Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1723902 **Date: 09/07/2012**

Subject Name: Energy Audit and Energy Management

Time: 10:30 am – 13:00 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) What is Energy Audit? Explain the necessity of Energy audit with its advantages. 07

(b) Write short note on Energy audit Procedure/Steps/Methodology. 07

Q-2 (a). Explain the Effect of harmonics in detail. 07

(b) Write a short note on benefits of power quality analysis. 07

OR

(b) Explain the following terms related to power quality in brief. 07

(1) Over voltage
(2) Under voltage
(3) Harmonics
(4) Voltage flicker
(5) Sag(Dips)
(6) Swells
(7) Interruption

Q-3 (a) Write a short note on Energy Management Programs and EMIS (Energy management Information system). 07

(b) Explain in detail SSM (Supply side Management) and (Demand side Management). 07

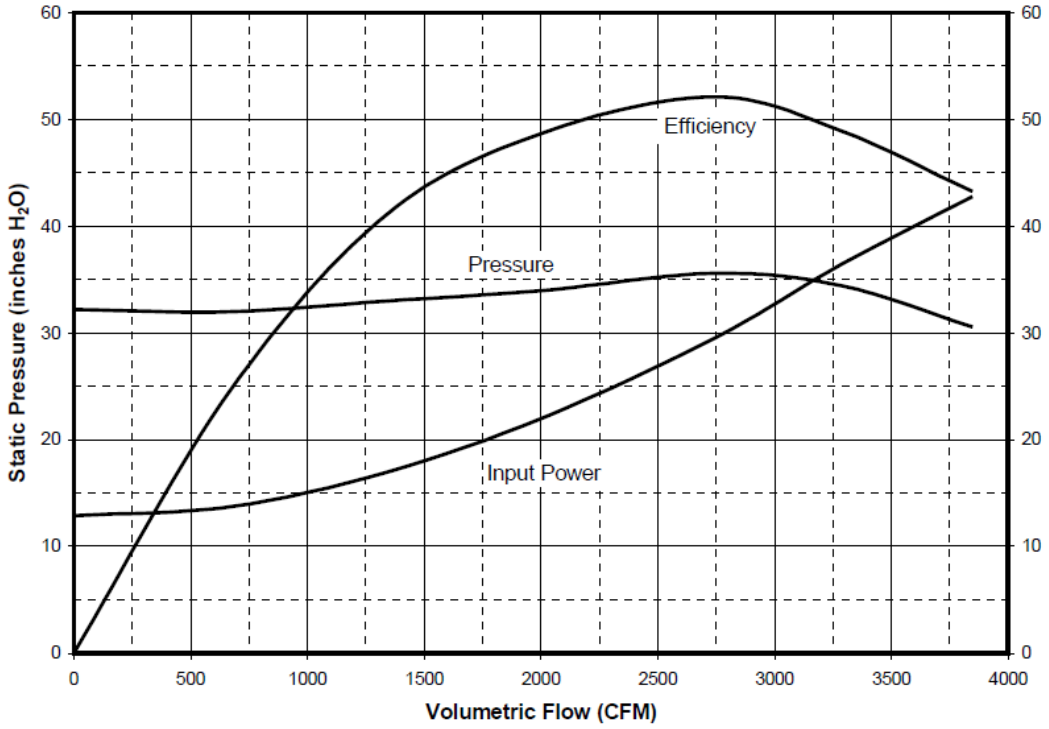
OR

Q-3 (a) Explain the necessity of power factor improvement and explain any one method of power Factor improvement. 07

(b). Write a short note on Energy Efficient motors. 07

Q-4 (a) Given below is a set of curves for a centrifugal fan. At its Best Efficiency Point (BEP) determine to the nearest approximation the following. 07

a) Static pressure in mmwc
b) Flow in m^3/hr
c) Shaft power in kW
d) Work out the static efficiency of the fan by calculation
e) Power drawn by the motor if the motor operating efficiency is 90%



(b) Disscuss energy efficiency opportunities for pumps & pumping systems. 07

OR

Q-4 (a) In an engineering industry located in Southern India, there are 4 numbers of compressors installed for compressed air requirement. All the four will be in operation at any point of time. The rated capacities of compressors are 100 cfm each, whereas the actual output of each are given below: 07

Compressor #1 : 80 cfm
Compressor #2 : 75 cfm
Compressor #3 : 90 cfm
Compressor #4 : 95 cfm

The power consumption of these compressors is 25 kW, 27 kW, 23 kW and 28 kW respectively. The compressor is continuously operated at 7 kg/cm2 pressure. During the measurements it was observed that the leakage losses constitute around 45% of the actual output of the compressors. Estimate the following:

1) Power loss due to leakage
2) Estimate the power savings if 50% of the leakages are arrested

(b) Disscuss in brief coolling tower types and performance evaluation. 07

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

(b) Disscuss economic thickness of insulation. 07

OR

Q-5 (a) Disscuss performance evaluation of boilers. 07

(b) Discuss control of furnace draft. 07

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