Total No. of Questions : 8]

SEAT No. :

PF-5367

[Total No. of Pages : 3

# [6627]-219

## B.E. (Mechanical)

## ENERGY AUDIT AND MANAGEMENT

## (2019 Pattern) (Semester - VIII) (402050B) (Elective - V)

*Time : 2½ Hours]* *[Max. Marks : 70*

***Instructions to the candidates:***

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8***
2) ***Figures to the right side indicate full marks.***
3) ***Use of Calculator is allowed.***
4) ***Assume Suitable data if necessary.***

***Q1)*** a) Write short note on risk and Sensitivity Analysis. **[5]**

b) Explain 'Simple Payback Period' method of financial analysis with its advantages and limitation. **[5]**

c) A Company invests Rs.10 lacks and completes an energy efficiency project at the beginning of year 1. The film is investing its own money and expects an internal rate of return, IRR, of a at least 26% on constant positive annual net cash flow of Rs.2 lacks, over a period of 10 years, starting with year 1. **[7]**

i) Will the project meet the firm's expectations?

ii) What is the IRR of this measure?

OR

***Q2)*** a) Explain following financial analysis methods. **[6]**

i) Net Present Value

ii) Return on Investment

iii) Internal Rate of Return

b) Explain various types of cash flows with cash flow diagram for an investment. **[6]**

c) Explain the terms present value and future value and relation between them. **[5]**

***P.T.O.***

SPPUQuestionPapers.com CEGP019671 103.157.122.163 09/06/2026 13:35:48 in-pnq-static-163-122-157-103

***Q3)*** a) Explain the energy saving opportunities in the compressed air system. **[5]**

b) Explain different efficient steam distribution methods. **[5]**

c) In a central chilling system of mall (Capacity = 40 TR), ethylene glycol is used as secondary refrigerant. Temperature of ethylene glycol entering and leaving the evaporator is -1 deg.C, and -4 deg.C. Flow rate of ethylene glycol is 13200 kg/hr. Specific heat of ethylene glycol is 2.34 kJ/kg deg.K. Electrical power consumed by compressor is 393 kW. Determine the net operating capacity, COP, and energy efficiency ratio of chilling system. **[8]**

OR

***Q4)*** a) What are the different Energy Conservation Opportunities in cooling tower and pumping System? **[5]**

b) What are different heat losses occurring in the oil fired furnaces? **[5]**

c) In the leakage test in a process industry, following results were observed: Compressor capacity = 40 cub.m/min, Cut in pressure = 5.8 kg/sq.cm (g), Cut out pressure = 8.5 kg/sq.cm (g), Load drawn 190 W, Unload kW drawn 60 W, Average load time = 2.5 min, Average unload time = 12.5 min. Calculate, **[8]**

i) Leakage Quantity / min and per day

ii) Specific power for compressed air generation

iii) Energy loss due to leakage / day.

***Q5)*** a) What are the types of lamps used in lighting system? Write are their features with typical applications. **[9]**

b) What is various energy saving opportunities in illumination? **[8]**

OR

***Q6)*** a) Explain the following terms: Power factor. Maximum demand, Copper losses, luminous losses, Stray losses. **[7]**

b) The connected loads for the hostel are as below : **[10]**

i) 190 fluorescent tubes of 55W each with magnetic ballast

ii) 20 fluorescent tubes of 40 W each with electronic ballast

iii) 20 old fan of 100 W each

It is decided to replace all tubes of 20 W each and old fan by new fan of 80 W. Considering usages of 6 hours per day and an electrical tariff of Rs. 4 per kWh; Calculate energy saving of tubes and fans replacement.



SPPUQuestionPaper.com CEGP019671 103.157.122.163 09/06/2026 13:35:48 in-pnq-static-163-122-157-103

***Q7)*** a) Write short notes on : **[9]**

i) Recuperator

ii) Regenerator

b) Explain the term topping cycle and bottoming cycle with examples. **[9]**

OR

***Q8)*** a) What are benefits of waste heat recovery? Explain the concept of heat wheel. **[9]**

b) Write a short note on : **[9]**

i) CDM projects

ii) Carbon credit

SPPUQuestionPapers.com
CEGP019671
103.157.122.163 09/06/2026 13:35:48 in-pnq-static-163-122-157-103