Total No. of Questions : 8]

SEAT No. :

PB-2376

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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, Q7or 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 a short note on: Net Present Value (NPV) **[5]**

b) Illustrate need of Financial analysis. **[5]**

c) Consider two projects, A & B with the initial investment Rs. 80,000. The project life times are 5 years in each case. The saving in each of the 5 years for the two projects is as shown in the following table **[7]**

	Project A	Project B
Capital Cost (Rs.)	Rs. 80,000	Rs.80,000
Year	Cash Flows (Rs.)	Cash Flows (Rs.)
01	10,000	50,000
02	20,000	40,000
03	30,000	30,000
04	40,000	20,000
05	50,000	10,000

Assuming discount rate 20%, find out the preferable project out of A & B.

OR

Q2) a) Explain Internal Rate of Return. What are advantages and disadvantages of IRR? **[6]**

b) Write short note on risk and Sensitivity Analysis. **[6]**

c) Write a short note on : **[5]**

i) Discounting ii) Depreciation

P.T.O.

Q3) a) Enlist and discuss energy saving methods in pumping system. **[8]**

b) A Cooling water pump is used for process cooling of a chemical plant. The data obtained during testing are: Power pump discharge 0.8 m^3/s, Power absorbed i.e. power input P = 650 KW, Suction Head hs = 1m, Delivery Head hd = 56m, Height of cooling tower = 5m, Efficiency of motor = 0.89, Density of water =997 kg/m^3. Determine the pump efficiency. **[10]**

OR

Q4) a) What are the measures to be taken for efficient operation of HVAC system? **[8]**

b) Find the furnace efficiency required to melt one ton of steel from ambient temp of 30°C. following data is given : **[10]**

i) Specific heat of steel = 0.682 kJ/kg/deg°C

ii) Latent heat of melting of steel = 272 kJ/kg

iii) Melting point of steel = 1650°C

iv) The melting furnace consumed 625 kWh to melt one ton of steel.

Q5) a) Explain the following terms: Power factor. Maximum demand, Copper losses, luminous losses, Stray losses. **[10]**

b) What are the factors affecting energy efficiency of electrical motors? **[8]**

OR

Q6) a) The connected loads for shop are as below : **[10]**

10 bulbs of 60 W each 08 fluorescent tubes of 50 W each. An old refrigerator of 300W. It is decided to replace the bulbs and tubes with 12CFL of 16W each and an old refrigerator by energy efficient refrigerator of 150W. Considering usages of 8 hours per day an electrical tariff of Rs. 5 per kwh. Calculate an annual electrical energy saving in kWh and cost.

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

Q7) a) What are benefits of waste heat recovery? Explain the concept of heat wheel. **[9]**

b) Write notes on : **[8]**

i) Heat Pipes

ii) Carbon credits.

OR

Q8) a) Explain CDM project with flowchart. **[8]**

b) What is the cogeneration? Describe technical option for cogeneration and write down advantages of cogeneration. **[9]**

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