Code No.: EE104ES   R20   H.T.No. [ ][ ][8][R][ ][ ][ ][ ]

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–I–Semester End Examinations (Supply) - January- 2022
BASIC ELECTRICAL ENGINEERING
(Common to CSC, CSD, CSE, IT)

[Time: 3 Hours]   [Max. Marks: 70]

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A   (20 Marks)

1. a) State KVL.   [2M]
   b) Give the V-I relation of (i) Inductance (ii) capacitance.   [2M]
   c) Write the expression for resonant frequency of series RLC circuit connected to A.C supply.   [2M]
   d) What is the power factor and active power of a circuit carries a current of $15 \angle 45^0$ A and   [2M]
       applied voltage of $230 \angle 15^0$ V?
   e) What is Ideal Transformer? Write the difference between ideal and practical transformer?   [2M]
   f) What is auto transformer? Give its applications.   [2M]
   g) Explain the significance of back E.M.F in D.C motor.   [2M]
   h) Give the classification of D.C motors.   [2M]
   i) Why starter is needed in case of 3-Phase Induction motor?   [2M]
   j) Define slip of a 3-phase Induction motor.   [2M]

PART-B   (50 Marks)
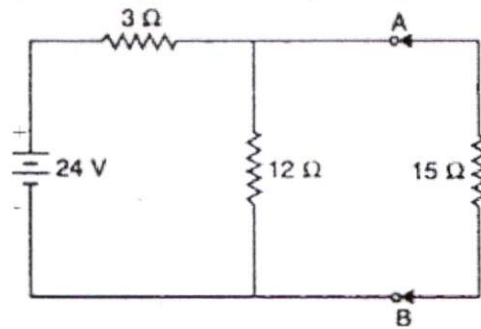
2. a) State and explain Superposition theorem.   [5M]
   b) Convert below delta network into an equivalent star network.

[5M]
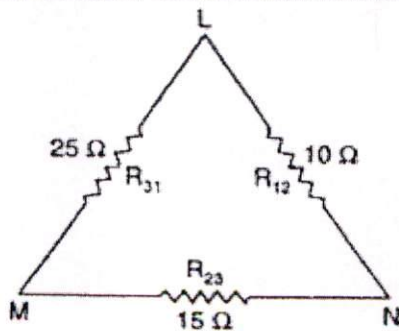
OR

3. a) State and explain Thevenin's theorem.   [5M]

b) Find the current flowing through 15 Ω resistance using Norton's theorem. [5M]

4. a) Derive average and R.M.S value of a sinusoidal quantity. [5M]
    b) A coil takes current of 2 amps when connected across 200V, 50 Hz supply .The power [5M] consumed by the coil is found to be 300 Watts. Find the inductance and power factor of the coil.

OR

5. A balanced 3-phase delta connected load of (6+j8) Ω/ phase is connected to a 3-phase [10M] 400V, 50 Hz balanced supply. Find the current, p.f, active power, reactive power and apparent power of the load.

6. a) Explain the construction and working principle of a single phase transformer. [6M]
    b) The maximum flux density in the core of a 220/440V, 50Hz single phase transformer is1.2Wb/m^2. If the E.M.F per turn is 20V, determine (i) primary and [4M] secondary turns and (ii) area of the core.

OR

7. a) Develop the equivalent circuit of a single phase transformer. [5M]
    b) Explain various configurations of 3-phase Transformers. [5M]

8. a) Derive the E.M.F equation of D.C. Generator. [5M]
    b) Distinguish between self excited and separately excited D.C. Generators. How are [5M] self excited D.C. Generators classified? Give their circuit diagrams.

OR

9. a) Derive the torque equation of a D.C. Motor. [6M]
    b) A 220 V D.C shunt motor has an armature resistance of 0.5Ω and takes a current of 40 A on full loads. By how much main flux must be reduced to raise the speed [4M] by 60%, if the developed torque is constant?

10. a) Sketch and explain torque-slip characteristic of a 3- phase Induction motor. [6M]
    b) Explain how rotating magnetic field is produced in a 3- phase Induction motor. [4M]

OR

11. Explain the working of synchronous Generator with neat sketch. [10M]
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