

B.TECH SEM – VIII (2007 COURSE) (ELECTRICAL ENGG.)

: WINTER - 2017

SUBJECT : ENERGY AUDIT & MANAGEMENT

Day : **Monday**
Date : **20/11/2017**

Time : **02.30 PM TO 05.30 PM**

W-2017-2667 Max. Marks : 80

N.B.:

- 1) **Q.No.1 and Q.No.5 are COMPULSORY.** Out of the remaining questions attempt **ANY TWO** questions from each section.
- 2) Answers to both the sections should be written in the **SEPARATE** answer books.
- 3) Draw neat and labeled diagrams **WHEREVER** necessary.
- 4) Figures to the right indicate **FULL** marks.
- 5) Assume suitable data if necessary.

SECTION – I

Q.1 a) Differentiate between Supply Side Management (SSM) and Demand Side Management (DSM). [05]

b) Elaborate the contents of Action Plan. When is it prepared and when is it used? [04]

c) Explain the concept of “Time Value of Money” and explain how this concept is applied in Net Present Value method. [05]

Q.2 a) Explain the following: [06]

- i) Energy conservation and its importance
- ii) Indian energy scenario.

b) Explain the advantages to the society and utility with implementation of Demand Side Management (DSM). [07]

Q.3 a) What is Sankey Diagram and how is it used? Draw Sankey Diagram for a thermal power plant system. Discuss the areas using Sankey diagram where maximum energy wastage happens. [07]

b) Calculate CUSUM for data shown in table below and comment the result based on CUSUM graph. [06]

Month	Bill before audit (Rs.)	Bill after audit (Rs.)
January	50,000	43,000
March	60,000	64,000
May	75,000	77,000
July	65,000	62,000
September	55,000	46,000

Q.4 a) Table below shows capital costs and net savings of 3 projects for a discount rate of 12%. Calculate NPV for each project. [07]

Capital Cost / Net Annual Savings	Project – 1 15,000/-	Project – 2 15,000/-	Project – 3 15,000/-
Year			
1	+ 3000	+ 4000	+ 3500
2	+ 3000	+ 4000	+ 3500
3	+ 3000	+ 3800	+ 3900
4	+ 2800	+ 3600	+4300
5	+ 2800	+ 3200	+ 4300
6	+ 2800	+ 2800	+ 4400

P.T.O.

- b) In energy audit of cement industry, it is suggested to implement a new conservation scheme with following details. [06]

Cost of installation	Rs. 20 lakh
Annual operating cost	Rs. 50,000
Annual fuel saving	45,000 million KJ
Fuel price	Rs. 20/- million KJ

Calculate Payback Period (PP) and Return on Investment (ROI) of the scheme.

SECTION – II

- Q.5** a) What are energy efficient motors used in motive power and how they can help in energy conservation [05]
- b) Explain energy conservation measures for Autoclaves used in hospitals. [05]
- c) From point of view of quality monitoring, explain the concept of point of common coupling. [04]
- Q.6** a) Explain how efficiency of pumping system can be improved by using Variable Frequency Drives (VFD) [07]
- b) Discuss how losses can be reduced and efficiency can be increased for a transmission line. [06]
- Q.7** a) Elaborate the major consumption areas of water pumping system and how energy conservation can be achieved. [07]
- b) Give the list of designated industries and explain ways of energy conservation in Cement Industry. [06]
- Q.8** a) Define the terms: [06]
- i) Total Harmonic Distribution (THD)
- ii) Total Demand Distribution (TDD)
- b) What are various sources of harmonic generation and how monitoring of such sources can be performed? [07]

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