

Reg. No. :

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 53505

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

Third Semester

Electronics and Instrumentation Engineering

15UEI305 - ELECTRICAL CIRCUITS AND NETWORKS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

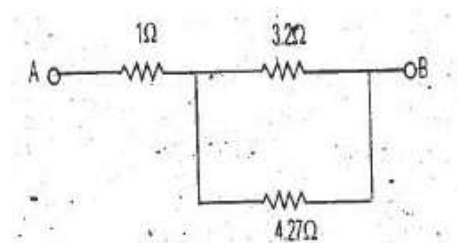
PART A - (10 x 1 = 10 Marks)

- Kirchhoff's laws are applicable to circuits with
 - Distributed parameters
 - Lumped parameters
 - Passive elements
 - Non-linear resistances
- If there are 'b' branches and 'n' nodes the number of equations will be
 - n-1
 - b
 - b-n-1
 - b-n+1
- The superposition theorem requires as many circuits to be solved as there are
 - Nodes
 - Sources
 - Nodes and Sources
 - Nodes, Sources and Mesh
- Condition for maximum power transfer theorem is
 - $R_L = 4R_S$
 - $R_L = 2R_S$
 - $R_L = R_S/2$
 - $R_L = R_S$
- Which of the following is nonlinear circuit parameter
 - Transistor
 - Inductor
 - Condenser
 - Wire wound resistor

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. The power of a 3 phase supply systems of having V line voltage is
- (a) VI (b) $3VI$ (c) $\sqrt{3}VI\cos\phi$ (d) $3VI\cos\phi$
10. Minimum number of Wattmeter required to measure power in 3ϕ , 3 wire unbalanced systems is
- (a) one (b) two (c) three (d) anyone

PART - B (5 x 2 = 10 Marks)

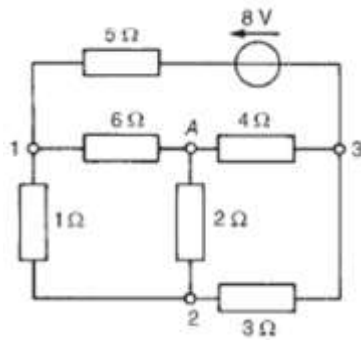
11. Determine the equivalent resistance of the given circuit



12. List the applications of Thevenin's theorem.
13. Define the term coefficient of coupling.
14. What is transient?
15. Define phase sequence.

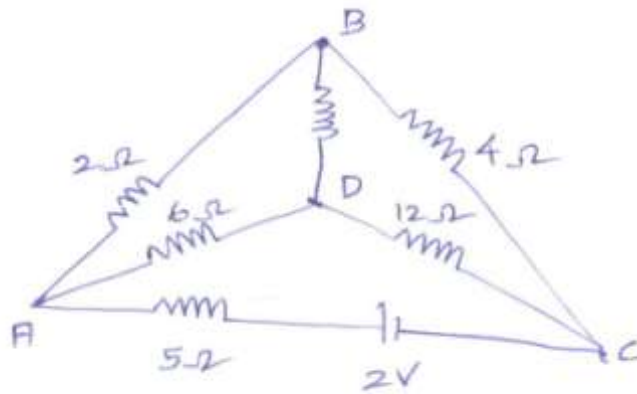
PART - C (5 x 16 = 80 Marks)

16. (a) Use nodal analysis to determine the voltages at nodes 2 and 3 in fig. and hence determine the current flowing in the $2\ \Omega$ resistor and the power dissipated in the $3\ \Omega$ resistor. (16)

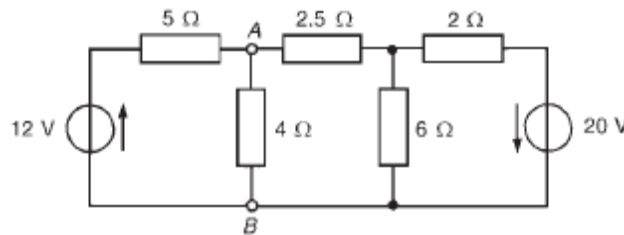


Or

- (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)

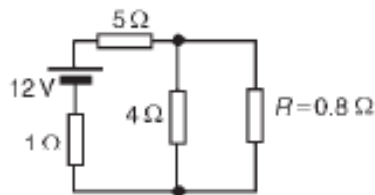


17. (a) Use the superposition theorem to determine the current in the 4Ω resistor of the network shown in Fig. (16)



Or

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



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

Or

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

(ii) Derive for the single tuned 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) (i) Enumerate RL transients for applying AC input. (10)

(ii) A capacitor of value 1 micro farad and a resistor of 5.45 mega ohms are connected in series across a 220 V DC supply through a switch. Calculate the time by which the capacitor will be charged to 60% of the supply voltage. (6)

20. (a) With a neat circuit and phasor diagram explain the three-phase power measurement by two wattmeter method and also derive the expression for Power Factor. (16)

Or

(b) A 400 V, 3-phase, 50 Hz power supply is connected across three terminals of a delta connected 3-phase load. The resistance and reactance of each phase is 6 ohms and 8 ohm respectively. Calculate the line current, phase current, active power, reactive power and apparent power of the circuit. (16)