

Reg. No.

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

Second Semester

EE22201 – ELECTRIC CIRCUIT ANALYSIS

(Electrical and Electronics Engineering)

(Regulation 2022)

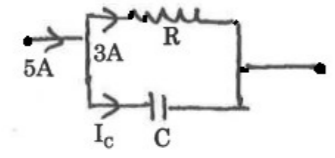
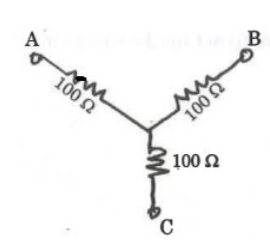
TIME: 3 HOURS

MAX. MARKS: 100

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Apply circuit laws to analyze steady-state parameters of given electrical circuits.	4
CO 2	Simplify DC and AC electrical circuits by applying suitable reduction methods and network theorems	3
CO 3	Analyze three phase balanced and unbalanced circuits to determine power and power factor	4
CO 4	Analyze transients of electrical circuits and parameters of two-port network	4
CO 5	Realize resonance phenomenon and the effect of magnetic coupling in real time applications	5

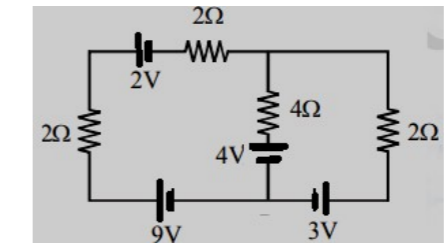
PART- A (20x2=40 Marks)

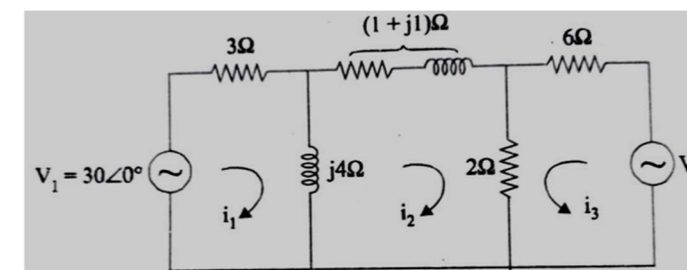
(Answer all Questions)

Q. No.	Statement	CO	RBT LEVEL
1.	Determine current through capacitor of the circuit.	1	2
			
2.	An Electric heater is rated 750W, 230V. Find the current drawn & resistance of the heating element.	1	2
3.	State Kirchoff's current law.	1	2
4.	Distinguish between mesh and super mesh.	1	2
5.	Write down the expression of equivalent resistance for 'n'- number of equal value of resistors in parallel connection.	2	2
6.	Mention the steps to solve the Norton's theorem.	2	2
7.	Draw equivalent delta circuit	2	2
			
8.	State maximum power transfer theorem.	2	1
9.	Distinguish between power factor leading and power factor lagging.	3	2

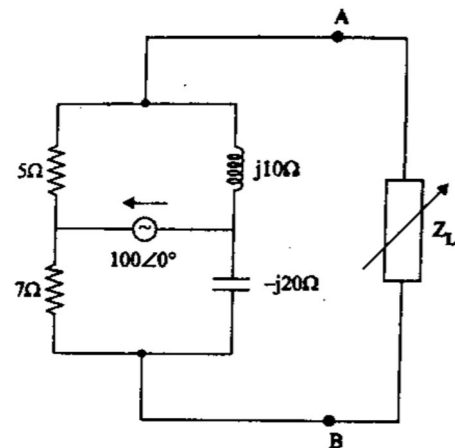
10.	Draw the phase sequence of a 3 φ system.	3	2
11.	A delta connected load has (30-j40) Ω impedance per phase. Determine the phase current if it is connected to a 415V, 3 φ, 50Hz supply.	3	2
12.	Write the power factor equation of 3 φ system by two wattmeter method.	3	2
13.	Outline the transient current response of RL series circuit.	4	2
14.	A RLC series circuit has R=50Ω and L=10mH. Find value of capacitance will make the circuit critically damped case.	4	2
15.	Define ABCD Parameters.	4	2
16.	Draw the h parameter model.	4	2
17.	Define the quality factor of the coil.	5	2
18.	Compare low pass filter and high pass filter.	5	2
19.	Write the frequency equation at resonant condition.	5	2
20.	Give the applications of tuned circuit.	5	2

PART- B (5x 10=50 Marks)

Q. No.	Statement	Marks	CO	RBT LEVEL
21. (a)	Make use of mesh current analysis, determine current through 4Ω resistor for the circuit shown in figure below:	(10)	1	4
				
	(OR)			
(b)	In the given network, shown in figure identify the voltage V ₂ such that the current in the (1+j) ohm branch is zero	(10)	1	4

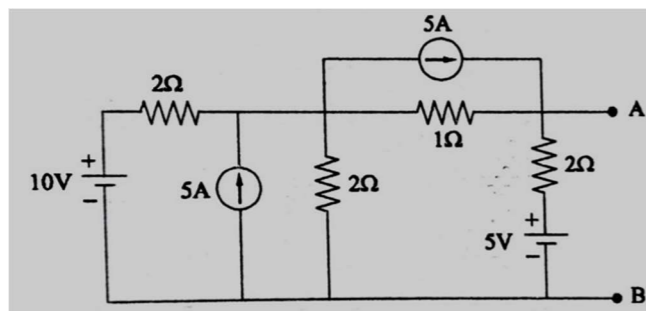


22. (a) Determine the value of Z that will receive maximum power and also obtain the power delivered. (10) 2 4



(OR)

- (b) Predict the Thevenin's equivalent circuit across the terminals AB for the circuit shown in figure below: (10) 2 4



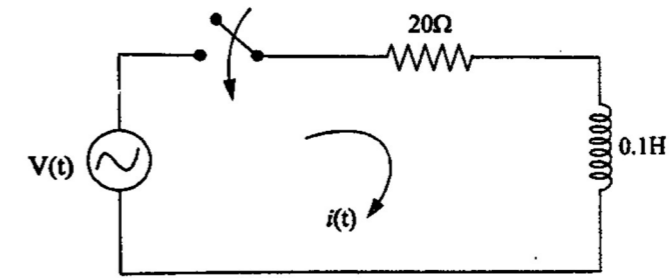
23. (a) A balanced delta connected 3ϕ load is fed from 3ϕ , 400V supply. The line current is 20A and total power absorbed by the load is 10KW. Calculate a) the impedance in each branch b) the power factor c) total power consumed if some impedance are star connected. (10) 3 4

(OR)

- (b) A balanced 3ϕ star connected load is fed from 400V, 3ϕ , 50Hz supply. The current per phase is 25A (lagging) and total active power observed by load is 13.86KW. Determine a) resistance and inductance of load per phase b) Total reactive power c) Total apparent power. (10) 3 4

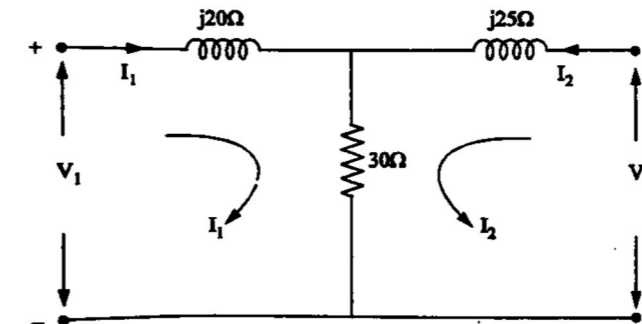
24. (a) For the circuit shown figure, determine the complete solution for the current, when switch 'S' is closed at $t = 0$. Applied voltage is

$$V(t) = 100 \cos\left(1000t + \frac{\pi}{2}\right).$$



(OR)

- (b) Determine the Z-Parameters for the given network (10) 4 4



25. (a) Compute Quality factor of the series RLC circuit with $R = 10\ \Omega$, $L = 40\ \text{mH}$ and $C = 1\ \mu\text{F}$. Find bandwidth, resonant frequency and half power frequencies. (10) 5 4

(OR)

- (b) A coupled coils with self-inductance $L_1 = 0.8\text{H}$ and $L_2 = 0.2\text{H}$ have a coupling coefficient of 0.6. coil-2 has 500 turns. If the current in coil-1 is $i_1(t) = 10\sin 200t$, determine the voltage of coil-2 and maximum flux set up by the coil-1. (10) 5 4

PART- C (1x 10=10Marks)

(Q.No.26 is compulsory)

26. A current $50\angle -30^\circ\text{A}$ is flowing through a circuit which consists of series connected elements, when excited by a source of $200\angle 45^\circ\text{V}$, 50Hz. Analysis the elements of circuit and power. Also draw the phasor diagram. (10) 3 5

Marks CO RBT LEVEL