PAPER ID-311350

Subject Code: REE101

Roll No: | | | | | | | | | | | | | |

BTECH

(SEM I) THEORY EXAMINATION 2023-24

BASIC ELECTRICAL ENGG

TIME: 3HRS **M.MARKS: 70**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a.	Define ideal voltage source and ideal current source.
b.	Define Active power and Reactive power.
c.	What are the advantages of three phase system over single phase system?
d.	Define MMF and reluctance in magnetic circuit.
e.	What is the use of autotransformer?
f.	What is the role of commutator in DC machine?
g.	A 3 phase 4 pole 50 Hz induction motor runs at 1460 rpm. Determine its slip.

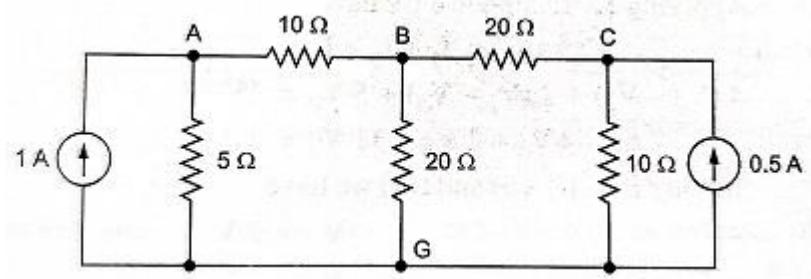
SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a.	Derive the expression of equivalent resistance for converting a star network to delta network and delta network to star network.
b.	Derive the relation for resonant frequency in case of series resonant circuit.A series R – L – C circuit consists of R = 1000 Ohm, L = 100 mH and C = 10 μF. The applied voltage across the circuit is 100 V. (i) Find the resonant frequency of the circuit. (ii) Find the quality factor of the circuit at the resonant frequency.
c.	Derive the relation between line and phase parameters of 3-φ, star connected load. A balanced star connected load impedance 6+8j Ω per phase is connected to a three phase 400V supply. Find the line current, power factor, active power and total apparent power
d.	Explain the working of a single phase transformer & derive the emf equation a single phase transformer.
e.	Explain the principle of working and Toque Slip characteristics of 3 phases Induction Motor.

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

(a)	Determine the Current in all branches using Node analysis. 
(b)	Calculate the Average value, RMS value and form factor of the output voltage wave of a half wave rectifier.

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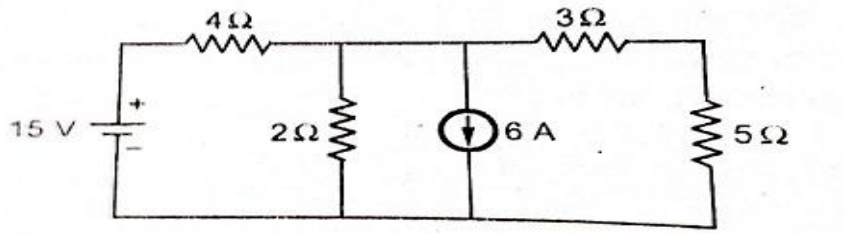
4. Attempt any *one* part of the following: 7 x 1 = 7

(a)	State and prove maximum power transfer theorem.
(b)	Find current in 5 ohm resistance using Superposition Theorem. 

5. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Explain the principle and construction of PMMC type instruments. Discuss their merits and demerits.
(b)	Explain the Power Measurement using two wattmeter method with detailed diagram with phasor diagram.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Write a note on the following **i.** Define hysteresis and eddy current losses in a magnetic material **ii.**Analogy between Electrical Circuit and Magnetic circuit.
(b)	A transformer is rated at 100 KVA. At full load its copper loss is 1200 Watts and iron losses are 960 Watts. Calculate **(i)** The efficiency (η) at full load, unity power factor. **(ii)** The efficiency(η) at half load ,0.8 power factor lagging **(iii)** The load KVA at which maximum efficiency occurs

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Derive the E.M.F equation of D.C machine. A 6 pole lap wound DC shunt motor has 500 conductors in the armature. The armature resistance is 0.05 ohm. The shunt field resistance is 25 ohm. Find the speed of the motor when it takes 120 A from 100 Volt DC supply. Flux per pole is 0.02 weber.
(b)	Explain why single phase induction motor is not self starting? Discuss one method of starting of this motor with its application.