be

        a)   5 paise / kWh.   b)   80 paise / kWh.

        c)   40 paise / kWh.   d)   10 paise / kWh.

    v)   Primary objective of energy audit is

        a)   to reduce energy consumption

        b)   to reduce load losses

        c)   to reduce the operating cost of plant.

    vi)   The world is facing energy crisis due to

        a)   depletion in natural resources

        b)   non-availability of major non-conventional sources

        c)   all of these.

vii) An energy auditor carry out

    a)   energy auditing exercise

    b)   implement & supervise energy conservation programme

    c)   check the installed equipment of the power generating plant

    d)   both (a) and (b).

viii) Energy saving devices eligible for higher depreciation are

    a)   digital heat loss meter

    b)   flameless furnaces

    c)   recuperators and air preheaters.

ix) ABT stands for

    a)   Availability Based Tariff

    b)   Advanced Bi-monthly Tariff

    c)   Accepted Basic Tariff

    d)   None of these.

x) Which of the following refers to energy intensity ?

   a) Energy consumed per real GDP created

   b) Energy/GNP ratio

   c) Energy consumed per unit output

   d) Energy used per SDP.

xi) Which of the following is termed as 'TOD'-scheme ?

   a) Offering cheap electricity during OFF-peak load period

   b) Offering cheap electricity during peak load period.

   c) Offering cheap electricity any time during the day.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following.   3 × 5 = 15

2. What is Co-energy ? Explain its physical significance.

3. What is the time period for achieving results in an Energy Management Program and what is the expected savings ?

4. What is sustainable development ? Give two examples of its practice in day to day life.
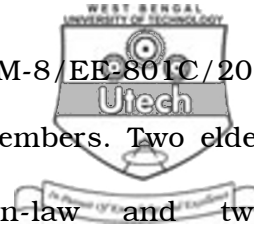
5. In an Indian household, there are six members. Two elder parents, their son and daughter-in-law and two grandchildren aged 8 and 12. The daily menu for breakfast for each member is as follows :

Sl. No.	Course Item	Calory content of Food	Equivalent Energy cost for soil preparation, growing, cleaning, steaming, hulling, cutting, rolling, packaging, transportation, preserving, food preparation and serving (Ounce of Crude Oil)
1	A bowl of Oatmeal porridge	125	4 ounces
2	A serving of an apple or any other fruit	75	1 ounce
3	Butter, Milk and Salt	125	1 ounce
4	A cup of Coffee	75	2 ounces

The average energy output of Crude oil is 1,29,670 BTU per gallon. 1 BTU = 252 Calorie. 1 gallon = 128 ounce. Calculate the energy cost in calories for the breakfast of the above Indian household per month (1 month = 30 days)

6. What is energy audit ? Describe briefly the procedure of energy audit.

GROUP – C

(Long Answer Type Questions)

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

7. Discuss environmental aspects of fossil fuel thermal power plant. Give a brief account of various pollutants of a coal based power station, their likely impact and methods of abatement. 15

8. a) What is the total system loss in Indian power sector ? What should be the loss as per IE rule ?

   b) What is the effect of transmission loss on the cost of generation of electrical energy ?

   c) How can the system losses be reduced or minimized ?

   3 + 6 + 6

9. a) Discuss PCRA subsidy scheme for energy audit.

   b) A reservoir of area 10 hectors holds 100 million cubic metres of water. It stands at a height of 150 m above the hydro-electric power station. Assuming the hydraulic efficiency to be 80% and losses in the generating plant 12%, calculate what is the available energy in kWh ? If there is a supply of 20,000 kW for 5 hours, find what is the fall of level in the reservoir ? Density of water 1 gram per cubic centimeter. 6 + 9

10. Discuss in detail one case study for implimentation of an energy management programme using frequency converters.

15

11. Write short notes on the following : (Any *three*)   3 × 5

    a)   Maximum Demand

    b)   Energy conservation in boilers

    c)   Load duration curve and generating stations

    d)   Objectives of tariff

    e)   Electrical conservation opportunities.

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