Dronacharya Group of Institution, Greater Noida

Department of APS, Even Semester (2014-15)

NEE-101

UNIT 1

1. *State the difference between following parameter.*
   - *(i) current –voltage*
   - *(ii) resistance-conductance*
   - *(iii) circuit-network*
   - *(iv) node-junction*
   - *(v) loop-mesh*
   - *(vi) active-passive element or active-passive network*
   - *(vii) bilateral-unilateral element/network*
   - *(viii) linear-nonlinear element/network*
   - *(ix) lumped-distributed element/network*
   - *(x) dc-ac source*
   - *(xi) series-parallel resistance*
   - *(xii) independent –dependent energy source*
   - *(xiii) current division – voltage division rule*
   - *(xiv) delta-star & star - delta transformation*
   - *(xv) source transformations, voltage to current & current to voltage*
   - *(xvi) ideal voltage & ideal current source and their V-I characteristics*
   - *(xvii) State the ohms law and its limitations.*
   - *(xviii) Source transformations*

2. *Find the total equivalent resistance of the network shown below across the open terminal*

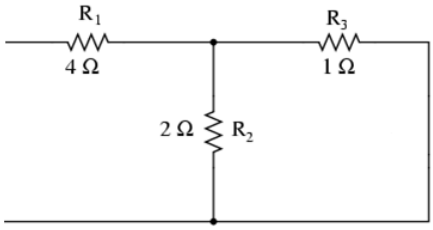


Fig.1.1 Ans:4.667 Ω

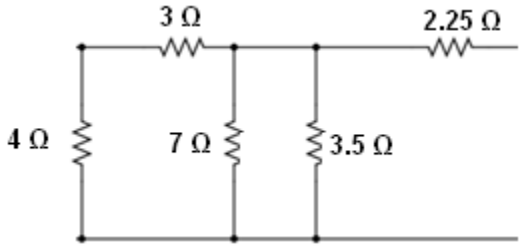
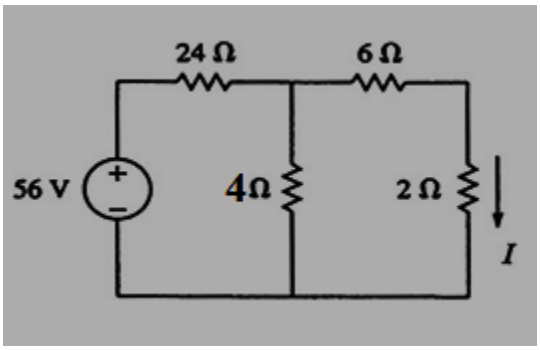
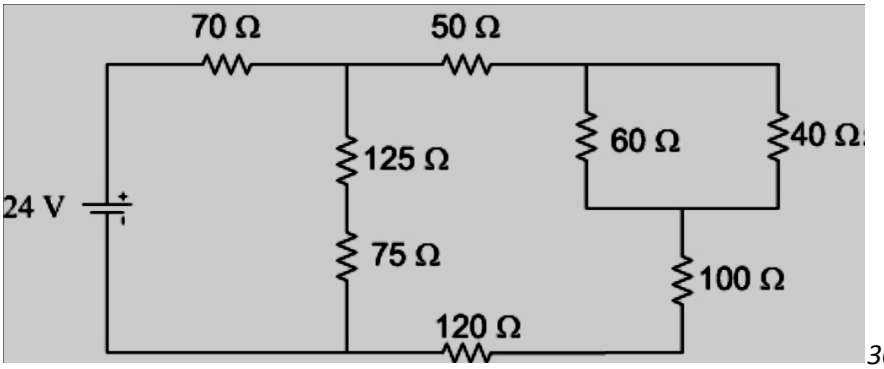


Fig.1.3 Ans: 4 Ω

3. *Three equal resistors each of 3ohm are connected in star. Find the value of resistors in equivalent delta.*
4. *Find the I through 2 ohm resistor*

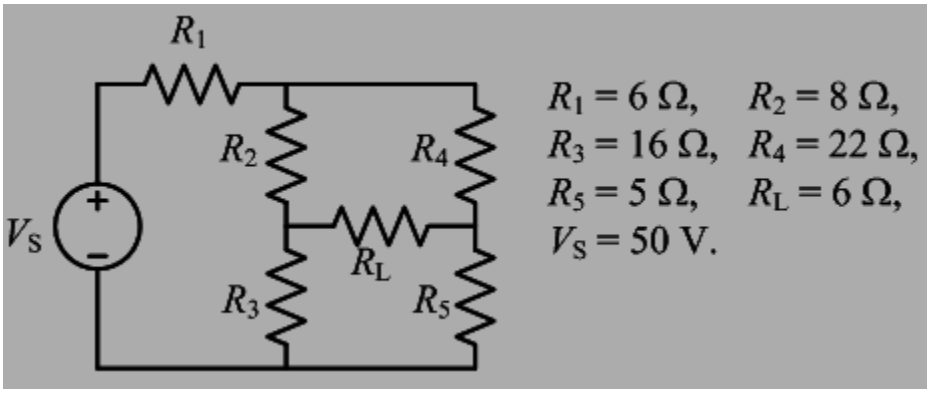


5. *Calculate the current through battery and 40 ohm resistor using ohms law and current divider.*

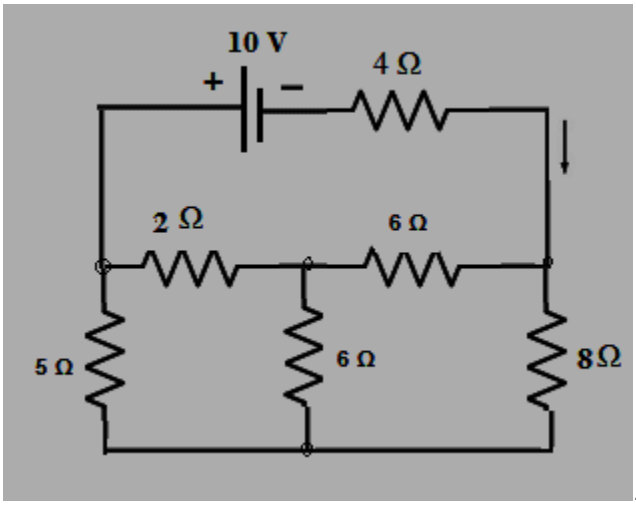


30.84 mA

6. *Find the current through the resistor R1 using delta to star transformations.*



7. *Find the current through 4 ohm resistor using star –delta transformations.*

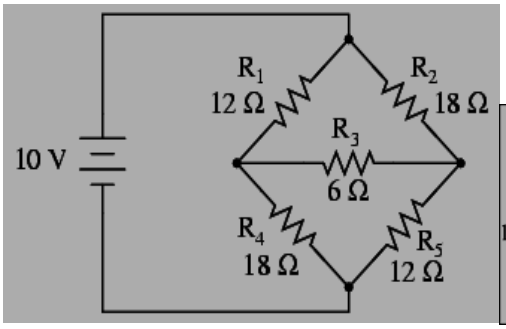


2.15 A

6. *State Superposition and Maximum power transfer theorem*

7. *Give expression for converting a star network to a delta network.*

8. *Find the power dissipated in 6Ω resistor in the circuit shown in figure-1 using Thevenin's Theorem.*



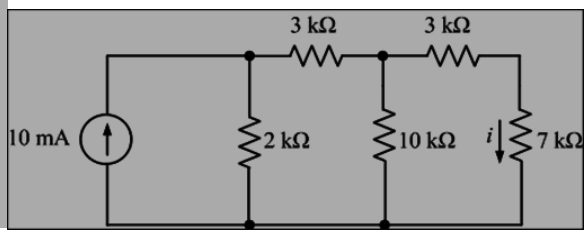
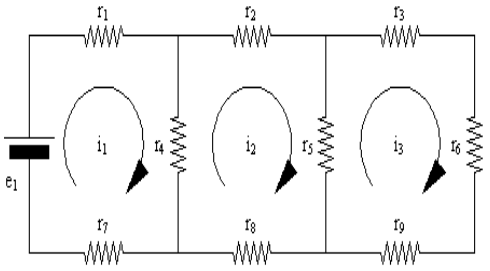


figure-1 *figure-2*

9 . Explain current division method. Find the current i through the 7kΩ resistor for the network shown in figure-2 using current division method.

10. Using Mesh Analysis find the mesh currents i1, i2 and i3 in figure-3

r1=10Ω r2=10Ω r3=10Ω r4=20Ω r5=10Ω r6=10Ω r7=5Ω r8=10Ω r9=20Ω and e1=16 V



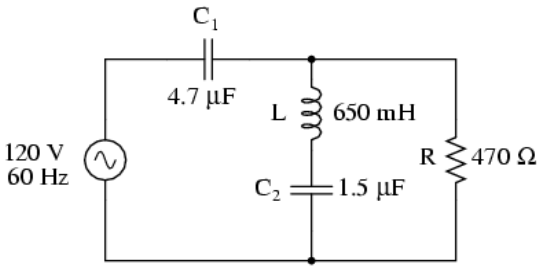
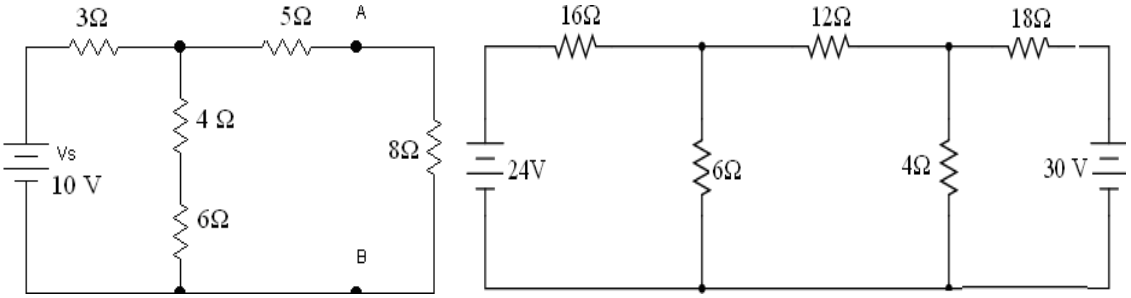


Figure-3 *figure-4*

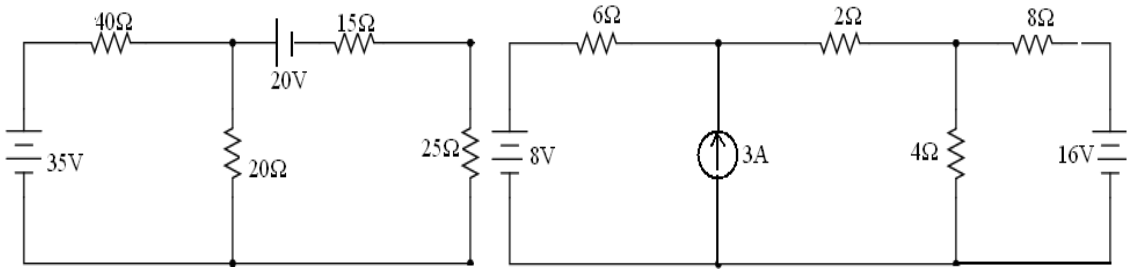
11 . Find the current flowing through capacitor C1 for the network shown in figure-4. Also calculate reactive power drawn by the circuit.

12.Using Thevenin theorem find the voltage across A-B for the electrical network shown in figure 1.

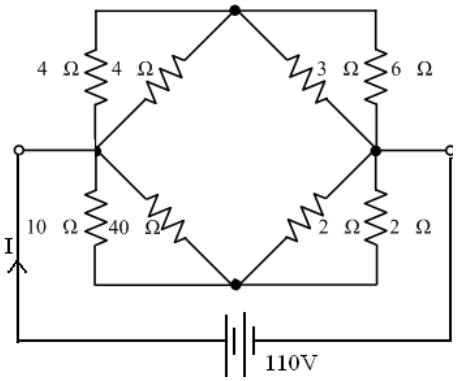


13. Find the current in 12 Ω using Nodal or Mesh analysis for the network in figure 2

14. Find the current through 20 Ω resistor using Superposition theorem for the network in figure 3



15.Find the current I delivered by the battery for the network shown in figure 3.



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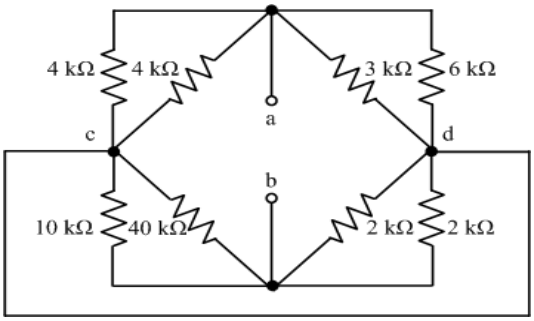
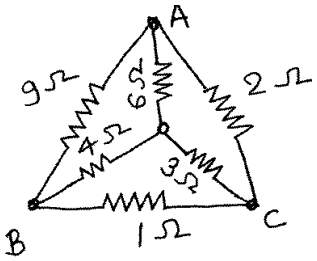
16. Obtain the equivalent resistance at terminals a-b



17. What is the utility of thevine theorem?

18. Compute equivalent resistance measured between terminals A & C in the circuit shown in fig.



19. State thevenin's theorem. Find the value of VTH across 320 Ωresistances in fig.4

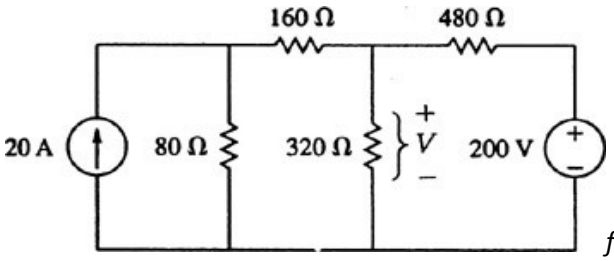


fig.4

20. What is superposition theorem? By taking any one example prove the superposition theorem.

UNIT 2

1. *Why series RLC resonance circuit is called voltage resonance?*
2. *Explain, in brief, active power, reactive power and apparent power.*
3. *What are advantages of 3-phase circuit over 1-phase circuit?*
4. *What is selectivity in resonance circuit?*
5. *10.A constant frequency sinusoidal voltage source of magnitude Vs is connected to series circuit made of 10.a resistance of 15 , a coil winding resistance R and an inductance L and a 50 μF capacitor. The voltage across 15 resistances is 30V, across the coil is 50V, across the capacitor is 40V. The voltage across the combination of 15 resistors and the coil together is 72.11V. Determine the values of inductance L, winding resistance R and the source voltage V.*
6. *What is resonance curve? . 2*
7. *Why series RLC resonance circuit is called voltage resonance? . 2*
8. *A 100 ohm resistance is carrying a sinusoidal current given by 3Cos wt. What is the value of average power? . 2*
9. *A choke coil of inductance L and a series resistance R is shunted by a capacitor C. What is the the value of dynamic impedance of the resonant circuit? . 2*
10. *A 100 ohm resistance is carrying a sinusoidal current given by 3Cos wt. What is the value of average power? . 2*
11. *If the bandwidth of a resonant circuit is 10 kHz and the lower half power frequency is 120 kHz, find out the value of the upper half power frequency and the quality factor of the circuit. .5*
12. *A voltage wave v(t) =141.4 sin 120 t produces a current i (t) =14.14 sin 120 t + 7.07 cos (120 t + 600) n a circuit. Determine (i) the resultant time expression of current (ii) the power factor and the power delivered by the source. .5*
13. *What is the power factor of an R-L-C circuit under resonant conditions?*
14. *What is meant of Q- factor of series circuit?*
15. *Why the series R-L-C circuit also called the accepter circuit?*
16. *What do you understand by the term bandwidth of a resonance circuit?*
17. *Give the properties of R-L-C series circuit and express it in terms of circuit parameter.*

18. *Explain in brief parallel resonance*
19. *Derive an expression for lower and upper frequencies for an R-L-C circuit.*
20. *Derive an expression for parallel resonance and mention its salient features.*

UNIT 3

1. *What are advantages of 3-phase circuit over 1-phase circuit? . 2*
2. *Explain, in brief, active power, reactive power and apparent power. 2*
3. *While measuring power in a three phase load by two wattmeter method, when the readings of the two wattmeters will be equal and opposite? . 2*
4. *Derive and explain the two wattmeter method of measurement of three phase power and power factor for a balanced star connected load.*
5. *In star connected system, find the phase difference between the line voltage VL and phase voltage Vph. .2*
6. *While measuring powe r in a three phase load by two wattmeter method, when the readings of the two wattmeters will be equal and opposite? .5*
7. *Discuss harming effects of low power factor in supply system. How can the power factor be improved? Explain with Phasor diagram. .5*
8. *A 400V, 3-phase source supplies power to both delta and wye (star) connected loads, connected in parallel. All the phase impedances are identical and equal to (5+j8.66) ohms. Compute total line current and power drawn from source. .5*
9. *A single phase energy meter has a constant speed of 1,300 revolutions/kWh. The disc revolves at 3.5 rpm when a load of 150 W is connected to it. If the load is on for 11 hours, how many units are recorded as error? What is the percentage error? .5*
10. *A voltage wave e (t) =141.4 sin 120 t produces a current i (t) =14.14 sin 120 t + 7.07 cos (120 t + 300) n a circuit. Determine (i) the resultant time expression of current (ii) the power factor and the power delivered by the source.*
11. *Three equal impedances, each consisting of Rand L in series are connected in star and are supplied from a 400 volts, 50 Hz, 3-phase,3-wire balance supply system. The power input to the load is measured by 2-wattmeter method and the two wattmeters read 3 KW and 1 KW. Determine the value of R and L connected in each phase.*
12. *Derive the relation between line voltage and phase voltage of an alternator.*
13. *Describing the following in case of measuring instruments, Deflecting torque, controlling torque, damping torque.*
14. *Describe a PMMC instrument in details. Also discuss it advantage and disadvantage.*
15. *What do you understand by ammeter shunt?*
16. *What do you understand by voltmeter multiplier ?*

UNIT 4

1. *What is Earthing. 2*
2. *Explain the PMMC instrument, also defined the deflecting torque.*
3. *A moving coil instrument having coil resistance of 4.5 ohms gives a full scale deflection of 30 mA.Find the value of resistance to be connected in parallel with this instruments to read up 2.5 A.*
4. *Write the notes on safety, Need of Earthing of equipment and devices, important electrical safety issues.*
5. *Compare electric and magnetic circuits with respect to their similarities and dissimilarities .2*
6. *A circular ring 20 cm in diameter has an air-gap 1 mm wide cut in it. The area of cross-section of the ring is 3.6 cm2. Calculate the value of the direct current needed in a coil of 1000 turns uniformly wound round the ring to create a flux of 0.5 m Wb in the air-gap. Neglect fringing and assume relative permeability for the iron as 650. .5*
7. *Explain the principle of operations of a single phase transformer. Where are they used.*
8. *Draw and explain the phasor diagram of transformer under loaded conditions.*
9. *What is meant by equivalent resistance of a transformer with refer to (a) primary (b) secondary.*
10. *What is an auto transformer? How does it differs from conventional two winding transformer?*

UNIT 5

1. *Explain why single –phase induction motor is not self-starting and enlist different methods used to produce starting torque in such motors.*
2. *What is the function of commutaor in DC Machines? 2*
3. *What are types of armature winding? . 2*
4. *Find the condition for the maximum efficiency in a transformer. . 2*
5. *An induction motor having 8 poles runs at 727.5 rpm. If the supply frequency is 50 Hz, what is the frequency of emf of the rotor?*
6. *Compare a resistor split phase motor with a capacitor start 1-phase Induction Motor.*
7. *Drive an expression for torque of a DC motor and emf in DC generator. Draw and explain the torque–speed, torque-current and speed-current characteristics of a dc shunt motor. .5*
8. *Three phase induction motor is self-starting but three phase synchronous motor is not self-starting. Explain. Draw V –curves and give application of 3-phase synchronous motor. .5*

9. *A 3-phase, 50 Hz induction motor has 6 poles and operators with a slip of 5% at a certain load. Determine (i) the speed of the rotor with respect to the stator. (ii) the frequency of the rotor current.(iii) the speed of the rotor magnetic field with respect to rotor.(iv) the speed of the rotor magnetic field with respect to stator and (v) the speed of the rotor magnetic field with respect to the stator magnetic field.*

10. *A 250 V dc shunt motor having an armature resistance of 0.25 carried an armature current of 50A and runs at 750 rpm. If the fiux is reduced by 10 %, find the speed. Assume that the torque remains the same.. .5*
11. *A 4-pole dc shunt generator with lap-connected armature has field and armature resistances of 110 and 0.2 ohm respectively. It supplies power to 50 lamps rated for 100 volts, 60 watts each. Calculate the total armature current and the generated emf by allowing a contact drop of 1 volt per brush. .5*

12. *A 4-pole dc shunt generator with lap-connected armature has field and armature resistances of 80 and 0.1 respectively. It supplies power to 50 lamps rated for 100 volts,60 watts each. Calculate the total armature current and the generated emf by allowing a contact drop of 1 volt per brush.*