Reg. No. | | | | | | | | | | | | | |

B.E / B.TECH.DEGREE EXAMINATION, MAY 2023

Third Semester

EE18201 – ELECTRIC CIRCUIT ANALYSIS

(Electrical and Electronics Engineering)

(Regulation 2018 /Regulation2018A)

TIME:3 HOURS **MAX. MARKS: 100**

CO1 Analyze DC and single phase AC electrical circuits
CO2 Simplify DC and AC electrical circuits using network theorems
CO3 Study resonance phenomenon in electrical circuits and understand the effect of magnetic coupling between windings
CO4 Perform transient analysis of electrical circuits and model circuits as 2 port networks
CO5 Analyze three phase AC electrical circuits

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	An Electric iron is rated 1000W, 230V. Find the current drawn and resistance of the heating element.	**1**	**2**
2.	Distinguish between a Loop and Mesh in a circuit	**1**	**2**
3.	State maximum power transfer theorem	**2**	**1**
4.	State the steps to solve the super position theorem.	**2**	**2**
5.	Define Apparent power and Power factor.	**3**	**1**
6.	What is parallel resonance?	**3**	**2**
7.	Write down the time constants of R-L and R-C circuit.	**4**	**1**
8.	When is a two port network is said to be reciprocal?	**4**	**2**
9.	Distinguish between unbalanced supply and unbalanced load.	**5**	**2**
10.	If active power of 3 phase motor is 5600W and Power factor is 0.81 Find its reactive power.	**5**	**3**

PART- B(5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	Determine the total current flowing through the circuit as shown in figure 1.	**(14)**	**1**	**3**

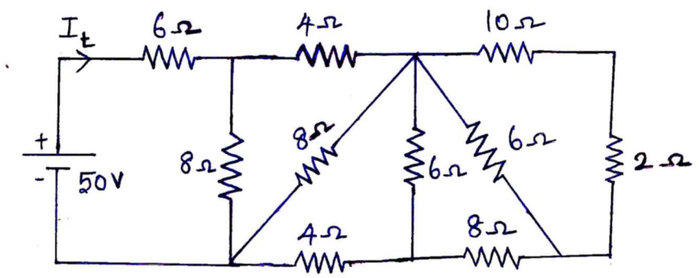

Figure 1.

(OR)

(b)	Determine the current I_2 of the given Figure 2 using mesh analysis technique. Also, apply nodal analysis method to verify the current I_2 value.	**(14)**	**1**	**3**

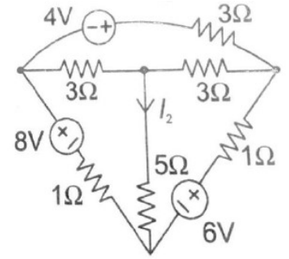

Figure 2.

12. (a)	What are the limitations of superposition theorem? With suitable circuit example state and prove the superposition theorem.	**(14)**	**2**	**4**

(OR)

(b)	Determine the Thevenin's equivalent across the terminal A and B of the circuit shown in figure 3.	**(14)**	**2**	**4**

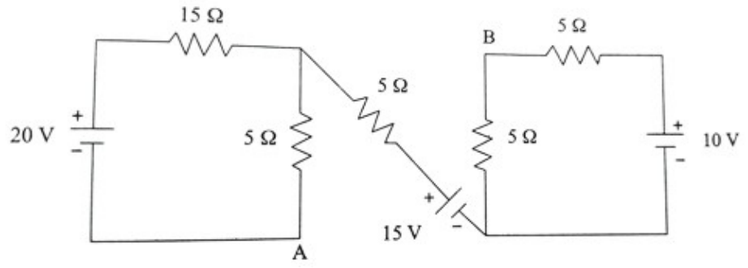

Figure 3.

13. (a)	Determine the value of R_L of a network comprising (R_L + j20) Ω and (20 - j10) Ω connected in parallel operated at resonance condition.	**(14)**	**3**	**3**
	(OR)			
(b)	Derive the expression for the equivalent inductance of (i) series opposing and (ii) series aiding circuits.	**(14)**	**3**	**3**
14. (a)	Derive the DC response of RL and RC series circuits. Compare their performances.	**(14)**	**4**	**3**
	(OR)			
(b)	A series RLC circuit with R=20 Ω, L=0.05 H and C=20 μF is excited from a voltage source of V=100 V. Obtain the equation for current in the circuit.	**(14)**	**4**	**3**
15. (a)	A 3-phase 4-wire 400 V supply is given to balanced star connected load of impedance (8+6j) Ω in each branch. Determine line current, power factor and total power.	**(14)**	**5**	**4**
	(OR)			
(b)	Show that three phase power can be measured by two watt meters. Draw the phasor diagrams. Derive an expression for power factor in terms of wattmeter readings.	**(14)**	**5**	**4**

PART- C(1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	A 3 phase, 400V supply is given to a delta connected load of impedances $10\angle 30\,\Omega$, $10\angle 45\,\Omega$ and $2.5\angle 60\,\Omega$ respectively in each branch. Find the line currents and draw the phasor diagram.	**(10)**	**5**	**4**