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

Question Paper Code: 93302

B.E./B.Tech. DEGREE EXAMINATION, NOV 2022

Third Semester

Electrical and Electronics Engineering

19UEE302 – ELECTRIC CIRCUIT ANALYSIS

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The form factor of sinusoidal wave form is ____ CO1- App

   (a) 1.414 (b) 1.11 (c) 1 (d) 0

2. In maximum power transfer theorem, source resistance must be CO2- U

   (a) greater the source resistance (b) equal to zero

   (c) equal to load resistance (d) equal to internal resistance

3. As $X_L = X_C$ in a series resonance circuit, the impedance is_____ CO3- U

   (a) Purely capacitive (b) Purely inductive

   (c) Purely resistive (d) Capacitive and inductive

4. In a series resonance circuit, series resonance occurs when? CO3- U

   (a) $X_L = 1$ (b)$X_C = 1$ (c)$X_L = X_C$ (d) $X_L = - X_C$

5. Time constant of RC series circuit is CO4- U

   (a) 2L/R (b)RC (c)L/R (d) R/L

6. What is the time constant of RL circuit with R = 10 Ω and L = 20 mH? CO1- U

   (a) 2ms (b) 4ms (c) 6ms (d) 8ms

7. For a star connected three phase AC circuit ——— CO5- U

   (a) $V_L = V_{ph}$ (b)$V_L = \sqrt{3}V_{ph}$ (c)$V_L = \frac{V_{ph}}{\sqrt{3}}$ (d) $V_L = 0$

8. For a delta connected three phase AC circuit ——— CO5- U

(a) $I_L = I_{ph}$ (b)$I_L = \sqrt{3} I_{ph}$ (c) $I_L = \frac{I_{ph}}{\sqrt{3}}$ (d)$I_L = 0$

9. For a two port network, the condition of symmetry in terms of Y - Parameter is CO6- U

(a) $Y_{12} = Y_{21}$ (b)$Y_{11} = Y_{22}$ (c) $Y_{12} = Y_{11}$ (d)$Y_{21} = Y_{22}$

10. For a two port network, the condition of reciprocity in terms of Y - Parameter is CO6- U

(a) $Y_{12} = Y_{21}$ (b)$Y_{11} = Y_{22}$ (c) $Y_{12} = Y_{11}$ (d)$Y_{21} = Y_{22}$

PART – B (5 x 2= 10Marks)

11. State Super Position Theorem. CO2- U

12. Compare series resonance and parallel resonance. CO3- U

13. Sketch the transient response curve for a series RL circuit. CO4- U

14. When a three phase supply system is called balanced supply system? CO5- U

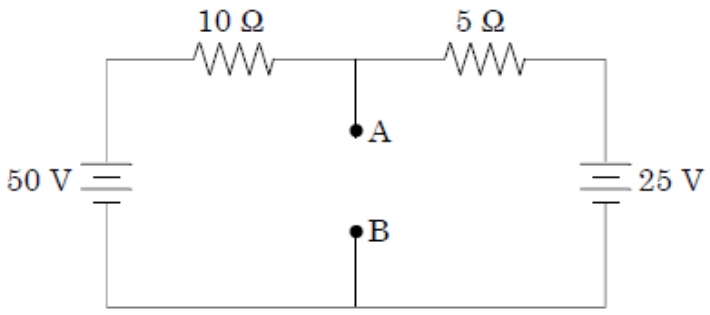
15. Give an example of two port network. CO6- U

PART – C (5 x 16= 80 Marks)

16. (a) A 22 nF capacitor, and a 3.9 kΩ resistor, are connected in series across a 40V, 1 kHz supply. Determine, (a) the circuit current, (b) the circuit phase angle (c) power factor and (d) the power dissipated CO1-App (16)

Or

(b) Determine the Norton equivalent circuit across AB for the given circuit shown in fig. CO2-App (16)



17. (a) (i) A series RLC circuit has R = 5Ω, L = 40mH and C = 1μF.Calculate resonant frequency, Quality factor of the circuit, half power frequency fi and f_2 and separation between half power frequencies. CO3-App (16)

(ii) Derive an expression for resonance frequency of given series resonance circuit.

Or

(b) A coil having an inductance of 100 mH is magnetically coupled to another coilhaving an inductance of 900 mH. The coefficient of coupling between the coilsis 0.45. Calculate the equivalent inductance if the two coils are connected in CO3-App (16)

(a) Series aiding

(b) Series opposing

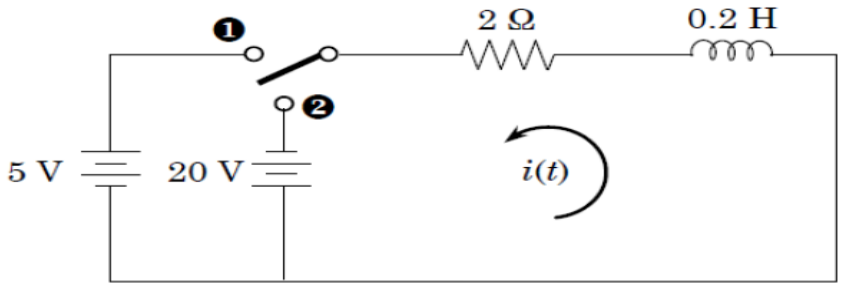
(c) Parallel aiding

(d) Parallel opposing

18. (a) A series RC circuit is excited by a DC voltage source of magnitude. Derive the suitable expression for the current and respective charging and discharging voltage profile. Also find the voltage drop across the resistance and capacitance during transient period. CO4- Ana (16)

Or

(b) In the series RL circuit shown in Fig, the switch is closed on position 1 at *t=0*. At *t=100ms*, the switch is moved to position 2. Find *i(t)* and analyze the transient response. CO2- App (16)

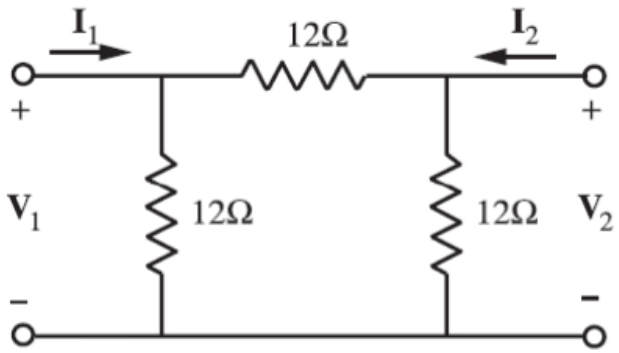


19. (a) A 3-phase, 400 V supply is given to balanced star connected load of impedance(8+j6) Ω in each branch. Determine line current, power factor and total power. CO5-E (16)

Or

(b) Prove that three phase power and power factor measurement by Two wattmeter method with neat circuit diagram. CO5-E (16)

20. (a) Find Z parameters of the circuit. CO6- App (16)



Or

(b) Find Y parameters of the circuit. CO6- App (16)