

Code: EC1T6

**I B.Tech - I Semester – Regular / Supplementary Examinations
December - 2016**

**INTRODUCTION TO ELECTRICAL CIRCUITS
(ELECTRONICS & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11 x 2 = 22 M

1.

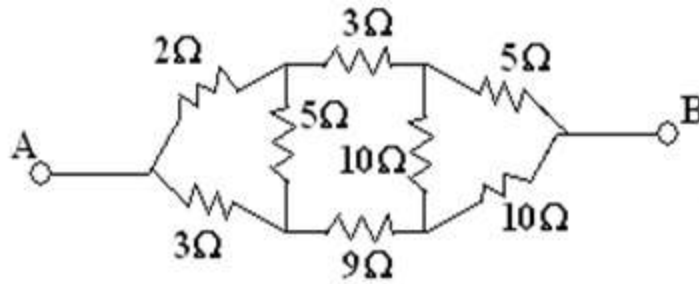
- a) The element of 500 w electric iron is designed for use on 200V supply. Then find the resistance of the element.
- b) Four elements whose conductances are 5, 10, 15 and 20 ohms are connected in parallel the find the equivalent resistance.
- c) A square wave of a time period of 10 m sec is having a peak value of 10 V. Find the RMS value of Square wave.
- d) In a given circuit $e(t)=10 \sin 314 t$ and the peak value of current is 5A and leads the voltage by 45° . Find The expression of $i(t)$.
- e) In a given series resonant circuit, the resistance is halved. then find the new resonant frequency.
- f) In a series R-L-C circuit $R=10$ ohms $X_L = X_C =20$ ohms. Then find the impedance of the circuit at resonance.

- g) A coil having 500 turns carries a current of 5 amps and corresponding flux established is 1mwb. Then find the self inductance.
- h) The expression for the coefficient of coupling in terms of self and mutual inductance is?
- i) In a given series R-L circuit, the voltage across resistance is 30v, and voltage across inductance is 40 V. Find the total voltage across the series circuit.
- j) In a series R-C circuit the impedance of the circuit is 10 ohms and resistance is 8 ohms. Find the phase angle of the current w.r.t voltage.
- k) The Admittance of a circuit is 0.02 Siemens and applied voltage is 50 V. Find the current in the circuit.

PART – B

Answer any **THREE** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Explain difference between ideal and practical voltage source. 8 M
- b) Find the voltage to be applied across AB in order to drive a current of 5A into the circuit by using star-delta transformation. Refer figure. 8 M



3. a) Define the following: 8 M

- | | |
|-------------------------|------------------|
| i) Alternating Quantity | ii) R.M.S. Value |
| iii) Average value | iv) Form factor. |

b) Obtain the rms value, average value, form factor and peak factor for a voltage of symmetrical square shape whose amplitude is 10V and time period is 40secs. 8 M

4. a) Define the following: 8 M

- | | |
|--------------------------------|-----------------------|
| i) Self inductance | ii) Mutual Inductance |
| iii) Static Induced e.m.f | |
| iv) Dynamically induced e.m.f. | |

and Derive the relationship between the self, mutual inductances and coefficient of coupling.

b) Two similar coils connected in series gave a total inductance of 600 mH and when one of the coil is reversed, the total inductance is 300mH. Determine the self inductance of two coils and mutual inductance between the coils. Assume coefficient of coupling between the coils as 1. 8 M

5. a) Explain the current division in a R-L parallel circuit. 8 M

b) A series circuit with a resistor of 100 ohm capacitor of 25 micro Farad and inductance of 0.15H is connected across 220V, 60Hz supply. Calculate: 8 M
i) current ii) power and iii) power factor in the circuit.

6. a) Bring out the differences between series and parallel Resonance. 8 M

b) A series RLC circuit consists of resistance $R = 20\Omega$, inductance, $L=0.01\text{H}$ and capacitance, $C = 0.04 \mu\text{F}$. Calculate the frequency at resonance. If a 10 Volts of frequency equal to the frequency of resonance is applied to this circuit, calculate the values of V_C and V_L across C and L respectively. Find the frequencies at which these voltages V_C and V_L are maximum. 8 M