

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject code: 1723902

Date: 18-06-2014

Subject Name: Energy Audit and Energy Management

Time: 02:30 pm - 05:00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q-1 (a) Explain necessary steps to be followed in primary Energy audit and Detail Energy Audit 07
(b) Write short note on Efficient report writing and contents for the final report after energy Auditing. 07

- Q-2 (a) Write a short note on instruments needed for energy audit 07
(b) Define following in context of Lightning.
1) Lumen
2) Lux
3) Installed load Efficiency
4) Lamp circuit Efficiency
5) Color Rendering Index(CRI) 07

OR

- (b) Explain the the Effects of harmonics in detail 07
Q-3 (a) Write a short note on Energy Management Programs and EMIS (Energy management Information system). 07
(b) Explain Automatic power factor controllers 07

OR

- Q-3 (a) Explain the losses in Industrial heating furnace and hence explain performance evaluation of such furnace. 07
(b). Explain variable frequency drives as Energy Efficient device as compared to throttling for centrifugal pump application. 07
Q-4 (a) For a coal fired boiler following measurements were taken. 07

Heat Output Data:-

Quantity of steam generated(Output):-8 Tonnes/Hour.

Steam Pressure/Temperature:-10 kg/cm²(g)/180°C

Enthalpy of steam(dry and saturated) at 10 kg/cm²(g) pressure:-665 kcal/kg.

Feed water temperature:-85°C .

Enthalpy of feed water:- 85 kcal/kg.

Heat Input Data:-

Quantity of coal consumed(Input):-1.6 Tonnes per Hour.

Gross Calorific value of coal:-4000 kcal/kg.

Calucalte Boiler Efficiency and Evaporation Ratio.Also discuss merits and demerits of finding boiler efficiency by above method.

(b) Disscuss energy efficiency opportunities for pumps & pumping systems.

07

OR

- Q-4** (a) An instrument air compressor capacity test gave the following results (assume the final compressed air temperature is same as the ambient temperature) .Calculate compressor output and Comment the results. Also Explain simple method of capacity assessment of compressor on shop floor. 07

Piston displacement:- $16.88 \text{ m}^3/\text{minute}$.

Theoretical compressor capacity:- $14.75 \text{ m}^3/\text{minute}@7 \text{ kg/cm}^2$.

Compressor rated rpm:-750.

Motor Rated rpm:-1445.

Receiver Volume:- 7.79 m^3 .

Additional hold up volume,i.e., pipe / water cooler, etc., is:- 0.4974 m^3 .

Total volume:- 8.322 m^3 .

Initial pressure P1:- 0.5 kg/cm^2 .

Final pressure P2:- 7.03 kg/cm^2 .

Atmospheric pressure P0:- 1.026 kg/cm^2 .

Time taken to buildup pressure from P1 to P2:-4.021 minutes.

(b) Explain performance evaluation of Airconditioner system.

07

- Q-5** (a) Explain the mechanism of fluidized bed combustion. 07

(b) Explain Procedure for calculating economic thickness of insulation. 07

OR

- Q-5** (a) Explain Typical Instruments used for boiler performance Acessment. 07

(b)Classify Cogeneration systems and explain in detail with relative merits and demerits. 07
