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?

(Compulsory Question)

- 9. (a) What is the role of a transformer in power transmission and distribution?
 - (b) What do you understand by unilateral and bilateral element in electric circuits? 2
 - (c) What are the deciding factors of selection of wires?
 - (d) Define the term resonance in series RLC circuit.
 - (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.
 - (f) What are the constructional parts of dynamometer type wattmeter?

Roll No.

Total Pages: 05

July-22-00203

B. Tech. EXAMINATION, 2022

Semester I (CBCS)

PRINCIPLES OF ELECTRICAL ENGINEERING EE-101

Time: 3 Hours

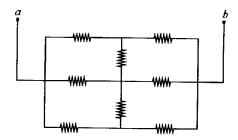
Maximum Marks: 60

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

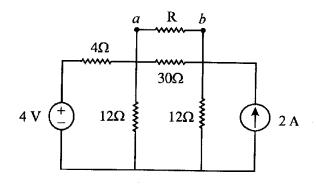
Note: Attempt *Five* questions in all, selecting *one* question from each Sections A, B, C and D. Q. No. 9 is compulsory.

Section A

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.



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.



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.

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.

Section C

- Explain the construction of and working principle of moving iron attraction type and repulsion type instruments.
- 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.

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.

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