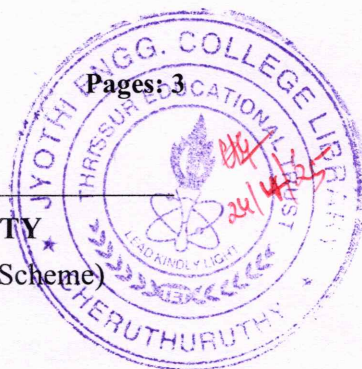


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
 B.Tech Degree S8 (R,S) / S6 (PT) (R,S) Exam April 2025 (2019 Scheme)

**Course Code: EET424****Course Name: ENERGY MANAGEMENT****Max. Marks: 100****Duration: 3 Hours****PART A***Answer all questions, each carries 3 marks.***Marks**

- | | | |
|----|---|-----|
| 1 | Identify the underlying reasons for conducting an energy audit. | (3) |
| 2 | Explain about ECBC. | (3) |
| 3 | Explain how energy-efficient motors help reduce energy consumption. | (3) |
| 4 | Write notes on design measures for increasing efficiency in transformers | (3) |
| 5 | Explain the concept of demand-side management (DSM) | (3) |
| 6 | A 3-phase, 5kW induction motor has a pf of 0.75 lagging. A bank of capacitors is connected in delta across the supply terminals and pf raised to 0.9 lagging. Determine the kVAR rating of the capacitors connected in each phase. | (3) |
| 7 | How capacity of an HVAC system is measured? What is meant by the coefficient of performance | (3) |
| 8 | Explain the working of any one type of Waste Heat Recovery System | (3) |
| 9 | A company is considering investing in a project that requires an initial investment of Rs 100,000 for some machinery. There will be net inflows of Rs 20,000 for the first two years, Rs 10,000 in years three and four, and Rs 30,000 in year five. Finally, the machine has a salvage value of Rs 25,000. Calculate ARR | (3) |
| 10 | "It becomes more beneficial when Energy Management System (EMS) and SCADA are used together" Justify this statement | (3) |

PART B*Answer any one full question from each module, each carries 14 marks.***Module I**

- | | | |
|----|--|------|
| 11 | a) Explain various steps involved in Energy Management Planning | (10) |
| | b) What are the power quality parameters which are to be considered during a power quality audit? Define each term | (4) |

OR

- | | | |
|----|--|------|
| 12 | a) Classify energy audit? Explain the steps involved in detailed energy audit. | (10) |
|----|--|------|

- b) List down the major energy audit instruments (4)

Module II

- 13 a) An energy audit was conducted in a large machine shop and the audit report suggested replacing 30 machine motors with energy efficient motors. The loading details of old and new motors are given below. (10)

Motor rating (kW)	% load	% η Old motor	% η New motor	No. of motors
7.5	75	86	89	12
11.5	85	88	91	7
15	70	89	92	11

Assuming motor loading remains the same, calculate the annual energy savings, for 4000 hours of operation per year.

- b) Explain cascade efficiency in the case of electricity transmission and distribution system (4)

OR

- 14 a) Explain energy management opportunities in lighting system (8)
b) What are the benefits of maximum demand control in an industry (6)

Module III

- 15 a) The load on an installation is 800 kW, 0.8 lagging p.f. which works for 3000 hours per annum. The tariff is Rs 100 per kVA plus 20 paise per kWh. If the power factor is improved to 0.9 lagging using loss-free capacitors costing Rs 60 per kVAR, calculate the annual savings effected. Allow 10% per annum for interest and depreciation on capacitors. (11)
b) What is meant by time-of-day pricing? (3)

OR

- 16 a) Explain any two strategies that can be used for peak demand control in industries. (8)
b) Write short notes on any three demand side management techniques (6)

Module IV

- 17 a) Explain any seven energy conservation opportunities in boilers (7)
b) What are the different types of HVAC systems. Explain (7)

OR

- 18 a) What is boiler blowdown? List any two benefits of boiler blowdown. (6)
b) Explain the working of different types of cogeneration systems (8)

Module V

- 19 a) Explain about Computer Aided Energy Management Systems (7)
- b) Investment for an energy proposal is Rs.12.00 lakh. Annual savings for the first three years is 150,000, 200,000 & 300,000. Considering the discount rate as 10%, what is the net present value of the proposal? (7)

OR

- 20 a) Explain Life cycle costing approach. What are the advantages of product life cycle costing (7)
- b) Calculate the NPV of a project which is having following cash flows. Assume a discount rate of 10% (7)

Investment	Rs. (1,000,000)
Saving in Year	Cash flow
1	200,000
2	200,000
3	300,000
4	300,000
5	350,000
