

(4)

(c) A circuit consisting of a coil of resistance 12Ω and inductance 0.15 H is series with a capacitor of $12 \mu\text{F}$ is connected to a variable frequency supply which has a constant voltage of 24 V calculate

- (i) The resonant frequency
- (ii) The current in the circuit at resonance
- (iii) The voltage across the capacitor and coil at resonance.

7

6. (a) What is two port network ?

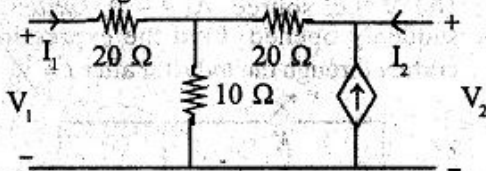
2

(b) Derive the expression for z-parameter.

5

(c) Determine the z-parameters of the network shown in fig.

7



7. (a) Draw the circuit constant k high pass filter.

2

(b) A tank circuit consist of a 500 nF capacitor and a coil of resistance 50Ω and inductance 250 mH . Find frequency of resonance and Q-Factor.

5

(c) Design k-type band pass filter having a design impedance of 500Ω and cut-off frequencies 1 kHz and 10 kHz .

7

III/SEM/ELECT/2015 (W)

CIRCUIT AND NETWORK THEORY

Sub Code-EET 301

Full Marks : 70

Time : 3 hours

Answer any five questions

The figures in the right-hand margin indicate marks

1. (a) Express the given voltage $(5 + 3j) \text{ V}$ to polar form.

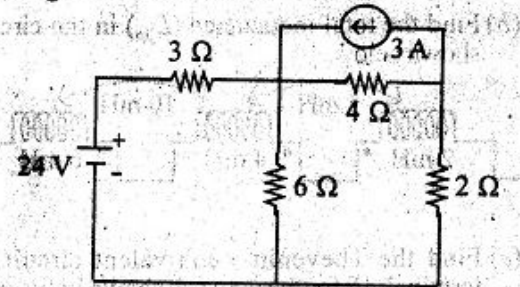
2

(b) Derive an expression for the resonance frequency of series RLC circuit.

5

(c) Find the current through the 2Ω resistor using Norton's theorem.

7



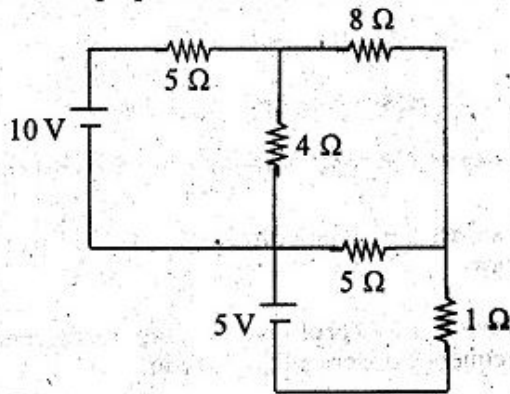
2. (a) What is the value of form factor for pure sinusoidal AC signal?

2

(2)

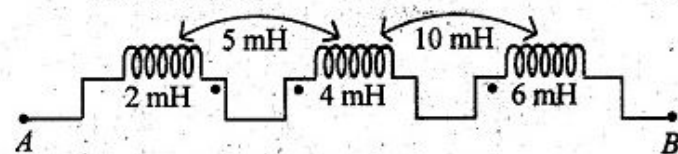
(b) State and explain Milliman's theorem. 5

(c) Find the current through $1\ \Omega$ resistor applying the superposition theorem. 7



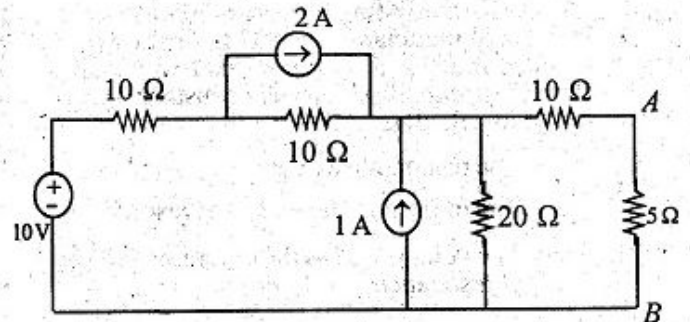
3. (a) What is active element and passive element? 2

(b) Find the total inductance (L_{AB}) in the circuit shown below. 5



(c) Find the Thevenin's equivalent circuit at terminal AB for the network shown in fig. and hence determine the power dissipated in a $5\ \Omega$ resistor connected between A and B . 7

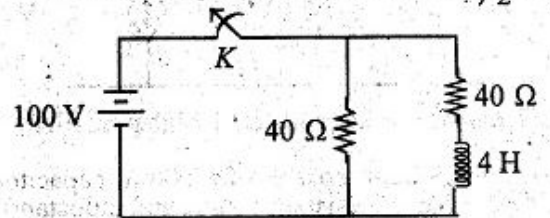
(3)



4. (a) What is co-efficient of coupling? 2

(b) Explain hysteresis loop with diagram. 5

(c) In fig. steady state condition is reached with $100\ \text{V}$ d.c. source. At $t = 0$, switch K is suddenly opened. Find the expression of current through the inductor after $t = \frac{1}{2}$ sec. 7



5. (a) What is resonance? 2

(b) Explain the relation between line voltage and phase voltage, line current and phase current in star network. 5