

B.Tech I Year II Semester (R15) Supplementary Examinations December 2018

ELECTRICAL CIRCUITS – I

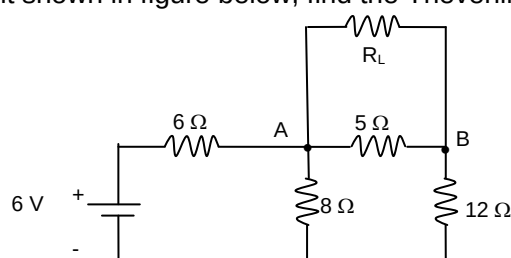
(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Distinguish between dependent and independent voltage sources.
 - State Kirchhoff's voltage and current laws.
 - Define form factor. What is its value for a pure sinusoidal voltage?
 - State the values of power factor for pure resistance, inductance and capacitance.
 - Write the expression for resonant frequency of a series R-L-C circuit.
 - What is Q factor? Write its significance.
 - For the circuit shown in figure below, find the Thevenin's resistance, across AB.



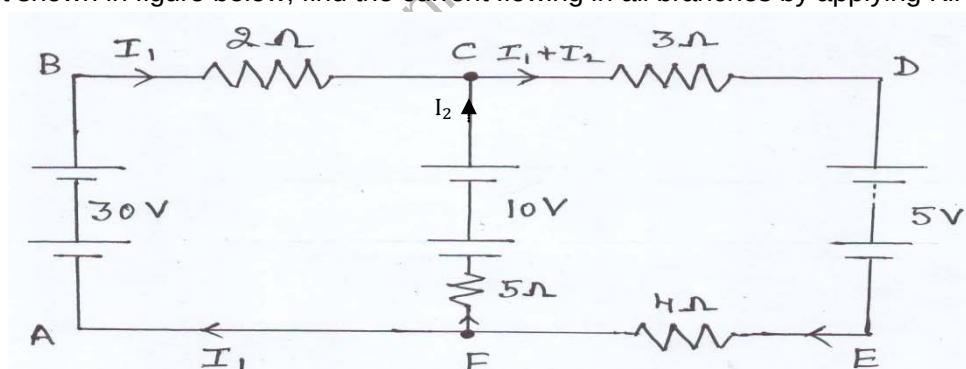
- State reciprocity theorem.
- List the parameters of a two port network.
- Write the expressions for Y-parameters in terms of Z-parameters.

PART – B

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

UNIT – I

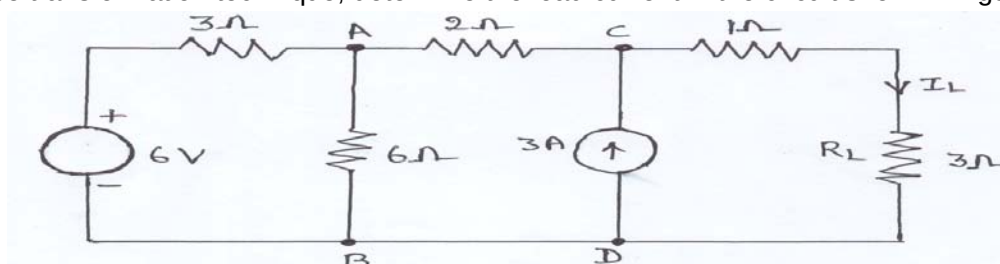
- 2 (a) For the circuit shown in figure below, find the current flowing in all branches by applying Kirchhoff's laws.



- Two coils connected in series have a resistance of 18Ω and when connected in parallel have a resistance of 4Ω . Find the value of resistances.

OR

- 3 (a) Derive an expression for energy stored in an inductor.
(b) Using source transformation technique, determine the load current in the circuit shown in figure below.



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UNIT - II

- 4 (a) Write short notes on R.M.S and average value for a periodic waveform.
(b) Two impedances in an electrical network are given by $Z_1 = 4.7\angle 35^\circ$ and $Z_2 = 7.36\angle 48^\circ$. Determine in polar form the total impedance Z_T given that $Z_T = Z_1 Z_2 / (Z_1 + Z_2)$.

OR

- 5 For an R-L series circuit, the current $i = 14.14 \sin(157t)$, $R = 5$ ohms, $L = 30$ mH. Determine: (i) Inductive reactance. (ii) Impedance. (iii) Total voltage. (iv) Power factor. (v) Real power and reactive power.

UNIT - III

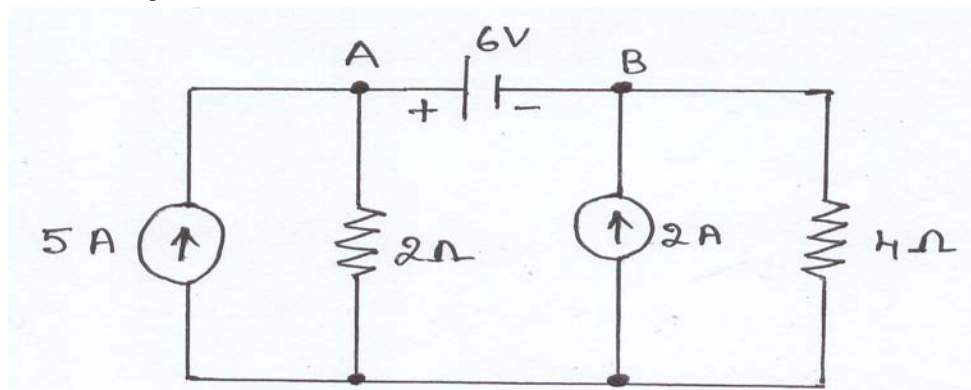
- 6 For a series RLC circuit, $R = 25$ ohms, $L = 10$ mH and $C = 0.06$ μ F. Find the value of Bandwidth and Q factor. Derive the necessary expressions.

OR

- 7 (a) Draw the current laws of R-L series circuit with variable resistance with constant applied voltage and frequency, deriving necessary expressions.
(b) Derive the expressions for maximum impedance is a practical parallel circuit.

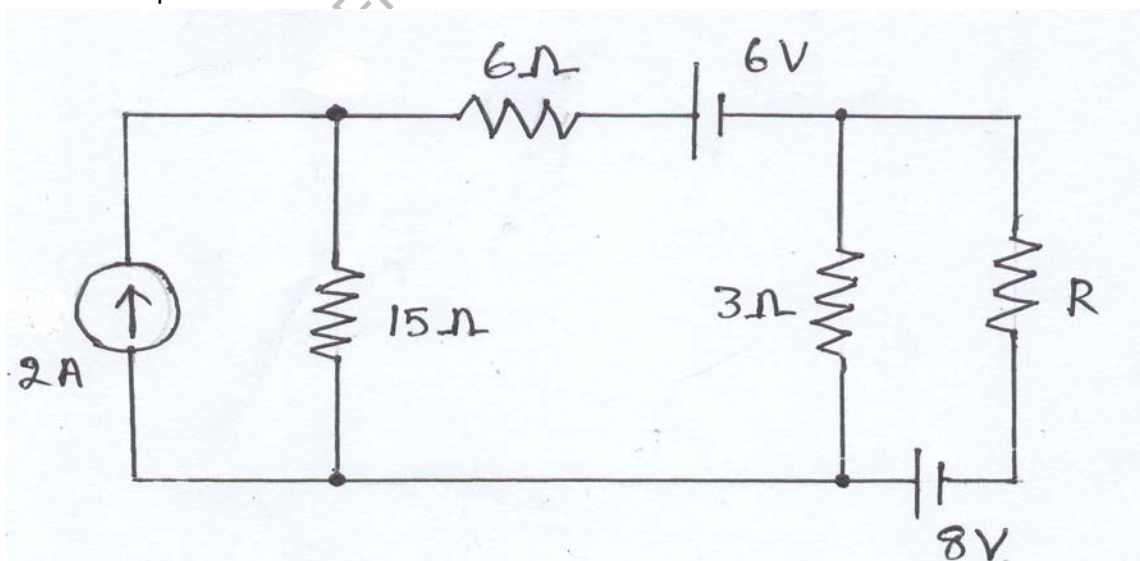
UNIT - IV

- 8 Determine the current in 4 ohm resistor for the circuit shown in figure below by using Thevenin's theorem and verify the result using Norton's theorem.



OR

- 9 Calculate the value of R which will absorb maximum power from the circuit of given below. Also find the value of maximum power.

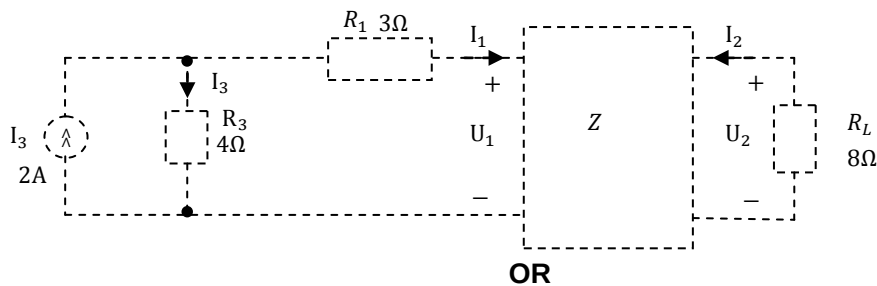


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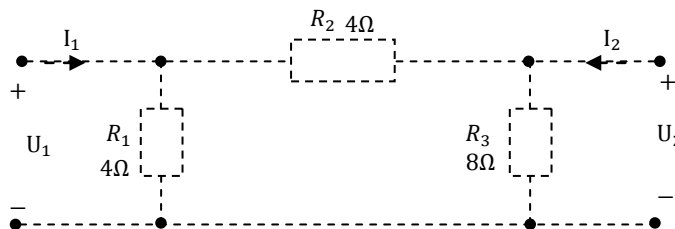
UNIT - V

- 10 Obtain the current and power of the load R_L , if the two port shown in the figure below is defined with its Z parameter: $Z = \begin{bmatrix} 8\Omega & -3\Omega \\ -4\Omega & 9\Omega \end{bmatrix}$.



OR

- 11 Obtain the hybrid parameters for the two port network shown in figure below.



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