

Government College of Engineering, Aurangabad
(An Autonomous Institute of Government of Maharashtra)

B. E. (E.E.P.) (Old) & P.T. Examination
End Semester Examination

EE 403: Energy Conservation & Management

Time: Three Hours

18 NOV 2016

Max Marks: 60

"Verify the course code and check whether you have got the correct question paper"

N.B:-

1. Attempt any five questions
2. All Question carries equal marks.
3. Assume suitable data if necessary and state it clearly
4. Use of programmable calculator is not allowed

- Q.1 a) Explain ten step methodology of detailed energy audit (6)
b) The maximum demand of a consumer is 100 kVA at 0.707 lagging p.f. (6)
A condenser bank of 40 kVAR is used to improve the power factor. Calculate
i) The new power factor ii) Additional heating load in kW that can be used
without exceeding maximum demand
- Q.2 a) Explain the process of global warming & its impact (6)
b) In an industry, if the drawl over a recording cycle of half hour is as shown in (6)
Following table, Calculate the Maximum demand recorded
- | | | | | |
|---------|------|------|------|------|
| kVA | 1000 | 4100 | 3000 | 2500 |
| Seconds | 1200 | 4800 | 2400 | 3600 |
- Q.3 a) State & explain vapour compression refrigeration system (6)
b) Calculate the transformer total losses for a 100 kVA transformer for an average (6)
loading of 40%. Assume no load & full load losses as 1.70 kW & 10.50 kW
- Q.4 a) Explain the method to calculate installed load efficiency ratio & energy (6)
Saving potential in case of lighting load installations
b) An instrument air compressor capacity test gave the following results. (6)
Piston displacement = 16.88 m³/min., Theoretical compressor capacity
=14.75 m³/min Receiver volume=7.79 m³, Additional hold up
volume=0.4974 m³, Initial pressure=0.5kg/cm², Final Pressure=7.03 kg/cm²,
Atmospheric pressure=1.026 kg/cm², Time taken to build up pressure=4.021
Minutes Temperature of inlet air = 23⁰c, Temperature of compressed air =
26⁰ C. Calculate i) Compressor output in m³/day ii) Volumetric efficiency
iii) Isothermal efficiency
- Q.5 a) List & explain different energy audit instruments (6)
b) A centrifugal water pump operates at 30 m³/hr. at 1440 rpm, the operating (6)
efficiency of pump is 65% & motor efficiency is 89%. The discharge pressure
gauge shows 3.4 kg/cm². The suction head is 3m below pump. If the speed of
the pump is reduced by 25%, calculate i) pump flow ii) pump head iii) power
drawn by motor. Assume motor & pump efficiency remains same at reduced
speed
- Q.6 a) State & explain concept of fuel substitution (6)
b) A company having the contract demand of 100 kVA has recorded following (6)

readings on its energy meter & Time of day consumption is as follows. Calculate the average power factor & monthly electrical energy charges as per HTP-II tariff

Zone	A	B	C	D
Units	12272	15134	5522	6665

Date	kWh	kVAh	rkVAh	M.D.(Kva)
18/07/2016	1219439	1246676	113089	148
17/06/2016	1179846	1205389	104688	

- Q.7 a) State any six points resulting in electrical energy saving in homes (6)
- b) The dimensions of an office hall is 9mX6m, lamps are located at a height of 2m above working plane. Total circuit watt is 999. The average lux level measured in hall is 786 lux. Target lux/watt/m² is 46. The office works for 9 hours a day & 330 days a year. Calculate i) Installed load efficiency ratio ii) Energy saving potential per year. (6)