CS/B.TECH (EE)/SEM-8/EE-801F/09

1. ..... *Signature of Invigilator*

2. ..... *Signature of the Officer-in-Charge*

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

CS/B.TECH (EE)/SEM-8/EE-801F/09

ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL – 2009

ENERGY MANAGEMENT AND AUDIT (SEMESTER - 8)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

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Marks Obtained

	Group – A										Group – B			Group – C				
Question Number																	***Total Marks***	***Examiner's Signature***
Marks Obtained																		

.....

Head-Examiner/Co-Ordinator/Scrutineer

8850-F/F (25/04)

DO NOT WRITE ON THIS PAGE

ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL – 2009

ENERGY MANAGEMENT AND AUDIT

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Time : 3 Hours] [Full Marks : 70

GROUP – A

(Multiple Choice Type Questions)

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

i) Energy consumption per unit of GDP is called

a) Energy ratio b) Energy intensity

c) per capita consumption d) none of these. ☐

ii) Which of the following plants has the maximum capital cost ?

a) Steam plants b) Hydroplants

c) Diesel plants d) Nuclear plants. ☐

iii) B.E.E. stands for

a) Board of Energy Efficiency b) Bureau of Energy Efficiency

c) Branch of Energy Efficiency d) none of these. ☐

iv) A single phase induction motor is drawing 10A at 230 V, 50 Hz. If the operating power factor of the motor is 0·9, then the power drawn by the motor is

a) 2·3 kW b) 3·58 kW

c) 2·07 kW d) 2·70 kW

e) none of these. ☐

v) The transmission capacity of a line at 50 Hz compared to that at 60 Hz is

a) lower b) higher

c) same. ☐

vi) Non-contact speed measurement can be carried out by

a) Tachometer b) Stroboscope

c) Oscilloscope d) Speedometer

e) none of these. ☐

vii) 1% fuel can be saved in boiler fuel consumption if feed water temperature is increased by

a) 6°C b) 10°C

c) 12·C d) 22°C

e) none of these. ☐

viii) The contribution of CO_2 to the greenhouse gas is

a) 23% b) 95%

c) 54% d) 0%. ☐

ix) If the voltage rise of a domestic consumer is 5%, then the increase of energy drawn will be

a) 10% b) 10·25%

c) 10·75% d) 25%. ☐

x) Which of the following is renewable source of energy ?

a) Uranium $_{235}$ b) Wood

c) CNG d) None of these. ☐

xi) Element in fuel oil responsible for corrosion is

a) CH_4 b) N_2

c) CO d) CO_2

e) None of these.

GROUP – B

(Short Answer Type Questions)

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

2. State the function of 'Economizer' and explain how it helps to increase the efficiency of a boiler.

3. How First and Second law of thermodynamics are related to energy conversion ? Explain.

4. While preparing the energy balance of a steam generator, define the useful energy and also the various losses encountered by the steam generator.

5. Define average demand, load factor, plant factor and diversity factor.

6. List the major instruments used for energy audit.

GROUP – C

(Long Answer Type Questions)

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

7. a) Explain the term multi-objective energy management with emphasis on conservation, pollution and evaluation of alternative energy resources.

b) Explain 'Energy Planning', 'Energy Monitoring' and 'Energy Staffing' in industry.

c) Mention the names of some energy efficient equipment. 6 + 6 + 3

8. a) Write energy conservation opportunities in industrial boiler ?

b) A plant uses 4 ton/day of coal to generate steam. The calorific value of coal is 4000 kcal/kg. The cost of coal is Rs. 2,000/ton. The plant substitute coal with rice husk as a boiler fuel which has a calorific value of 3000 kcal/kg at a cost of Rs. 700/ton. Calculate annual cost saving at 300 days of operation assuming that the boiler efficiency decreases from 78% of coal to 72% on rice husk. 8 + 7

9. a) Define 'Energy Audit'.

b) List out the steps involved in 'detailed energy audit'.

c) Suggest your lighting design plan in an institute where the rooms are used for classroom, seminar room, workshop and Civil Engineering drawing classroom.

15

10. a) What are the methods of saving of heat losses from a container having hot liquid ?

b) The exposed roof of a residential building is made of 1·5 cm of Gypsum plaster, 10 cm of reinforced concrete and 5 cm of brick tiles. In order to reduce the heat load, insulation is provided by mud - fuska interposed between brick tiles and concrete. If the heat transfer is reduced by 70%, determine the thickness of layer of mud - fuska. The thermal conductivity of plaster = 0·8 W/m°K, concrete = 1·25 W/m°K, brick tiles = 0·7 W/m°K and mud - fuska = 0·15 W/m°K. 5 + 10

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

a) Co-generation

b) Role of an energy manager

c) Geothermal energy

d) Environmental impact of the various pollutants from fossil fuel power plant

e) Energy storage methods.

END