1. The cost of monthly electricity consumption of this factory using the following basic tariff structure:

Monthly demand charges: ₹300 per kVA

Unit charges: ₹7.15

Monthly surcharge: ₹0.25 per unit

Monthly service tax: ₹0.20 per unit

**2+2+6=10**

1. Attempt any five questions **5×1=5**
2. What is the static efficiency of a fan?
3. What do you understand by the term "Heat Rate"?
4. How do the soft starters work?
5. Define ton of refrigeration.
6. What is the reason for not operating small DG-set parallel with grid?
7. What is the surging of a centrifugal compressor?
8. Name the types of losses occur in a transformer.
9. Explain the principle of ‘vapour compression’ system with a neat sketch? **7**
10. What is the effect of change in heat load on cooling tower performance? Explain with the help of an example. **10**

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**TU/ CODL**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (AUTUMN), 2017**

**DRE203: ENERGY EFFICIENCY IN ELECTRICAL UTILITIES**

**Time: 3 Hours Total Marks: 70**

*The figures in the right-hand margin indicate marks*

*for the individual question.*

***---------------------------------------------------------------------------------------***

1. **Choose the correct answer**  **10×1=10**
2. The total losses in a transformer operating at 40% load (with designed no load and losses at 2 kW and 50 kW respectively) are

a) 8 kW b) 10 kW

c) 20 kW d) 22 kW

1. The rating required for a DG set with 500 kW connected load and with 1.5 diversity factor, 80% loading and 0.8 power factor is

a) 520 kVA b) 625 kVA

c) 600 kVA d) 500 kVA

1. Variable speed cannot be obtained with \_\_\_\_

a) DC motors controller b) AC motor controller

c) AC & DC controllers d) Soft starter controller

1. A compressor is operating with a discharge pressure of 235.3 psig and a suction pressure of 35.3 psig. What is the compression ratio?

a) 10:1 b) 8:1

c) 6.7:1 d) 5:1

**P. T. O.**

1. Centrifugal compressors are most efficient when they are operating at\_\_\_\_\_ load.

a) 50% b) 75%

c) 100% d) minimum

1. A pure capacitive load in an alternating current (AC) circuit draws

a) lagging reactive power b) active power

c) leading reactive power d) none of the above

1. A fan with 25 cm pulley diameter is driven by a 1470 rpm motor through a v-belt system. If the motor pulley is reduced from 20 cm to 15 cm at the same motor rpm and fan pulley diameter, the fan speed will reduce to

a) 882 rpm b) 294 rpm

c) 1176 rpm d) 1470 rpm

1. The kind of heat that causes a change in the state of a material without a change in temperature is called

a) Latent heat b) Sensible heat

c) Superheat d) Regular heat

1. If the compressor of 200 cfm loads in 10 seconds and unloads in 20 seconds, the air leakage would be

a) 10 cfm b) 100 cfm

c) 133 cfm d) 67 cfm

1. The refrigerant used in a vapour absorption system is

a) Pure water b) ammonia

c) Freon d) lithium bromide

**P. T. O.**

1. A 4-pole 415 V 3-phase, 50 Hz induction motor runs at 1440 RPM at 0.88 pf lagging and delivers 10.817 kW. The stator loss is 1060 W, and friction & windage losses are 375 W. Calculate

(a) Slip,

(b) Rotor copper loss

(c) Line current and

(d) Efficiency. **4×2=8**

1. How can maximum demand control be practiced in a plant?  **5**
2. Highlight advantages of an LED lamp over a CFL and an incandescent lamp. **5**
3. List out five energy conservation opportunities in DG set.  **5**
4. Describe the step by step methodology of lighting system audit in a plant? **5**
5. A bakery is having a contract demand of 1000 kVA. The minimum billing demand is 70% of the contract demand. The connected load to the bakery is 2000 kVA. The recorded demand and power factor of November 2017 are 1200 kVA and 0.8 respectively. The monthly energy consumption of this bakery is 4.0 lakh units with an average and maximum loads of 700 kW and 900 kW, respectively. Calculate
6. minimum billing demand of the bakery
7. load factor and demand factor of the plant

**P.T.O**