Reg. No. :

Question Paper Code: 53505

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Third Semester

Electronics and Instrumentation Engineering

15UEI305 - ELECTRICAL CIRCUITS AND NETWORKS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Ohmic law mention, $V = IR$, when

    (a) voltage is constant   (b) at any resistance
    (c) only for DC   (d) when temperature remains constant

2. If there are 'b' branches and 'n' nodes the number of equations will be

    (a) n-1   (b) b   (c) b-n-1   (d) b-n+1

3. The superposition theorem requires as many circuits to be solved as there are

    (a) Nodes   (b) Sources

    (c) Nodes and Sources   (d) Nodes, Sources and Mesh

4. Condition for maximum power transfer theorem is

    (a) $R_L = 4R_S$ (b) $R_L = 2R_S$ (c) $R_L = R_S/2$ (d) $R_L = R_S$

5. When a RLC circuits is said be at resonance, then than PF of the circuits will be

    (a) zero   (b) unity   (c) lag   (d) load

6. A Capacitor is generally a

    (a) Bilateral and active component   (b) Non-Linear component
    (c) Linear and Bilateral component   (d) Nonlinear active component

7. In a series-parallel circuit, any two resistance in the same current path may be connected in

    (a) Series with each other   (b) Parallel with each other

    (c) Series with the voltage source   (d) Parallel with the voltage source

8. The time constant of *RL* series circuit is

    (a) *L*   (b) *R/L*   (c) *L/R*   (d) none of these

9. A 3-phase balanced load, when connected in delta across three-phase balanced supply, the total power in 3-phase delta connected load is equal to _____ times of power in star connected load.

    (a) *10*   (b) 5   (c) 6   (d) 3

10. For a 3 - phase load balanced condition, each phase has the same value of

    (a) Impedance   (b) Resistance

    (c) Power factor   (d) All of these

<center>PART - B (5 x 2 = 10 Marks)</center>

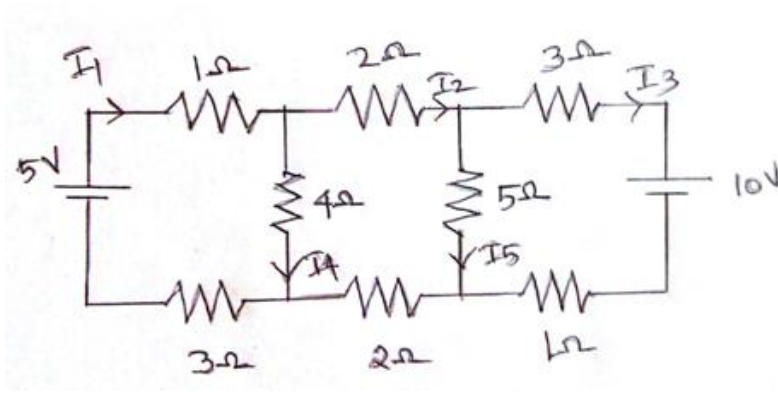11. Draw the equivalent voltage source for the current source given
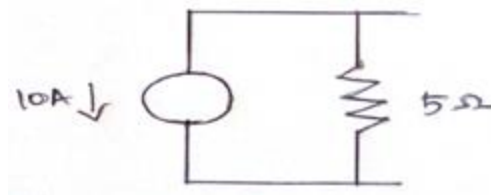
12. State superposition theorem.

13. Define the term coefficient of coupling.

14. What is transient?

15. Define phase sequence.

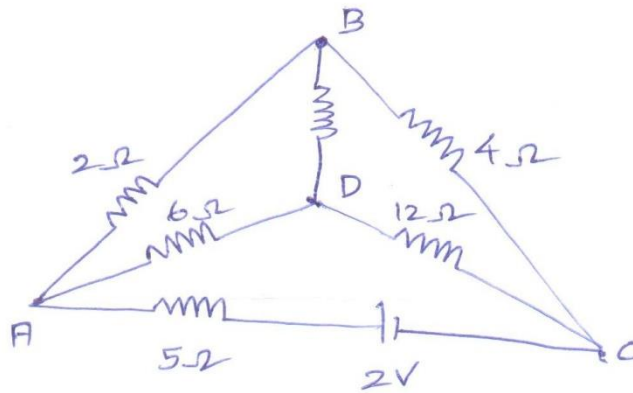<center>PART - C (5 x 16 = 80 Marks)</center>

16. (a) Find the current in all the branches of the circuits given below by nodal method.
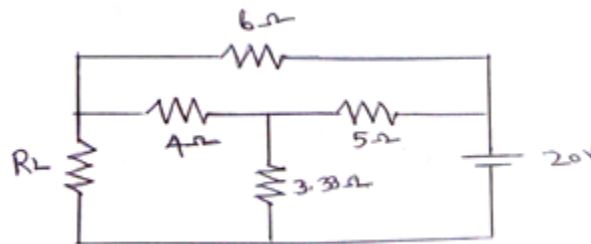
                                                                   (16)

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Or

(b) For the circuit shown in Figure.2, obtain the value of current through DC of the network, when the current through the branch BD is zero. (16)
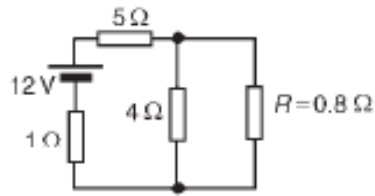

17. (a) Find the value of *RL* in the circuits given for maximum power transfer to it. Find maximum power. (16)

Or

(b) For the network shown in Fig. Determine the current in the 0.8Ω resistor using Thevenin's theorem. (16)

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18. (a) Derive the equation for band width $= R/2\pi L$. (16)

Or

(b) (i) Explain tunned circuits and its application. (6)

(ii) Derive for the single tunned coupled circuits maximum output at resonance. (10)

19. (a) Derive the equation for RC series circuit time constant both for charging and discharging condition. (16)

Or

(b) In the circuit given below, find the transient current and the initial rate of growth of current when the switch is closed at $t = 0$. (16)
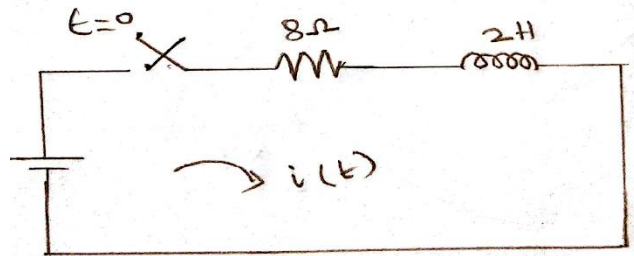
20. (a) Draw the circuit and prove that two Wattmeter method will measure 3 φ power. (16)

Or

(b) A balanced star connected load of 100 kW is connected to a balanced 3 φ supply system at 400 V and 50Hz. The line current taken from the supply is 150 A (lagging). Find the circuit constants of the load phase. (16)

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