Total No. of Questions – [06] Total No. of Printed Pages: 2

G.R. No.	

DECEMBER 2021-ENDSEM EXAM

T. Y. B. TECH. (Mechanical Engineering) (SEMESTER - I)

COURSE NAME: Energy Conservation and Management

COURSE CODE: (MEUA31183A)

(PATTERN 2018)

Time: [1Hr] [Max. Marks: 30]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q. 1) a) Calculate thermal efficiency of boiler by direct method with the help of following data: Type of boiler: Coal fired. [4 marks]
Quantity of steam generated: 11 TPH
Quantity of coal consumed: 1.6 TPH.
Steam pressure and temperature: 10 bar (gauge)/190°C.
Feed water temperature: 81°C.
GCV of coal: 12500 kJ/kg.
Enthalpy of saturated steam at 10 bar (gauge), Pressure :1685 kJ/kg
Enthalpy of feed water: 310 kJ/kg

b) Analyze energy saving opportunities in two stage reciprocating air compressor. [6 marks]

OR

Q.2) a) In a central air conditioning system of mall (capacity = 40 TR). mthylene glycol is used as secondary refrigerant. Temperature of mthylene glycol entering and leaving the evaporator is -1°C and -4°C. Flow rate of ethylene glycol is 14200 kg/hr. Specific heat of ethylene glycol is 2.34 kJ/kg K. Electrical power consumed by compressor is 39.5 kW. Determine the net operating capacity, COP of chilling system. [4 marks]

b) Illustrate the different energy saving opportunity in Heating Ventilation and Air Conditioning systems. [6 marks]

Q.3) a) Elaborate the following terms with reference to automotive industry. [4 marks]
i) Luminous efficacy ii) Colour rendering index

b) The connected load for the hostel is as below. [6 marks]
a. 190 Fluorescent tubes of 55 W each with magnetic ballast
b. 20 Fluorescent tubes of 40 W each with electronic ballast
c. 20 old fan of 100 W each
It is decide to replace the all tubes of 20 W with CFL and fan by new fan of 80 W. Considering usage of 06 hours per day and an electrical tariff of Rs. 4 per kWh.

Calculate energy saving of tubes and fans replacement per year.

OR

Q. 4) a) Illustrate the various factors which constitute the billing amount for a medium scale industry. [4 marks]

b) The connected loads for shop are as below 10 bulbs of 60W each 08 fluorescent tubes of 50W 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 and an electrical tariff of Rs. 5 per kWh; calculate an annual electrical energy saving in kWh and cost. [6 marks]

Q.5) a) Illustrate with neat sketch energy conservation in electric train. [4 marks]

b) Elaborate the energy conservation measures taken in sugar industry. [6 marks]

OR

Q.6) a) Analyze the energy conservation measures taken in car. [4 marks]

b) Elaborate the energy conservation measures taken in multi specialty hospital. [6 marks]

****