Register Number.....

BE DEGREE EXAMINATIONS: OCTOBER / NOVEMBER-2008

Second Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U07EC201: Circuit Analysis

Time: Three Hours **Maximum marks: 100**

Answer ALL Questions: -

PART A (20x 2= 40 Marks)

1. Value of source voltage **E** in Fig 1

A) 12V
B) 24V
C) 30V
D) 44V

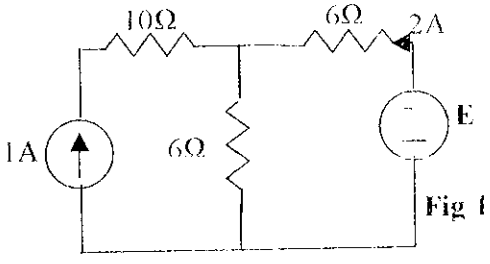


Fig 1

2. The value of resistance **R** in Ω in Fig 2

A)10
B) 20
C)30
D)40

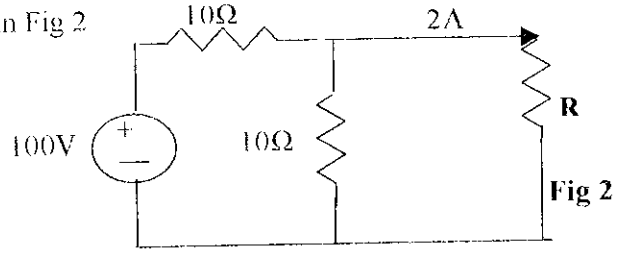


Fig 2

3.Consider the circuits I and II in Fig 3,which of the following statements regarding the current flowing through the ammetersA_1 and A_2 is correct.

Circuit **I** Circuit **II**

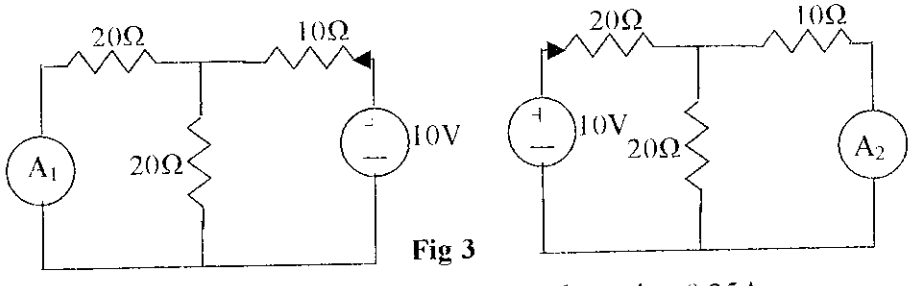


Fig 3

A) The currents A_1 andA_2 are of same value and equal to 0.25A.
B) The currents A_1 andA_2 are 0.25A and 2.5A respectively
C) The currents A_1 andA_2 are of same value and equal to 2.5A.
B) The currents A_1 andA_2 are 2.5A and 0.25A respectively

4. The current flowing through 120Ω resistor in the circuit shown in Fig 4

A) 1A B)2A C)3A D)4A

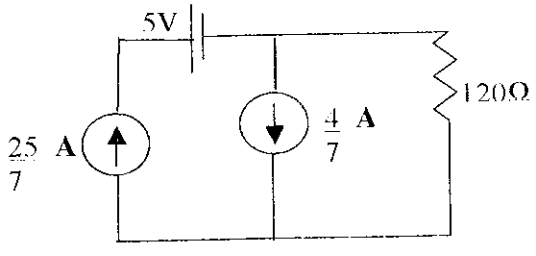
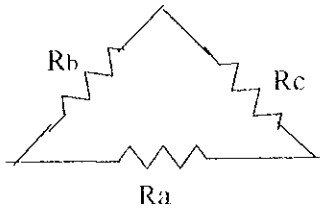


Fig 4

5.Ra,Rb,Rc are 20Ω,10Ω,10Ω respectively. The resistancesR1,R2 and R3are in ohms of an equivalent star connection as shown in Fig 5 is calculated as

A) 2.5,5,5
B) 5,5,2.5
C) 5,2.5,5
D) 2.5,5,2.5



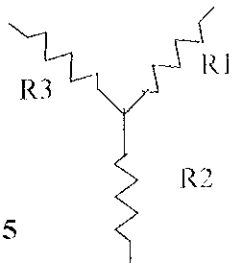


Fig 5

6.A network is said to be nonlinear if it does not satisfy
A) Superposition condition B)homogeneity condition
C) Both Superposition condition and homogeneity condition D)associative condition

7.The equivalent impedance between A and B in Fig 7
A)3Ω
B)3.2Ω
C)3.75Ω
D)20Ω

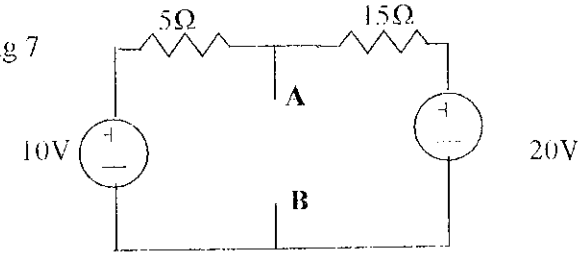


Fig 7

8.Regarding Norton's equivalent which of the following is not correct
A)Norton's equivalent is the voltage equivalent of the network.
B)Norton's equivalent is the current equivalent of the network.
C)Norton's equivalent resistance is the same as the Thevenin's equivalent resistance.
D)The load is connected in parallel Norton's equivalent resistance and Norton's equivalent source.

9.In the circuit shown in Fig 9 ,the voltage function is v(t) =150sinωt. The average power in the resistance R will be
A) 300W.
B) 450W.
C) 750W.
D) 700W.

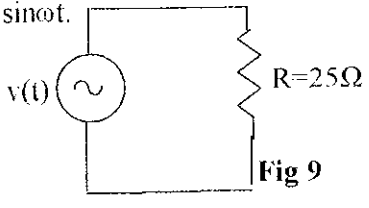


Fig 9

10.A series RLC circuit consisting of R =10Ω,X_L = 20Ωand X_C = 20Ω is connected across an ac supply of 100v (rms). The magnitude and phase angle of the voltage across inductance coil are respectively.
A) 100v,∠90 B) 100v,∠-90 C) 200v,∠-90 D) 200v,∠90

11.The series circuit in Fig 11 has a current i = 2cos500t A,
The applied voltage will be
A) 22.4 sin (5000t + 63.4)V
B) 22.4 cos (5000t - 63.4)V
C) 22.4 sin (500t - 63.4)V
D) None of the above

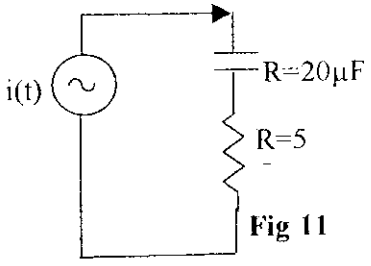


Fig 11

12.The emf in a circuit is given by e = 100sin628t volts then the maximum value of voltage and frequency are
A) 100V,50Hz B) 100V,100Hz C) 100√2 V,100Hz D) 100√2V,50Hz

13.Find the value of Z in Fig 13,which is more appropriate to cause parallel resonance at 500Hz
A) 125.00mH B) 304.20μF C) 2 μF D) 0.05 μF

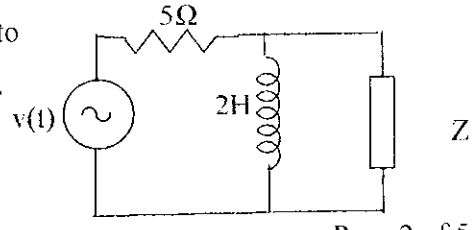


Fig 13

14. Transient currents are due to

A) Voltage applied to the circuit. B) Resistance of circuit.
C) Impedance of the circuit. D) Energy stored in inductor and capacitor

15. When testing a coil having a resistance of 10Ω, resonance occurred at 10MHz, value of capacitor was set at 500/20 pF. The effective value of Q of the coil is

A) 200 B) 254 C) 314 D) 542

16. For the network in Fig 16, switch S is closed at t = 0. The capacitor is uncharged the value of current at t = 0

A) 0 A B) 0.1A C) 0.01A D) 0.001A

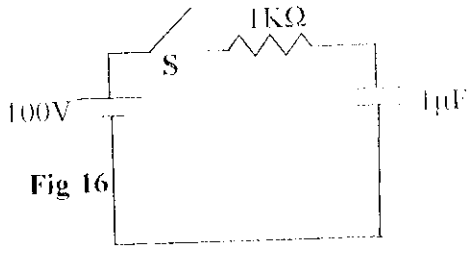


Fig 16

17. If there are 'b' branches and 'n' nodes, the number of equation is given by

A) b B) b-n C) b + n +1 D) b –n + 1

18. When a graph has 'b' branches and 'n' nodes, the number of chords is given by

A) b B) b-n C) b + n +1 D) b –n + 1

19. Two coupled coils L_1=0.8H and L_2 =0.2H have a coupling coefficient K = 0.9. The mutual inductance M is

A) 0.144H B) 0.23H C) 0.36H D) 0.43H

20. The equivalent inductance of the parallel connection is

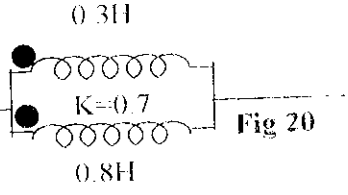


Fig 20

A) 0.25H B) 0.32H C) 0.34H D) 0.38H

PART B (5x 12= 60 Marks)

21. (a) (i) State Kirchhoff's laws. (4)

(ii) Find the currents in all the branches of the network in Fig 21a (8)

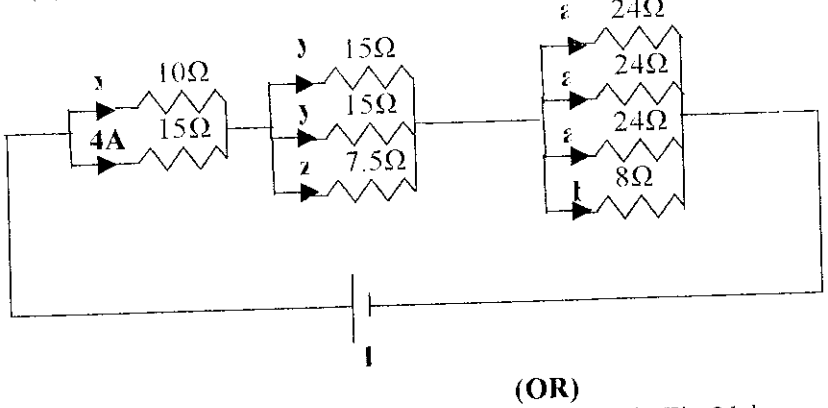


Fig 21 a

(OR)

21. (b) Determine the mesh currents in the circuit shown in Fig 21 b (12)

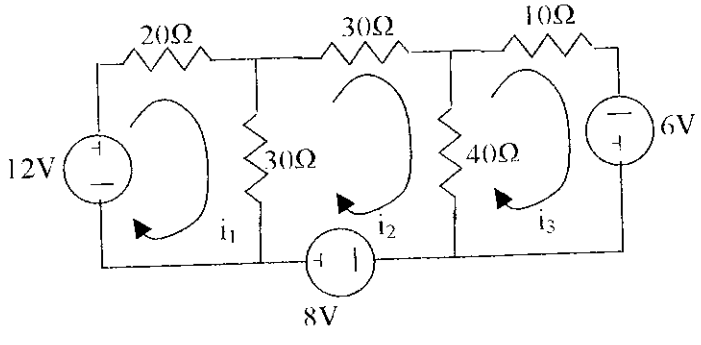


Fig 21 b

22. (a) (i)State and explain maximum power transfer theorem. (4)

(ii)Determine the current **I** in the network shown in Fig 22 a using Thevenin's theorem. (8)

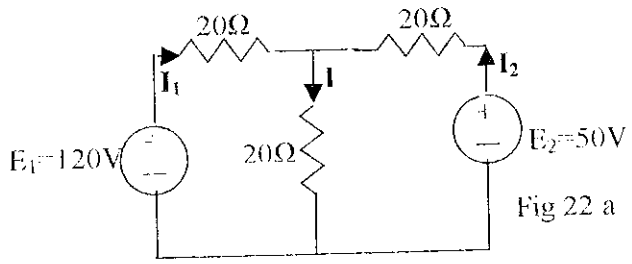


Fig 22 a

(OR)

22.(b)(i)State Norton's theorem. (2)

ii)Using the principle of superposition. Find I in the circuit given in Fig 22 b (10)

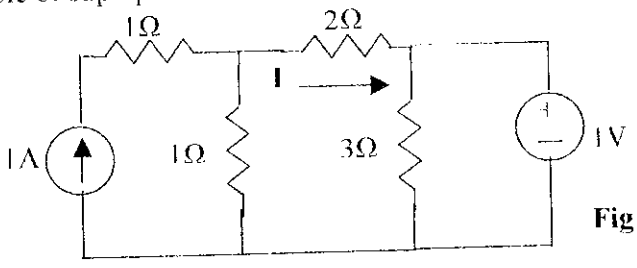


Fig 22 b

23.(a) (i) Find the power delivered by the 60Hz ac generator to the load impedance in the circuit shown in Fig 23 a (8)

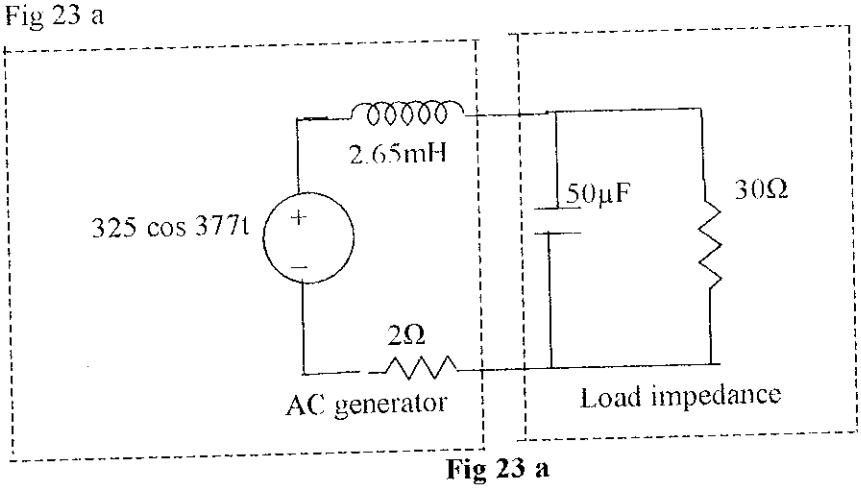


Fig 23 a

(ii) Find the two elements in a series circuit given that the current and total voltage are (4)

$i(t) = 10\cos(5000t - 23.13)A$

$v(t) = 10\cos(5000t + 30)V$

(OR)

23.(b) In the circuit shown in Fig 23 b ,Z1 = 60∠-30Ω and Z2 = 40∠45Ω,calculate the total apparent power, real power, reactive power and power factor. It (12)

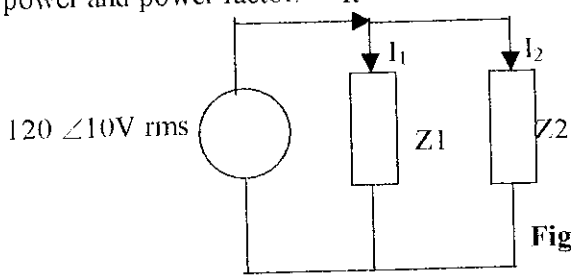


Fig 23 b

24. (a) In a parallel RLC circuit shown in Fig 24 a. Let R = 8K Ω, L = 0.2mH and C = 8μF. Calculate resonant frequency, quality factor, bandwidth, half power frequencies ω_1 and ω_2. Determine the power dissipated at ω_0. (12)

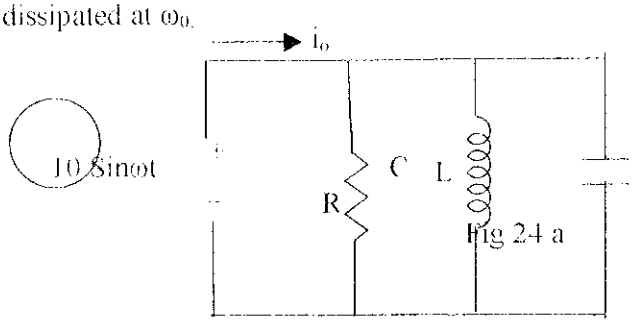


Fig 24 a

(OR)

24. (b) In the network shown in Fig 24 b switch is closed at t = 0 and there is no initial charge on either of the capacitors. Find the resulting current **I**.

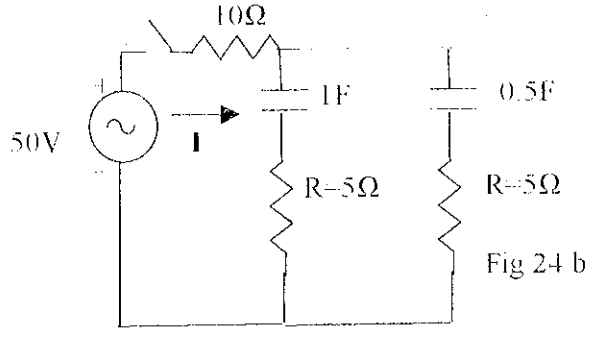


Fig 24 b

25. (a) Find the drop across R_L. (12)

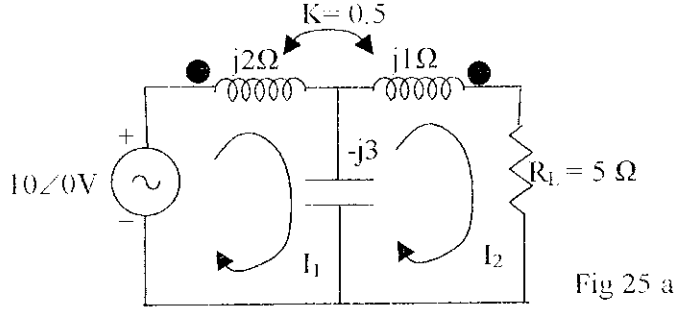


Fig 25 a

(OR)

25.(b) (i)Draw the dual circuit for Fig 25 b I (6)

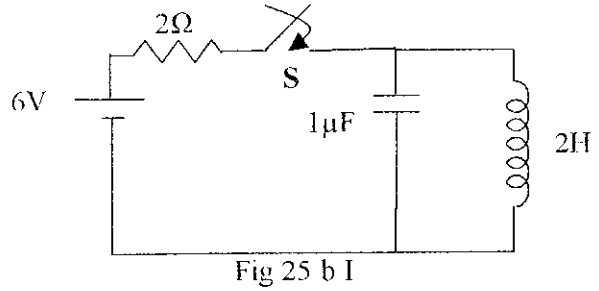


Fig 25 b I

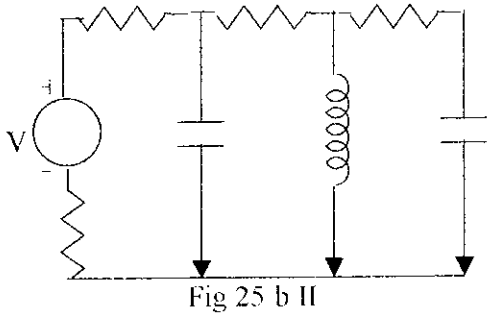


Fig 25 b II

(ii) Draw the graph of the given network shown in Fig 25 b II (6)

****