Question Paper Code: 53055

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

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. Two no. of 8Ω resistance is connected in parallel. What is the effective value?

(a) 16 (b) 4 (c) 4 (d) none of these

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. The maximum power transferred to any load of *RL* will be

(a) Vg/RL (b) $Vg^2/2RL$ (c) $Vg^2/4RL$ (d) none of these

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. Minimum number of Wattmeter required to measure power in 3φ , 3 wire unbalanced systems is
 - (a) one (b) two (c) three (d) anyone
- 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

PART - B (5 x 2 = 10 Marks)

- 11. Define crest factor.
- 12. State superposition theorem.
- 13. Define the term coefficient of coupling.
- 14. What is the time constant of a series *RC* circuits?
- 15. Define phase sequence.

PART - C (
$$5 \times 16 = 80$$
 Marks)

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

(16)



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(b) Derive for a given delta connected system the equivalent value in star position. (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)



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

Or

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

(16)

(16)

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) Three identical coils each having a resistance of 20 Ω and a reactance of 20 Ω are connected in (i) Star (ii) Delta across 440 V, 3 phase supply. Calculate for each case, line current and reading in each of the wattmeter connected to measure power. (16)