

**CMR ENGINEERING COLLEGE: : HYDERABAD**  
**UGC AUTONOMOUS**

**I-B.TECH-I-Semester End Examinations (Supply) - December- 2025**  
**BASIC ELECTRICAL ENGINEERING**  
**(Common for IT, CSD, ECE, CSC, CSM)**

**[Time: 3 Hours]**

**[Max. Marks: 60]**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 10 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**

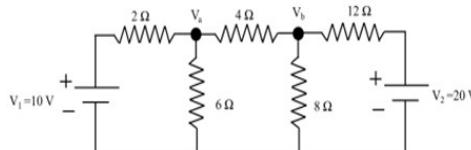
**(10 Marks)**

1. a) Write voltage and current relations for capacitance & inductance. [1M]
- b) State Super position theorem. [1M]
- c) Draw power triangle. [1M]
- d) Define resonant frequency. [1M]
- e) What is an auto transformer? [1M]
- f) List the three phase transformer connections. [1M]
- g) What is the function of commutator in DC generator? [1M]
- h) What is back emf? [1M]
- i) Define slip in three phase induction motor. [1M]
- j) Find the frequency, if synchronous speed is 1500rpm and poles are 4. [1M]

**PART-B**

**(50 Marks)**

2. Find the node voltages  $V_a$  and  $V_b$  in the given network using nodal analysis.

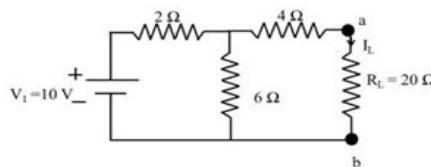


[10M]

**OR**

3. State Thevenins Theorem. Find the load current  $I_L$  using Thevenins Theorem.

[10M]



- 4.a) Define resonant frequency and derive the formula for it. [4M]
- b) A series RLC network consists of  $R=3\Omega$ ,  $L=2\text{mH}$  and  $C=0.4\text{mF}$  with the supply frequency of 50Hz. Determine the resonant frequency, Inductive reactance, capacitive reactance and impedance. [6M]

**OR**

5. Explain the behavior of series RLC circuit excited by a AC supply with relevant waveforms and phasor diagrams. [10M]

6.a) Define the following terms: [5M]  
(i) Transformer. (ii) Transformation Ratio. (iii) KVA ratings.

b) Why are transformers not working with DC supply? [5M]

**OR**

7. A single phase 25KVA, 1000V/2000V, 50 Hz transformer has maximum efficiency of 98% at full load upf. Determine the efficiency at (i)  $3/4^{\text{th}}$  full load UPF, (ii)  $\frac{1}{2}$  full load 0.8 pf, (iii) 1.25 full load 0.9 pf. [10M]

8. Briefly explain the constructional details of a DC Machine. [10M]

**OR**

9. Draw the torque-speed and torque-armature current characteristics of Dc shunt, series and Compound Motor. [10M]

10. Compare squirrel cage and slip ring induction motor. [10M]

**OR**

11. Explain torque slip characteristic of three phase induction motor with neat sketch. [10M]

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