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**Question Paper Code: 52B08**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Second Semester

Biomedical Engineering

15UBM208 - ELECTRICAL CIRCUITS ANALYSIS

(Regulation 2015)

Duration: 1:15hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

**(Answer any six of the following questions)**

1. Resistors are circuit elements that resist the flow of CO1- R  
(a) Current                      (b) Voltage                      (c) Power                      (d) Energy
2. Mesh analysis is based on CO1- R  
(a) Kirchhoff's current law      (b) Kirchhoff's voltage law      (c) Source      (d) Load
3. In superposition theorem, the independent current sources must be replaced by CO2- R  
(a) Active elements                      (b) Short circuit  
(c) Open circuit                      (d) Linear bilateral elements
4. Maximum power is transferred when load impedance is CO2- R  
(a) Equal to source impedance                      (b) Equal to half of the source impedance  
(c) Equal to zero                      (d) None of the above
5. What is the total reactance of a series RLC circuit at resonance? CO3- R  
(a) Equal to  $X_L$                       (b) Equal to  $X_C$                       (c) Equal to R                      (d) Zero
6. Mutual inductance is a property associated with CO3- R  
(a) Only one coil                      (b) Two or more coils  
(c) Two or more coils with magnetic coupling                      (d) None of the above

7. A network in which branch current and node voltages are not changing with respect to time is said to be CO4- R
- (a) Transition period (b) Transient response  
(c) Excitation (d) Steady state
8. The time constant of a series RL circuit is CO4- R
- (a) LR (b) L/R (c) R/L (d) 0
9. Three phase system give \_\_\_\_\_ output. CO5- R
- (a) DC (b) Constant  
(c) Steady (d) Poor
10. Wattmeter deflection in AC circuit is proportional to the CO5- R
- (a) Maximum power in the circuit (b) Instantaneous power in the circuit  
(c) Average power in the circuit (d) Half power in the circuit

PART – B (3 x 8= 24 Marks)

**(Answer any three of the following questions)**

11. Explain the classification of electrical networks CO1-U (8)
12. A linear time invariant network when terminated with i)  $R = 1\Omega$ , the current is  $5\angle -45^\circ$  A ii)  $X_C = 1\Omega$ , the current is  $10\angle -45^\circ$  A. Find the thevenin's equivalent of the network. What will be the current if it is terminated with  $X_L = 1\Omega$ . CO2- App (8)
13. In series RLC circuit with variable capacitance, the current is at maximum value with capacitance of  $20\ \mu\text{F}$  and the current reduces to 0.707 times maximum value with capacitance of  $30\ \mu\text{F}$ . Find the values of R and L. What is the bandwidth of circuit if supply voltage is  $20\ \sin(6.28 \times 10^3)t$  volts. CO3- Ana (8)
14. Derive and determine the DC response of an RL Series circuit and also find the voltage across the resistance and Inductance of the DC response. CO4- U (8)
15. A three-phase balanced delta-connected load of  $(4+j8)\Omega$  is connected across a 400 V, 3phase balanced supply. Determine the phase currents and line currents. Assume the phase sequence to be RYB. Also, calculate the power drawn by the load. CO5- U (8)