



Code No. : 5352/S

FACULTY OF ENGINEERING
B.E. 2/4 (E & EE) I Semester (Suppl.) Examination, July 2012
ELECTRICAL CIRCUITS – I

Time : 3 Hours]

[Max. Marks : 75

- Instructions : 1) Answer all questions of Part – A.
2) Answer any five questions from Part – B.

PART – A

(25 Marks)

1. Find "i" in the circuit shown in fig. 1.

3

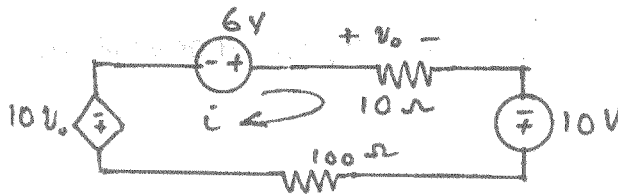


Fig. 1

2. Find the equivalent capacitance between terminals a – b in fig. 2.

2

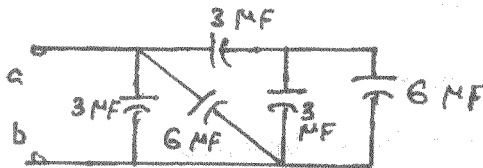


Fig. 2

3. Replace the star system in fig. 3 by an equivalent delta system.

3

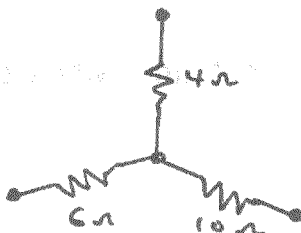


Fig. 3



4. Using Thevenin's theorem, determine the current through the 3 ohm resistor in fig. 4. 3

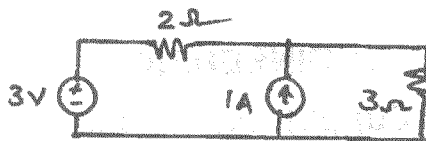


Fig. 4

5. In the circuit shown in fig. 5, determine the value of V_a , given $v_{ir} = 60 \sin(377t + 20^\circ)$
 $V_b = 20 \sin 377t$. 2

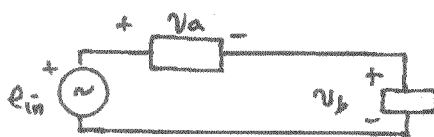


Fig. 5

6. Find the average value of the waveform in fig. 6 over one full cycle. 3

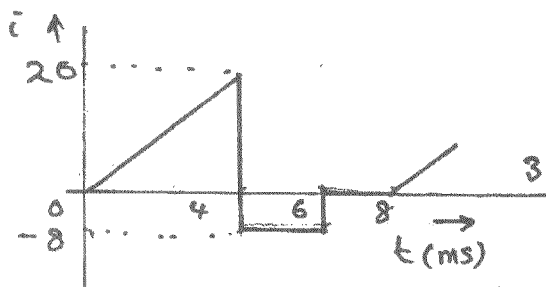


Fig. 6

7. Find the rms value of the following non-sinusoidal wave. 2
 $i = 6 \sin(\omega t + 20^\circ) + 2 \sin(2\omega t + 30^\circ) - \sin(3\omega t + 60^\circ)$
8. Find the average power dissipated in a network whose input current and voltage are 2
 $i = 5 \sin(\omega t + 40^\circ)$, $V = 10 \sin(\omega t + 40^\circ)$.
9. Calculate the half power frequencies of a series resonant circuit where the resonant frequency is 150 kHz and the bandwidth is 75 kHz. 2



10. Find the total admittance and impedance of the circuit shown in fig. 7. Identify the values of conductance and susceptance. 3

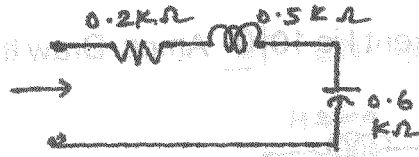


Fig. 7

PART - B

(50 Marks)

11. Determine the voltage across the 20 ohm resistor in fig. 8. 10

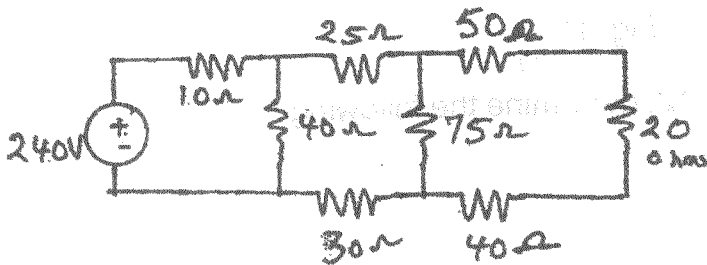


Fig. 8

12. Using mesh analysis solve for i_1 , i_2 and i_3 in fig. 9. 10

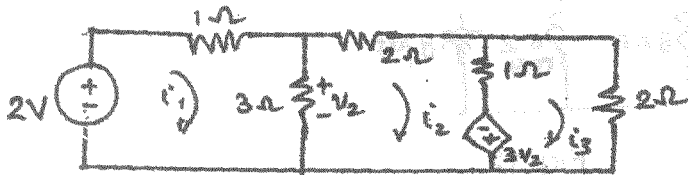


Fig. 9

13. Using Thevenin's theorem determine the current flowing through the 3 ohm resistor in fig. 10. 10

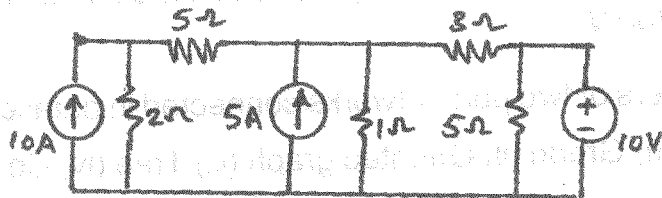


Fig. 10

14. In the circuit shown in fig. 11, determine the voltage V , at frequency of 50 Hz to be applied in order the circuit current I is $10 \angle 0^\circ$ Amps. Draw the phasor diagram. 10

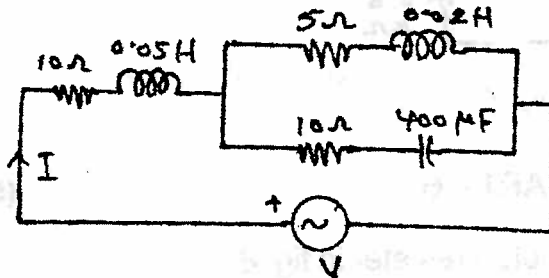


Fig. 11

15. In the parallel RLC shown in fig. 12, determine the following :
- The resonant frequency
 - The quality factor Q .
 - The Bandwidth.
 - The half power frequencies.
 - Power dissipated at the resonant frequency and at the half power frequencies. 10

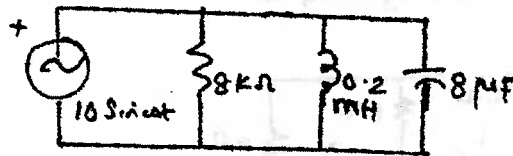


Fig. 12

16. One of the two wattmeters connected to measure the input power to a 3 phase circuit reads 10 kW on a balanced load when the power factor is unity. What does each wattmeter read when the p.f. falls to 0.866 lagging, the total power remaining unaltered ? Obtain the load impedance per phase if it is connected in star, when the line voltage is 400 V. 10
17. a) Obtain the overall parameters of two port networks connected in parallel. 4
- b) Define the following terms (i) Graph (ii) Oriented graph (iii) Tree (iv) Co-tree (v) Cut-set. 6