

Code No.: EE104ES

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**CMR ENGINEERING COLLEGE: : HYDERABAD**  
**UGC AUTONOMOUS**  
**I-B.TECH-I-Semester End Examinations (Regular) - April- 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**

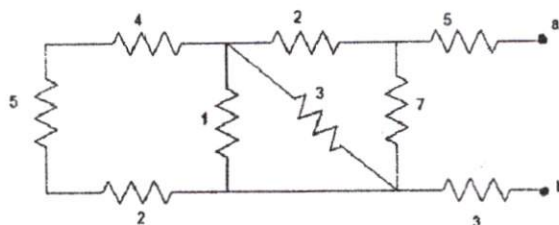
(20 Marks)

1. a) State and Explain Kirchoff's laws. [2M]
- b) Explain about Norton's theorem. [2M]
- c) Determine the average and RMS value of a sinusoidal waveform. [2M]
- d) Give the phasor representation of Resistor, Inductor and Capacitor and explain. [2M]
- e) Name the types of losses occurred in the Transformer. [2M]
- f) Compare the Auto transformer with Two winding Transformer. [2M]
- g) An 8 pole wave connected DC generator has 1000 armature conductors and flux/pole 0.035 Wb. At what speed must it be driven to generate 500 V? [2M]
- h) Draw the characteristics of D.C. shunt motor. [2M]
- i) Give the constructional details of Three phase induction motor with neat sketch. [2M]
- j) Name the different types of Synchronous generators. [2M]

**PART-B**

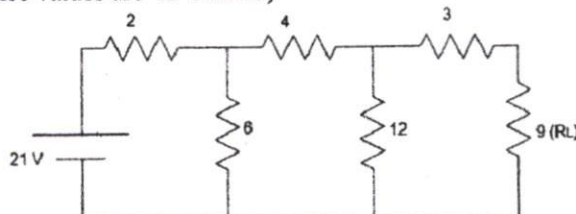
(50 Marks)

2. Determine the equivalent resistance from the given network across a and b terminals? ( all resistance values are in OHMS) [10M]



OR

3. Draw the Thevenin's equivalent circuit diagram from the given network, and determine current through load resistor? ( all resistance values are in OHMS) [10M]



4. Derive the relation for the RMS value of alternating current having sine wave. Explain the concept of power factor with the help of behavior of AC through RLC series circuit showing various waveforms. [10M]

OR

5. An alternative voltage of  $(160+j120)$  V is applied to circuit and the current in the circuit is given by  $(6+j8)$  A. Find i) the values of elements in the circuit. ii) Power factor. iii) Active, Reactive and Apparent Powers. [10M]

6. Explain the voltage Regulation of a transformer and hence derive the general equation for the same with neat phasor diagrams considering leading pf load case. [10M]

OR

7. A single phase 120 kVA, 2000/200 V 50 Hz transformer has impedance drop of 9% and resistance drop of 4.5% Find [10M]  
i) The regulation at 0.8 power factor lagging on full load  
ii) At what power factor, the voltage regulation is zero?

8. A 6-pole, 500- V wave- connected shunt motor has 1200 armature conductors and useful flux/pole of 20 mWb. The armature and field resistance are  $0.5 \Omega$  and  $250 \Omega$  respectively. What will be the speed and torque developed by the motor when it draws 20 A from the supply mains? Neglect armature reaction. If magnetic and mechanical losses amount to 900 W, find (i) output in kW and (ii) efficiency at this load. [10M]

OR

9. A DC Shunt Generator gives full load output of 50KW at a terminal voltage of 220V. The armature and shunt field resistances are  $0.3\Omega$  and  $50\Omega$  respectively. The iron and friction losses are 1100W. Calculate i) Emf generated. ii) Copper losses iii) Efficiency. [10M]

10. A 4-pole, 3-phase induction motor operates from a supply whose frequency is 50 Hz. Calculate [10M]  
(i) The speed at which the magnetic field of the stator is running.  
(ii) The speed of the rotor when the slip is 0.04.  
(iii) The frequency of the rotor current.

OR

11. Explain construction and working principle of three phase alternator with neat diagram. [10M]

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