Code: 15A02201 **R15**

B.Tech I Year II Semester (R15) Regular & Supplementary Examinations May/June 2019

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) An incandescent lamp is rated for 110 V, 100 W. Using a suitable resistor how you can operate this lamp on 220 V mains.

(b) Define self-inductance and mutual inductance of a coil.

(c) Define form factor and peak factor.

(d) A voltage of 100 V is applied to a capacitor of 12 μF. The current is 0.5 A. What must be the frequency of supply?

(e) What is the resonant frequency and bandwidth of a series RLC circuit whose R = 5Ω, L = 40mH and C = 1 μF.

(f) In a series RLC circuit, if the value of L and C are 10 mH and 0.1 μF, determine the value of R to give critical damping.

(g) A load is connected to a network of the terminals to which load is connected, R_{th} = 10Ω and V_{th} = 40 V. Calculate the maximum power supplied to the load.

(h) List the applications of Norton's theorem.

(i) A two port network is characterized by $V_1 = 8I_1 + 6I_2$ and $V_2 = 10I_1 + 6I_2$. Find the transmission parameters A and C.

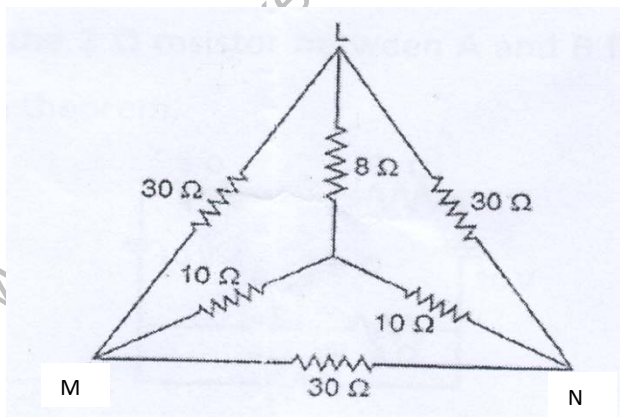
(j) When a two port network is said to be reciprocal?

PART – B

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

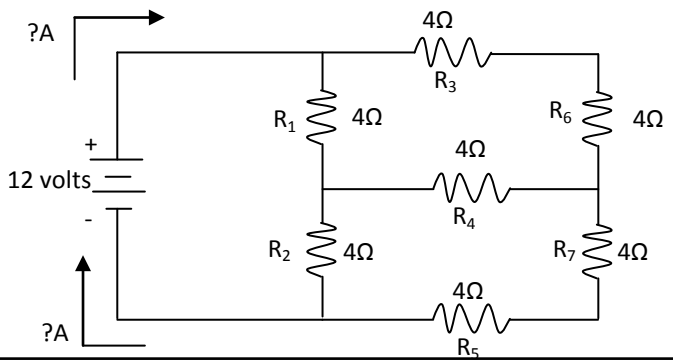
UNIT – I

2 For the network shown in figure below, find the equivalent resistance between the terminals M and N.



OR

3 For the circuit shown below, determine the current supplied by the 12 V d.c source.



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UNIT – II

4 A 20Ω resistor and a 30mH inductor are connected in series across a 300 V, 50 Hz a.c supply. Find: (i) Impedance of the circuit. (ii) Voltage across the resistor. (iii) Voltage across the inductor. (iv) Apparent power. (v) Active power. (vi) Reactive power.

OR

5 Two impedances (15-j10)Ω and (10+j15)Ω are connected in parallel. The supply voltage is 200 V, 50 Hz. Calculate: (i) Admittance. (ii) Conductance. (iii) Susceptance. (iv) Total current. (v) Total power.

UNIT – III

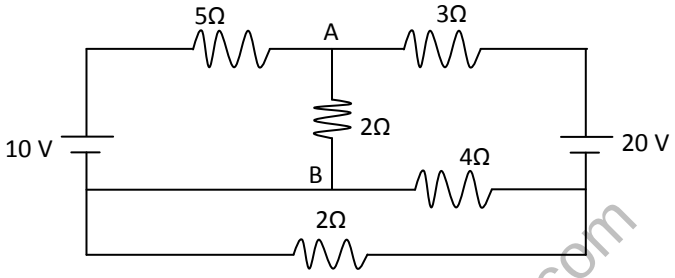
6 A coil of resistance 40Ω and inductance 0.75H forms part of a series circuit for which the resonant frequency is 55 c/s. If the supply is 250 V, 50 c/s. Find: (i) Line current. (ii) Power factor. (iii) Voltage across the coil.

OR

7 Derive the expression for resonant frequency and bandwidth for a series RLC resonant circuit.

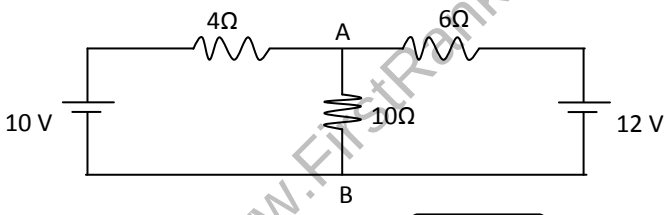
UNIT – IV

8 Find the current in the 2Ω resistor between A and B for the network shown below using Super Position theorem.



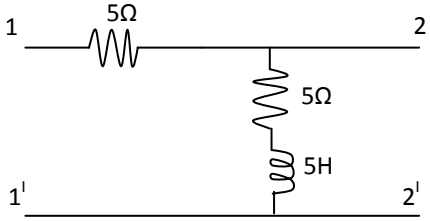
OR

9 Determine the current flowing through the 10Ω resistor by using Thevenin's theorem.



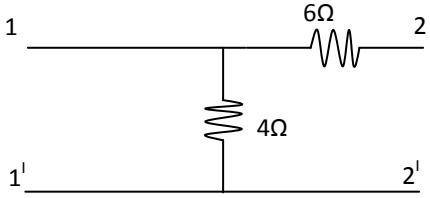
UNIT – V

10 Obtain the admittance parameters of the network shown in figure below.



OR

11 Find the h-parameter for the network shown below.



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