

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

**I–B.TECH–II–Semester End Examinations (Supply) – December - 2025**

**BASIC ELECTRICAL ENGINEERING**

**(Common for ECE, CSE, IT)**

**[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**

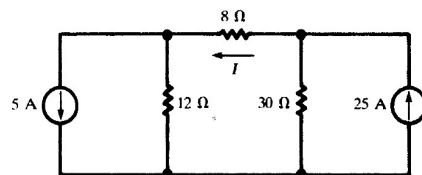
**(10 Marks)**

1. a) What are the current sources? [1M]
- b) State KVL. [1M]
- c) What is active power? [1M]
- d) What is the relation between phase and line voltage in a 3-phase balanced delta connection? [1M]
- e) What are the losses of a transformer? [1M]
- f) Give the typical value of the efficiency of a transformer. [1M]
- g) What is the function of brushes in a d.c generator? [1M]
- h) What is the significance of back e.m.f in a d.c motor? [1M]
- i) Define the slip speed of a 3-phase Induction motor. [1M]
- j) Give the applications of a 3-phase Induction Motor. [1M]

**PART-B**

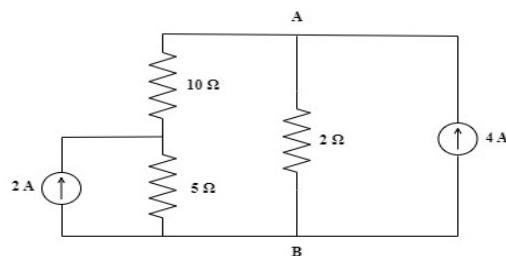
**(50 Marks)**

- 2.a) State and explain Thevenin's theorem. [5M]
- b) Find the current (I) flowing through an 8-ohm resistance. [5M]



**OR**

- 3.a) State and explain Norton's theorem. [5M]
- b) Find the current flowing through the 10 Ω resistance using the superposition theorem. [5M]



- 4.a) Explain (i) active power (ii) reactive power and (iii) apparent power. [5M]  
b) Find the total current to the series circuit consisting of  $L=0.25\text{ H}$  and  $C=50\text{ }\mu\text{F}$  with an applied voltage  $v=200\sin 314t$  volts. [5M]

**OR**

5. The equation of an alternating current is  $i(t)=250\sin(314t)$ . Find (i) Maximum value [10M]  
(ii) RMS value (iii) Average value (iv) Form factor (v) Peak factor.

- 6.a) Explain the working principle of a single-phase transformer. [6M]  
b) A 200 kVA, 11000 V/ 400 V, 50 Hz single-phase transformer has 100 secondary turns. [4M]  
Determine (i) the primary and secondary current, (ii) the number of primary turns, and  
(iii) the maximum value of the flux.

**OR**

7. Obtain the equivalent circuit of a transformer when referred to the primary from the fundamentals. [10M]

- 8.a) Derive an e.m.f. Equation of a d.c Generator. [5M]  
b) What are the types of d.c generators? Explain. [5M]

**OR**

9. Explain the working of a d.c motor with a neat sketch. [10M]

- 10.a) Draw the torque-slip characteristics of a 3-phase Induction Motor. [6M]  
b) A 3-phase, 50 Hz, 4-pole induction motor has a full load slip of 3 %. [4M]  
Find (i) synchronous speed and (ii) motor speed.

**OR**

11. Explain the constructional details and working principle of a 3-phase synchronous generator with a neat sketch. [10M]

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