PVP 14

Code: EC1T6

I B.Tech - I Semester – Regular / Supplementary Examinations
November 2018

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) Two resistors are connected in series across a 24 V supply and a current of 3 A flows in the circuit. If one of the resistors has a resistance of 2 Ω. Determine the value of the other resistor.

b) Capacitances of 1 μF, 3 μF, 5 μF and 6 μF are connected in parallel to a direct voltage supply of 100 V. Determine i) the equivalent circuit capacitance, ii) the total charge.

c) An 8 H inductor has a current of 3 A flowing through it. How much energy is stored in the magnetic field of the inductor?

d) A coil of resistance 5 and inductance 120 mH in series with a 100 μF capacitor, is connected to a 300 V, 50 Hz supply. Calculate i) the current flowing, ii) the phase difference between the supply voltage and current.

e) A 20 Ω resistor is connected in parallel with an inductance of 2.387 mH across a 60 V, 1 kHz supply. Calculate i) the current in each branch, ii) the supply current.

f) Obtain the admittance of RL parallel resonance.

g) A 12 V battery is connected in a circuit having three series-connected resistors having resistances of 4 Ω, 9 Ω and 11 Ω. Determine the current flowing through, and the p.d. across the 9 Ω resistor. Find also the power dissipated in the 11 Ω resistor.

h) Write the impedance of an RL series circuit and write its phasor diagram.

i) Obtain the RLC series circuit resonance frequency with reactance diagram.

j) Define form factor and peak factor of an ac periodic wave form.

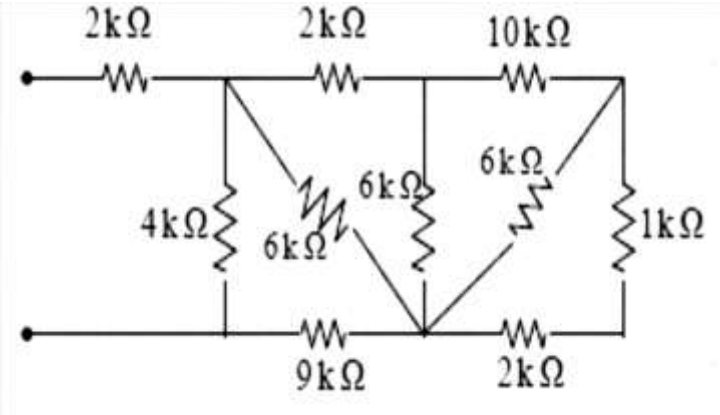
k) Define magnetic flux and magnetic flux density.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

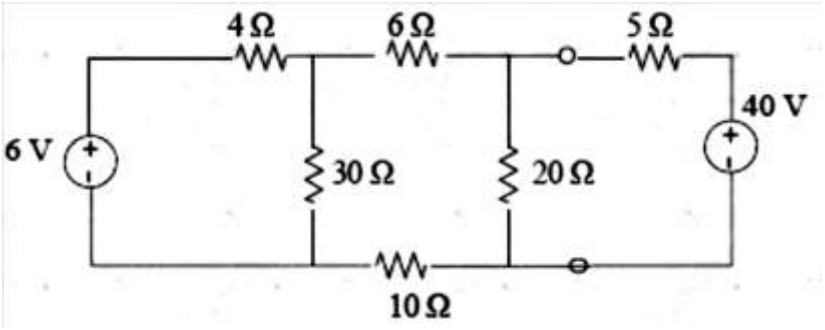
3 x 16 = 48 M

2. a) Find equivalent resistance for the circuit shown below



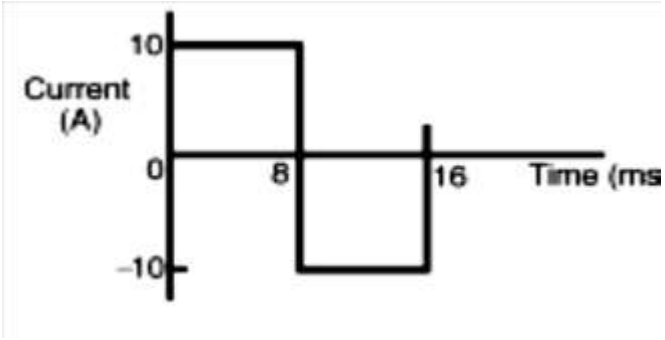
8 M

b) Find the power associated with the 6 V source for the circuit shown below 8 M



3. a) Explain the phase representation of alternating voltage and give the significance of 'j' operator. 6 M

b) Determine the average, rms values and form factor and peak factors for a rectangular waveform given for one cycle for a period. 10 M



4. a) Obtain coefficient of coupling K between two coils of inductances connected in series. 8 M

b) The energy stored in the magnetic field of an inductor is 80 J when the current flowing in the inductor is 2 A. Calculate the inductance of the coil. 8 M

5. a) A coil of resistance 5 Ω and inductance of 120mH and a capacitor of 20μF is connected to a 230 V, 50Hz supply. Calculate the current flowing, phase difference between supply voltage and current, voltage across the coil and the voltage across the capacitor. 8 M

b) Obtain the impedance of a series RLC circuit connected to an ac supply. Draw the voltage and impedance diagrams and explain. 8 M

6. a) The power taken by an inductive circuit when connected to a 120 V, 50 Hz supply is 400 W and the current is 8 A. Calculate: i) the resistance, ii) the impedance, iii) the reactance, iv) the power factor, and v) the phase angle between voltage and current. 8 M

b) A coil of inductance 80 mH and negligible resistance is connected in series with a capacitance of 0.25 μF and a resistor of resistance 12.5 Ω across a 100 V, variable frequency supply. Determine: i) the resonant frequency, and ii) the current at resonance. How many times greater than the supply voltage is the voltage across the reactances at resonance? 8 M