Code: 15A02201 **R15**

B.Tech I Year II Semester (R15) Regular & Supplementary Examinations May 2018

ELECTRICAL CIRCUITS – I

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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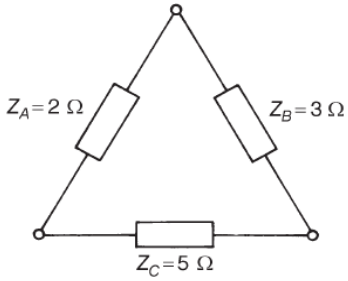
1 Answer the following: (10 X 02 = 20 Marks)

(a) Replace the equivalent delta connected network shown in figure below by an equivalent star connection.



(b) Define coefficient of coupling.

(c) Distinguish between Average value and RMS value.

(d) A coil takes a current of 2 A from a 12 V d.c. supply. When connected to a 240 V, 50 Hz supply the current is 20 A. Calculate the power factor.

(e) Draw the frequency response of a R-L-C circuit.

(f) Write the relationship between bandwidth and Q factor.

(g) State Maximum power transfer theorem.

(h) State Tellegen's theorem.

(i) What are Hybrid parameters?

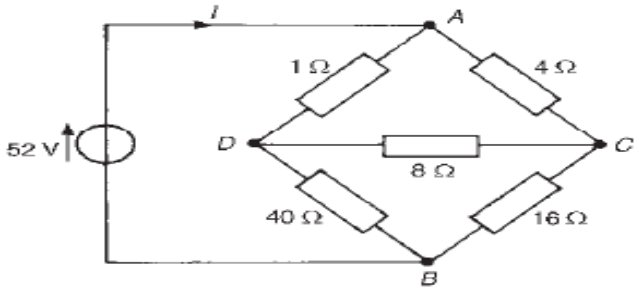
(j) What do you understand by Transformed network?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 For the bridge network shown in figure below by using suitable delta – star transformations, determine: (i) The value of the single equivalent resistance that replaces the network between terminals A and B. (ii) The current supplied by the 52 V source. (iii) The current flowing in the 8 Ω resistor.



OR

3 (a) Distinguish between self inductance and mutual inductance.

(b) Two coils connected in series have self inductance of 40mH and 10mH respectively. The total inductance of the circuit is found to be 60 mH. Determine: (i) The mutual inductance between the two coils. (ii) The coefficient of coupling.

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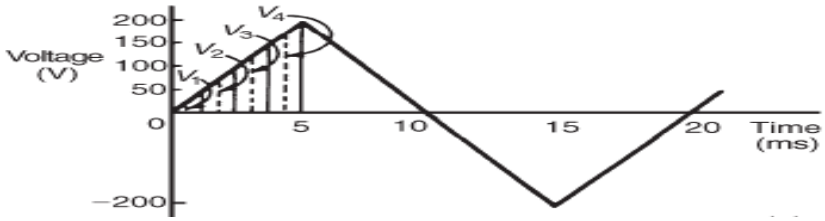
UNIT – II

4 A coil of resistance 5Ω and inductance 120 mH in series with a 100μF capacitor, is connected to a 300 V, 50 Hz supply. Calculate: (i) The current flowing in the circuit. (b) The phase difference between the supply voltage and current. (iii) The voltage across the coil. (iv) The voltage across the capacitor. (v) Real and reactive power.

OR

5 For the periodic waveforms shown in figure below, determine: (i) Average value over half cycle. (ii) Frequency. (iii) rms value. (iv) Form factor. (v) Peak factor.



UNIT – III

6 (a) A filter in the form of a series L–R–C circuit is designed to operate at a resonant frequency of 5 kHz. Included within the filter is a 20 mH inductance and 10Ω resistance. Determine the bandwidth of the filter.

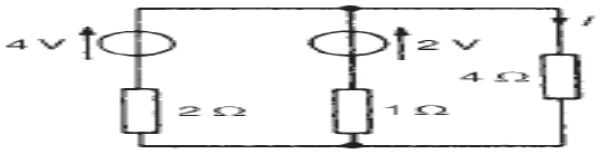
(b) A coil having a resistance of 10Ω and an inductance of 125 mH is connected in series with a 60 μF capacitor across a 120 V supply. At what frequency does resonance occur? Find the current flowing at the resonant frequency.

OR

7 Develop the expression for transient response for R-C series circuit and draw the response curve.

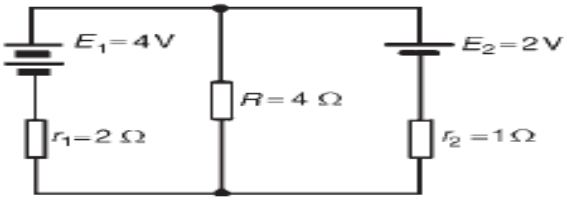
UNIT – IV

8 Determine the current in 4 ohm resistor for the circuit shown in figure below, by using Norton's theorem.



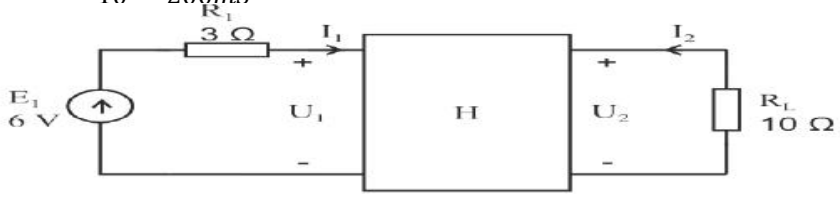
OR

9 Determine the current in 4 ohm resistor using Superposition theorem for the circuit of figure below.



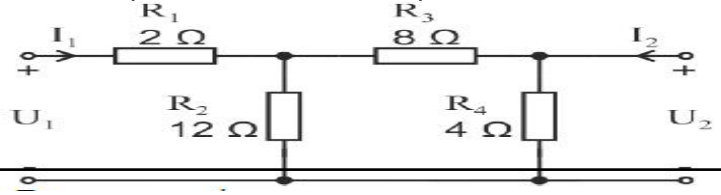
UNIT – V

10 Obtain the current and power of the load R_L, if the two port shown in the figure below is defined with its Hybrid parameter: $H = \begin{bmatrix} 10\Omega & 0.01 \\ 10 & 200mS \end{bmatrix}$



OR

11 Obtain the Z parameters for the two port network shown in below.



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