

8. Explain the construction and working of a single-phase capacitor start capacitor run induction motor. Also, state the types of dc motors. What is the basis of the classification of the different types of dc motors ? 10

(Compulsory Question)

9. (a) What is the role of a transformer in power transmission and distribution ? 2
- (b) What do you understand by unilateral and bilateral element in electric circuits ? 2
- (c) What are the deciding factors of selection of wires ? 2
- (d) Define the term resonance in series RLC circuit. 2
- (e) An alternating sinusoidal voltage is represented by $V_1 = 40 \sin\left(\theta - \frac{\pi}{3}\right)$ volts. Write the peak value, RMS value and average value of the voltage. 2
- (f) What are the constructional parts of dynamometer type wattmeter ? 2

Roll No.

Total Pages : 05

July-22-00203

B. Tech. EXAMINATION, 2022

Semester I (CBCS)

PRINCIPLES OF ELECTRICAL ENGINEERING

EE-101

Time : 3 Hours

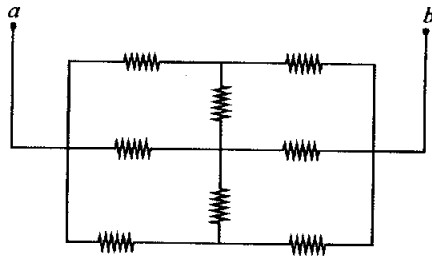
Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

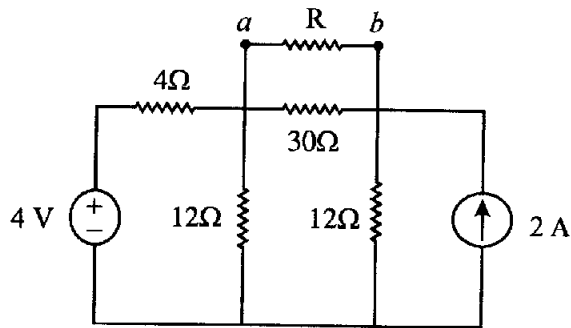
Note : Attempt *Five* questions in all, selecting *one* question from each Sections A, B, C and D. Q. No. 9 is compulsory.

Section A

1. Derive the necessary expressions for converting a delta network to an equivalent star network. Find the equivalent resistance viewed from the terminal *a* and *b*. All the resistance are of 1 ohm. 10



2. For the circuit of figure below, find the Thevenin's equivalent as viewed by the resistance R. Find the value of R for maximum power dissipation in it and the value of this power. 10



Section B

3. Define instantaneous value, average value, peak value and root mean square value in case of a sinusoidal

signal. Also, calculate the branch currents and total current of a circuit containing two impedances $Z_1 = 2 + j3\Omega$ and $Z_2 = 2 - j4\Omega$ connected in parallel across a 100 V, 50 Hz AC supply. 10

4. Mention the advantages of 3-phase system over 1-phase system. Also, establish the relationship between line and phase voltages and currents in a 3-phase delta connected balanced circuit. Show the vector diagram neatly. 10

Section C

5. Explain the construction of and working principle of moving iron attraction type and repulsion type instruments. 10
6. Explain the process of generating a BH curve of a basic toroid with a coil of N turns. Also, explain the residual flux and coercive force in the BH curve formation. 10

Section D

7. Explain what will happen if a transformer is connected to DC supply. Also, explain the basic working principle of a transformer and derive an expression for emf induced in transformer. 10

- (g) Define Reluctance. What is its unit ? 2
- (h) Does the transformer draw any current when secondary is open ? Why ? 2
- (i) What is the function of a commutator in a DC generator ? 2
- (j) Why single-phase induction motor does not self-start ? 2