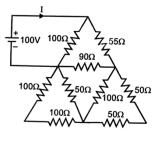
Question Paper Code: R2305B.E./B. Tech. DEGREE EXAMINATION, NOV 2024Second SemesterElectrical and Electronics EngineeringR21UEE205- ELECTRIC CIRCUIT ANALYSIS(Regulations R2021)Duration: Three hoursMaximum: 100 MarksAnswer All QuestionsPART A - (10 x 1 = 10 Marks)1.Which among the following is true about ohm's law?CO1-U(a) 1 $ rightarrow V$ (b) 1 $ rightarrow V$ (a) 1 $ rightarrow V$ (b) 400 $ rightarrow Q$ (a) 1 $ rightarrow V$ (b) 400 $ rightarrow Q$ (a) 1 $ rightarrow Q$ (b) 400 $ rightarrow Q$ (a) 1 $ rightarrow Q$ (b) 400 $ rightarrow Q$ (c) 100 $ rightarrow Q$ (a) 1 $ rightarrow Q$ (b) 25 $ rightarrow Q$ (a) 1 $ rightarrow Q$ (b) 400 $ rightarrow Q$ (c) 100 $ rightarrow Q$ (d) 25 $ rightarrow Q$ (d) 25 $ rightarrow Q$ (d) 25 $ rightarrow Q$ (d) 20 $ rightarrow Q$ (d) 100 $ rightarrow Q$ (d)	A		Reg. No. :							
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(a) equal to the load resistance (b) less than the load resistance		(a) equal to the load r	esistance	(b) less than the	(b) less than the load resistance					
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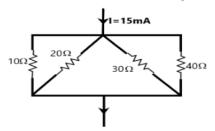
7.	The power factor is unity for the resonant circuit								
	(a) Series	(b) parallel	(c) both a &b	(d) none					
8.	The power factor is unity for the resonant circuit.								
	(a) Series	(b) parallel	(c) both a &b	(d) none					
9.	If the resistance in parallel with a parallel resonant circuit is reduced, CO1-U the bandwidth								
	(a) Disappears (b) Becomes sharper								
	(c) Increases (d) Decreases								
10.	If the roots of an equation are complex conjugate, then the response will be? CO1-U								
	(a) over damped (b) critically damped (c) damped (d) under damped								
PART - B (5 x 2 = 10 Marks)									
11.	In a circuit three reat the total resistance	sistors $R_1 \Omega$, $R_2 \Omega$ and	$R_3 \Omega$ are connected	in series. What is	CO1 U				
12.	Define form factor				CO1 U				
13.	Draw the Norton's equivalent circuit				CO1 U				
14.	Compare series and parallel reasonance				CO1 U				
15.	What is damping ratio?.								
	1 0								

16. (a) Briefly explain about the connections of resistance in the circuit CO2-App (16) Solve the total current taken from the source.



Or

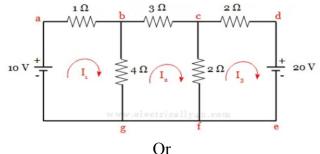
(b) Using the current division rule, find the current in each branch of CO2-App (16) the circuit shown in the figure.



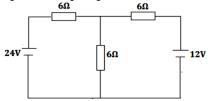
17. (a) A resistor of 6 Ω and an inductor of 25.5mH are connected in CO2- Ana (16) series across 220V, 50Hz supply. Find (1) Inductive reactance
(2) Impedance (3) Current (4) Phase angle (5) Power factor (6) Power (7) Voltage across the resistor and(8) Voltage across inductor

Or

- (b) With a neat circuit and phasor diagram explain the three phase CO2- App (16) power measurement by two wattmeter method.
- 18. (a) Find the current through 10 Ω load resistor using mesh current CO2- App (16) analysis



(b) Find the current through load resistor (6 Ω) in the following CO2- App (16) circuit by the principle of super position theorem



- 19. (a) Consider an RLC circuit consisting of a resistor (R), inductor (L), CO4-Ana (16) and capacitor (C) connected in series. The values of R, L, and C are given as follows: R = 5 Ω, L = 40mH, and C = 1µF. Answer the following questions based on this circuit:
 - (a) Calculate the resonant frequency (fr) of the circuit.
 - (b) Determine the Q-factor (Quality factor) of the circuit.
 - (c) Calculate the bandwidth of the circuit.
 - (d) Half Power frequencies.

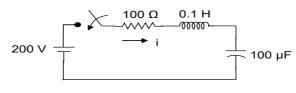
Or

(b) Consider a series RLC circuit consisting of a resistor (R = 10 Ω), CO4-Ana (16) an inductor (L = 30 mH), and a capacitor (C = 1 μF), and is supplied from a 10V variable frequency source. Analyze the circuit using the concept of resonance and answer the following questions:
Find the frequency for which the voltage developed across the

Find the frequency for which the voltage developed across the capacitor is a maximum and calculate the magnitude of this voltage.

20. (a) For the RLC circuit shown, find the expression for the transient CO4-Ana (16) current

When the switch is closed at time t = 0. Assume initially relaxed circuit conditions



(b) Consider a series RC circuit consisting of a resistor ($R = 1 k\Omega$) CO4-Ana (16) and a capacitor ($C = 1 \mu F$). The circuit is initially at rest, and a voltage step of 10 V is applied at t = 0. Analyze the circuit's transient response and answer the following questions:

(a) Calculate the time constant (τ) of the circuit.

(b) Determine the natural response of the circuit and explain its behavior over time.

(c) Calculate the initial capacitor voltage (Vc(0)) in the circuit when the voltage step is applied.

(d) Determine the complete solution for the capacitor voltage (Vc(t)) in the circuit as a function of time.