Code No.: EE204ES | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–II–Semester End Examinations (Supply) - January- 2022
BASIC ELECTRICAL ENGINEERING
(Common to CSM, ECE)

[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)**

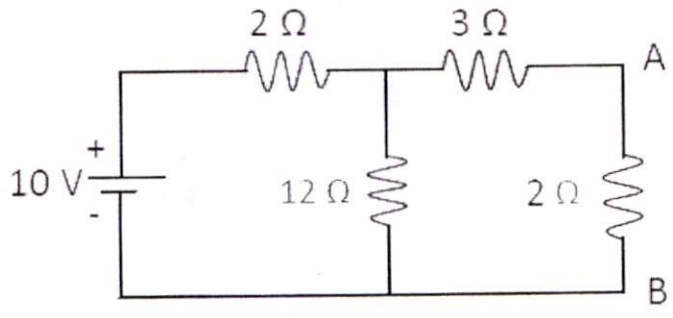
1. a) Define Capacitance and write the expression for voltage across a capacitor. [2M]
   b) State Thevenin's Theorem. [2M]
   c) Define the terms Impedance and Reactance. [2M]
   d) Draw the phasor diagram of a series RC circuit. Also define power factor. [2M]
   e) List the various losses in a Transformer. [2M]
   f) Mention the properties of an ideal Transformer. [2M]
   g) What is the significance of back EMF in DC motor? [2M]
   h) List the classification of various DC generators. [2M]
   i) Mention different starting methods used in three-phase induction motor. [2M]
   j) Write the significance of rotating magnetic field in the operation of three-phase Induction Motor. [2M]

PART-B **(50 Marks)**

2. A Series RC circuit is supplied by DC voltage. Determine the expression for i(t) when the switch is closed at t=0. [10M]

OR

3. Determine the current through 2Ω resistor connected between the terminals AB using Norton's theorem. Also draw its equivalent circuit. [10M]



4. Derive the expressions for RMS value and Average value of a sinusoidal quantity. Also show that form factor of sinusoidal alternating current wave is 1.11. [10M]

OR

5. a) A 20-Ω resistor, 20-mH inductor and 20-μF capacitor are connected in series with a 20-kHz voltage source. The RMS current through the circuit is 0.30 A. Find the RMS voltage drop across each of the elements. [5M]
   b) Derive the voltage and current relationships in a Three-phase balanced delta connected network. [5M]

6. Describe various three phase transformer connections and their significance? [10M]

OR

7. a) Draw the equivalent circuit of a single-phase Transformer and explain each part in it. [6M]
   b) Derive the condition for maximum efficiency in a Transformer. [4M]

8. a) A shunt wound DC generator delivers 10 A at 220 V to a load. The resistance of the shunt field coil is 100Ω and that of the armature winding 0.02Ω. Calculate the EMF induced in the armature. [5M]
   b) Derive the EMF equation of a DC Generator. [5M]

OR

9. Draw and explain the performance characteristics of a DC Shunt and Series Motors. [10M]

10. Describe the construction and working of Synchronous Generator. [10M]

OR

11. Derive the expression for torque in a three-phase Induction Motor. Also explain Torque-Slip characteristics. [10M]

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