**TU/ CODL**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (AUTUMN) 2019**

**DRE 203: ENERGY EFFICIENCY IN ELECTRICAL UTILITIES**

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

*The figures in the right-hand margin indicate marks for the individual question.*

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1. Select appropriate answer for each of the following questions: 1x13=13

a. Typical range of COP value for a compression refrigeration cycle is:

i) 2 to 20 ii) 2 to 5 iii) 1 to 20 iv) 1 to 10

b. The power requirement of a DG set is determined by the:

i) maximum load ii) base load iii) average load iv) no load

c. The maximum starting current of a DG set should not be more than

\_\_\_\_\_ % of the full load capacity

i) 100 ii) 150 iii) 200 iv) 50

d. The essential parameters to estimate cooling load from air side across

air handling unit (AHU) / Fan Coil Unit (FCU) are

i) DBT ii) RH/WBT iii) flow rate iv) all

e. Five percent increase in supply frequency will change the

synchronous speed by

i) +5% ii) − 5% iii) 10% iv) − 10%

f. The kVAr rating required for improving the power factor of a load

operating at 500 kW and 0.85 power factor to 0.95 is

i) 500 kVAr ii) 425 kVAr iii) 145 kVAr iv) 50 kVAr

**P.T.O.**

g. If voltage applied to a 415 V rated capacitors drops by 10%, its VAR

output drops by \_\_

i) 10% ii) 19% iii) 23% iv) 87%

h. The ratio of dissolved solids in circulating water to the dissolved

solids in make-up water is termed as

i) cycles of concentration ii) tower effectiveness

iii) TDS control iv) specific gravity

I. The total losses in a transformer operating at 50% load with designed

no load and load losses at 2 kW and 20 kW respectively are \_\_

i) 7 kW ii) 12 kW iii) 4.5 kW iv) 22kW

j. What is the typical frequency of operation of electronic ballast?

i) 50Hz ii) 50 kHz iii) 10 kHz iv) 30 kHz

k. Heat release rate to the cooling tower in vapour compression

refrigeration system is equal to \_\_\_\_\_\_ kCal/min/ton

i) 63 ii) 500 iii) 127 iv) 220

l. The refrigeration load in TR when 10m3/h of water is cooled from

16°C to 8°C will be about

i) 26.4 ii) 23.8 iii) 116.6 iv) 80

m. Which of the following can also act as a heat pump?

i) centrifugal pump ii) compressor

iii) refrigerator iv) none of the above

2. List down any three common type of devices which cause harmonics

in the electrical system. Mention any five problems that may arise

due to harmonics in an electrical system. 8

3. Explain the reasons behind high T&D losses in Indian electricity

distribution system. What are the short term and long term measures

that should be adopted to reduce the technical T&D loss in India?

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4. Explain few characteristics of load which influences the efficient use

of DG set. 12

5. 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 and windage losses are 375 W. Calculate (a) Slip, (b)

rotor copper loss, (c) line current, and (d) efficiency. 12

6. A cooling tower is designed to cool down the process water

temperature from 35℃ to 30℃ in 3 concentrating cycles. If the drift

loss of the cooling tower is 0.1% evaluate the following for a flow

rate of 1260 m3/h.

1. Daily make up water requirement
2. Evaporation loss
3. Blow down loss

3×2=6

7. Write a brief note on “day lighting”. 5

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