PAPER ID-310984

Roll No:

B.TECH
(SEM 1) THEORY EXAMINATION 2020-21
BASIC OF ELECTRICAL ENGINEERING

Time: 3 Hours   *Total Marks: 100*

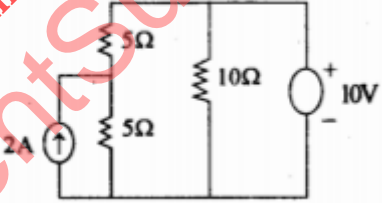**Note:** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   Attempt *all* questions in brief.   2 x 10 = 20

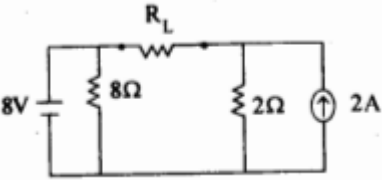|	
a.	What do you understand by Active and passive elements. Give Examples.
b.	Prove that the average power consumption in a pure inductor is zero when AC voltage is applied.
c.	Why is series resonance called as Voltage resonance.
d.	Write an expression of sensitivity of a voltmeter.
e.	What is meant by leakage and fringing.
f.	State the transformer losses.
g.	Write down about V curve in synchronous machine.
h.	What is slip.
i.	Enlist the various types of moving iron instruments.
j.	Draw the general layout of an electrical power system and explain.

SECTION B

2.   Attempt any *three* of the following: 10x3=30

a.	Using superposition theorem , determine the current through each branch
b.	Calculate the average and RMS value of Half wave rectifier output.
c.	Why single phase induction motor do not have starting torque. Explain its operation and various method of starting.
d.	Describe the analogies that can made between electric and magnetic circuit.
e.	Discuss the construction and working principle of PMMC type measuring instruments.

SECTION C

3.   Attempt any *one* part of the following: 10x1=10
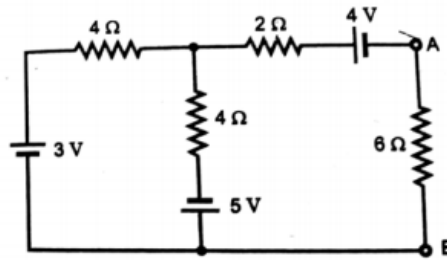
a.	State and prove the maximum power transfer theorem. Find the value of R_L for which the maximum power transfer and what its value

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b.	Using Norton theorem, determine the current through load resistance 6Ω

4. Attempt any *one* part of the following: **10x1=10**

a.	Derive and explain the two wattmeter method of measurement of three phase power for a balanced star connected load.
b.	A 25kVA, 2000/200V transformer has full load copper and iron losses of 1.8kW and 1.5kW respectively. Calculate efficiency at half the rated kVA and at unity power factor, the efficiency at full load and at 0.8 pf lagging and maximum efficiency.

5. Attempt any *one* part of the following: **10x1=10**

a.	For an RLC series circuit, derive an expression for resonant frequency , bandwidth and quality factor.
b.	A non inductive resistance of 10 ohm is connected in series with an inductive coil across 200V, 50Hz supply. The current drawn by the series combination is 10A. The resistance of the coil is 2 ohm. Determine i) Inductance of the coil ii) Power factor iii) Voltage across the coil

6. Attempt any *one* part of the following: **10x1=10**

a.	Derive the relationship between line current, phase current , line voltage and phase voltage in a 3-phase delta connected.
b.	Obtain the power factor of a two branch parallel circuit, where the first branch has $Z_1=(2+j4)\Omega$ and second $Z_2=(6+j0)$ Ω. To what value must be 6 Ω resistor can be changed to result in overall power factor 0.9 lagging.

7. Attempt any *one* part of the following: **10x1=10**

a.	Draw and explain the torque-slip characteristics of a 3-phase induction motor. What will happen if rotor resistance of motor changes.
b.	A Dc shunt machine connected to 230V supply has resistance of armature as 0.115 ohm and of field winding as 115 ohm. Find the ratio of the speed of generator to speed of motor with the line current in each case being 100A.