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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 costing 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 of 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 to unity. (06 Marks)
- c. Write a short note on energy efficient 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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