[Total No. of Questions - 9] [Total No. of Printed Pages - 3]

Dec-24-0510 (CBCS)

EE-701 (Energy Management)

B.Tech-7th (CBCS)

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note: Attempt five questions in all, select one question each from section A, B, C, D. Section E (Question-9) is compulsory. Use non-plrogrammable calculator is allowed.

SECTION-A

1. (a) What are different types of commercial energy resources? How is commercial energy different from non commercial energy? (5)

   (b) What is energy security? How can the goal of energy security be achieved? (5)

2. Explain the term Energy Conservation. What are the key features of Energy Conservation? (10)

SECTION-B

3. (a) What is preliminary energy audit? How is it different from a detailed energy audit? (5)

   (b) Describe any 2 key instruments required to conduct a successful energy audit? (5)

4. (a) What is the significance of knowing the energy cost? Give an example. (5)

   (b) Attempt any one part. (5)

   (i) Matching energy use with requirements.

   (ii) Optimizing the input energy requirements.

SECTION-C

5. (a) What is sensitivity and risk analysis? Explain various micro and macro factors that are considered for the sensitivity analysis. (5)

(b) What is energy performance contracting and role of Energy Service Company (ESCO)? (5)

6. A proposed project requires an initial cash capital investment of Rs 20,000. The cash flows generated by the project are shown in table below. Evaluate the net present value and financial merits of the proposed project. Given the cash flow data for internal rate of return of 8%, 12% and 16% for the projects. (10)

Year	Cash Flow (Rs)
0	-20,000
1	6,000
2	5,500
3	5,000
4	4,500
5	4,000
6	4,000

SECTION-D

7. (a) List advantages of power factor improvement by capacitor addition. What are the cost benefits of power factor improvement? (5)

(b) A chemical industry had installed a 1500 kVA transformer. The initial demand of the plant was 1160 kVA with power factor of 0.7. To improve the power factor and to avoid the penalty, the unit added about 410 kVAR of Capacitor Bank in motor load end. What is the improved power factor and percentage loading of transformer? (5)

[P.T.O.]

8. (a) Define electrical load management. Explain the steps for maximizing demand management. (5)

(b) What are the typical billing components of the two-part tariff structure? Explain the factors considered for electricity tariff. (5)

SECTION-E (Compulsory)

9. Explain the following:

i) Define the term energy pricing.

ii) What are non commercial energy sources?

iii) What are the goals of energy management?

iv) Explain the term bench marking

v) What is Energy Performance?

vi) How can fuel and energy Substitution be achieved?

vii) Define the term return on investment.

viii) What is Cashflow?

ix) Define the term Motor Efficiency.

x) What are the losses in Induction Motor? (10×2=20)