Energy Auditing and Demand Side Management VTU CBCS Question Paper Set 2018

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10EE842

Eighth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Energy Auditing and Demand Side Management

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Explain an approach to achieve lower specific energy consumption. **(06 Marks)**

b. Describe the different statutory public controls, which regulate the supply industry. **(08 Marks)**

c. Describes standards for electrical equipments. **(06 Marks)**

2 a. Develop a cashflow model for uniform series sinking fund method. **(06 Marks)**

b. What is depreciation? Explain declining balance method of depreciation. **(06 Marks)**

c. An electrical energy audit indicates the motor consumption is 4×10^6 kwh per year. By upgrading the motor spares with high efficiency motors, a 10% savings can be realized. The additional cost for these motors is estimated at Rs 80,000/-. Assuming an 8% per kwh energy charge and 20 year life, is the expenditure justified based on a minimum rate of return of 20% before taxes? Solve the problem using the present worth and annual cost methods. **(08 Marks)**

3 a. Write neatly a general format of energy audit report. **(10 Marks)**

b. Explain the audits required for creating energy profiles in an industry briefly. Discuss the energy audit instruments. **(10 Marks)**

4 a. Explain power flow concept with the help of a single line diagram. **(06 Marks)**

b. The load on the installation is 800kw, 0.8 lag which works for 3000hrs per annum. The tariff is Rs. 100/- per KVA plus 20 paise per kwh. If the power factor is improved to 0.9(lag) by means of loss free capacitors casting Rs. 60/- per KVAR. Calculate the annual saving affected. Allow 10% annum for interest and depreciation on capacitors. **(08 Marks)**

c. What are the effects of low power factor? **(06 Marks)**

PART – B

5 a. Obtain the condition for most economic power factor when KW demand is constant. **(06 Marks)**

b. A 3 phase, 50Hz, 400V motor develops 100HP(74.6 KW) the power factor being 0.75 lagging and efficiency 93%. A bank of capacitors is connected in delta across the supply terminals and power factor raised to 0.95 lag. Each of the capacitance units is built with 4 similar 100V capacitors. Determine the capacitance of each capacitor. **(08 Marks)**

c. Define : i) Plant energy performance
ii) Production factor
iii) Diversity factor
iv) Plant use factor. **(06 Marks)**

6 a. What are the objectives of tariff? What are the broad features of availability based tariff. **(10 Marks**

b. A factory has a maximum load of 240 KW at 0.8 pf. lagging with an annual consumption o 50,000 units. The tariff is Rs. 50 per KVA maximum demand plus 10 paise per unit Calculate the flat rate of energy consumption what will be the annual saving if pf is raised t unity. **(06 Marks**

c. Write a short note on energy different motors. **(04 Marks**

7 a. Explain the terms :
i) Peak clipping
ii) Valley filling
iii) Load shifting. **(10 Marks**

b. Explain the tariffs for demand side management. **(10 Marks**

8 a. Explain multiplicity power exchange model. **(10 Marks**

b. Explain the types of uncertainties in DSM programs. **(10 Marks**

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Eighth Semester B.E. Degree Examination, June/July 2015
Energy Auditing and Demand Side Management

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART - A

1 a. Describe the present energy situation in India. **(10 Marks)**

b. Write a short note on standards, with respect to equipments of electrical engineering. **(06 Marks)**

c. What is Energy conservation? Explain. **(04 Marks)**

2 a. Develop cash flow model for single payment compound amount. **(10 Marks)**

b. In a Milk Industry, the existing low cost conventional 5Hp motor is to be replaced with energy motor after 10 years. Assume that Rs 10,000 is to be provided after 10 years. Find the total fund during the course of 10 years by straight line depreciation method and sinking fund depreciation method. Plot the graph of total fund verses time in years for both the methods. Assume rate of interest 5% for sinking fund depreciation method. **(10 Marks)**

3 a. Explain the various classification of energy audit. **(10 Marks)**

b. Discuss the role of energy management team. **(10 Marks)**

4 Write short notes on :

a. Time value of money concept.

b. Layout of Typical ac power supply scheme.

c. Distribution scheme.

d. Advantages of energy audit. **(20 Marks)**

PART - B

5 a. Define Power factor and derive expression for most economical power factor. Discuss the importance of power factor improvement, from supplier and consumer point of view. **(10 Marks)**

b. A factory has a maximum load of 240 KW at 0.7 lagging with an annual consumption of 50,000 units. The tariff is Rs 50/KVA of maximum demand plus 10 paise/unit. Calculate the flat rate of energy consumption. What will be annual saving if PF is raised to unity? **(10 Marks)**

6 a. What is Tariff? What are the different types of tariff? Explain. **(10 Marks)**

b. What is ABT? What are the broad features of ABT design? **(10 Marks)**

7 a. What is DSM? What is the scope of DSM? How did the concept of DSM evolved? **(10 Marks)**

b. With a flow chart, explain the various steps in DSM planning and implementation. **(10 Marks)**

8 a. Discuss the tariff options for DSM. Which tariff promote DSM? **(10 Marks)**

b. Explain the following terms :

i) Peak clipping ii) Valley filling. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, June/July 2016
Energy Audit and Demand Side Management

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the energy conservation techniques used to reduce the energy costs. **(06 Marks)**

b. With respect to supply system summarise the points in the distribution code. **(08 Marks)**

c. Explain broad features of Indian electricity rules 1956. **(06 Marks)**

2 a. Explain payback analysis. Mention its advantages and disadvantages. **(06 Marks)**

b. What is life cycle cost analysis? What are typical costs for a system and different ways to minimize costs? **(06 Marks)**

c. The equipment in a power station costs Rs. 15, 60,000/- and has salvage value of Rs. 60,000/- at the end of 25 years. Determiner the depreciation value of the equipment at the end of 20 years by the following methods (i) straight line method (ii) Reducing balance method (iii) sinking fund method at 5% compounded annually. **(08 Marks)**

3 a. What are the energy management strategies? Explain them in brief. **(08 Marks)**

b. What are energy audit instruments? Explain each one of them. **(12 Marks)**

4 a. With a vector diagram, explain various components of power triangle. **(06 Marks)**

b. What is power flow concept? Define and explain plant energy performance and production factor. **(06 Marks)**

c. Write short notes on :
(i) Primary and secondary distribution (ii) Advantages of energy audit. **(08 Marks)**

PART – B

5 a. Define power factor. What are the causes and disadvantages of low power factor? **(12 Marks)**

b. Derive an expression for the most economical power factor. **(08 Marks)**

6 a. Write a note on energy efficient motors. **(10 Marks)**

b. An industrial load operates at 0.75 p.f lag and has a monthly demand of 750kVA. The monthly power rate is Rs. 8.50 per kVA. To improve the power factor 200kVAR capacitors are installed in which there is negligible power loss. The installed cost of equipment is Rs. 20,000/- and fixed charges are estimated at 10% per year. Calculate the annual savings effected by the use of capacitors. **(10 Marks)**

7 a. Define and explain the concept of DSM. **(06 Marks)**

b. What are the different benefits of DSM for supply industry, customers and society? **(06 Marks)**

c. Briefly explain the DSM implementation issues. **(08 Marks)**

8 a. Explain energy conservation opportunities in agricultural sector, industrial sector and illumination system. **(08 Marks)**

b. Discuss tariff options for DSM. Which tariffs promote DSM? **(06 Marks)**

c. Explain: (i) Peak clipping (ii) valley filling (iii) Strategic energy conservation. **(06 Marks)**

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Eighth Semester B.E. Degree Examination, June/July 2017
Energy Auditing and D.S.M

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain how energy sources are classified broadly. Give examples for each classification. **(06 Marks)**

b. Write a brief note on "energy scenario in India". **(08 Marks)**

c. List the objectives of energy conservation act 2001. **(06 Marks)**

2 a. What do you meant by i) cash flow model ii) depreciation. **(06 Marks)**

b. Develop a cash flow model for uniform series compound amount factor. **(06 Marks)**

c. Calculate the depreciation for data give below, salvage value Rs = 0, life of the equipment = 5 years, initial expenditure P = Rs 1,50,000/-. For declining balance use a 200% rate, by using i) straight line method ii) sum of years digit method iii) Decline balance method. **(08 Marks)**

3 a. What is an energy audit? Explain data acquisition and data analysis with respect to energy audit. **(06 Marks)**

b. Give the ten methodology steps for detailed energy audit and explain each one in brief. **(10 Marks)**

c. Write a short note on "energy use profile". **(04 Marks)**

4 a. Explain the typical A.C power supply scheme with suitable line diagram. **(08 Marks)**

b. Write a short note on "energy audit report". **(06 Marks)**

c. A single phase motor is connected to 400V, 50Hz AC supply takes a 20A at a power factor of 0.7 lagging. Calculate the capacitance required in parallel with the motor to raise the power factor to 0.9 lagging. **(06 Marks)**

PART – B

5 a. Using the power distribution diagram discuss the location of capacitors in a plant to reduce the energy consumption. **(06 Marks)**

b. What do you meant by Energy efficient motor (EEM), briefly discuss the design features of EEM. **(06 Marks)**

c. What is ABT? Discuss the broad features of ABT design. **(08 Marks)**

6 a. Briefly discuss the lighting control systems are used at design stage. **(08 Marks)**

b. Explain the following Indian tariffs
i) Three part tariff ii) Power factor tariff iii) KVA maximum demand tariff. **(06 Marks)**

c. Write a note on energy efficient lamps i) CFL ii) HPSV iii) TLD. **(06 Marks)**

7 a. What is demand side management? Mention the benefits of DSM. **(06 Marks)**

b. Explain: i) peak clipping ii) valley filling. **(08 Marks)**

c. Discuss the energy conservation opportunities in
i) Agriculture sector ii) Illumination system. **(06 Marks)**

8 a. Briefly discuss various DSM based tariffs. **(08 Marks)**

b. Write a note on DSM implementation issues. **(06 Marks)**

c. Explain the plant level energy conservation program with flow chart. **(06 Marks)**

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Energy Audit and Demand Side Management

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Give classification of energy sources with example. **(06 Marks)**
b. Discuss energy sources in India. **(08 Marks)**
c. Mention the provisions provided in Indian Electricity Act 2003. **(06 Marks)**

2 a. Develop a cash flow model for Uniform Series Compound Amount Factor. **(08 Marks)**
b. What is a simple pay back analysis? How it is used for comparing different investment options? **(04 Marks)**
c. A project with initial investment of Rs 3,50,000/- generates net revenue of Rs 50,000/- per year. Considering the life cycle of the project to be 15 years, find out the feasibility of the project. Compute the cash flow interms of present worth. Assume discount rate to be 12% per year. **(08 Marks)**

3 a. Mention the principles on which the energy management is based. Explain the steps involved in Energy Management Strategy. **(10 Marks)**
b. Tabulate ten steps involved in detailed energy audit. Give plan of action, purpose and results involved in each step. **(10 Marks)**

4 a. Write short notes on the following : i) Tax consideration in financial analysis of project. ii) Three pronged approach to energy management iii) Energy use profiles. **(12 Marks)**
b. Give a single line diagram of a typical A.C power supply, mentioning respective voltage level. **(08 Marks)**

PART – B

5 a. Explain any six different types of tariff. **(12 Marks)**
b. Derive an equation for most economic power factor. **(08 Marks)**

6 a. Give broad features of ABT design. **(10 Marks)**
b. Write a note on energy efficient motors. **(10 Marks)**

7 a. Why DSM is required? Explain. **(05 Marks)**
b. What is the scope of DSM? **(05 Marks)**
c. Give DSM planning and implementation. **(10 Marks)**

8 a. Explain tariff structures that promote DSM activities. **(10 Marks)**
b. Discuss the factors which influence customer participation in DSM.
c. Explain the following terms :
i) Peak clipping ii) Valley fillings. **(10 Marks)**

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