



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : EMT (15A01301)

Course & Branch: B.Tech - CE

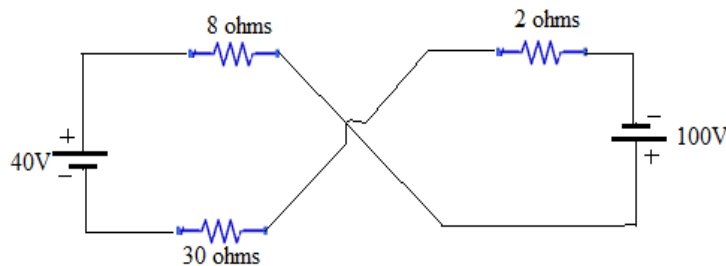
Year & Sem: II-B.Tech & I-Sem

Regulation: R15

UNIT – I
Introduction to DC and AC circuits

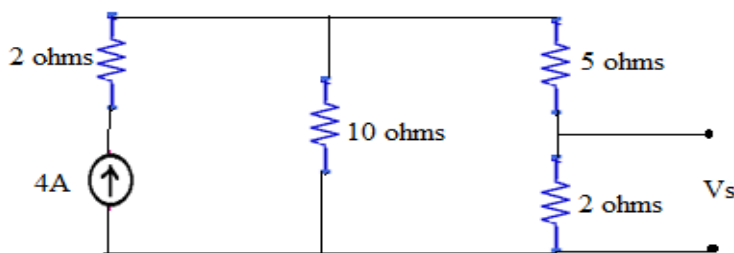
1. a) State and explain Kirchoff's Laws [L1,L2] 5*2=10M

b) In the circuit given, find current and voltage across 30Ω resistor [L4]

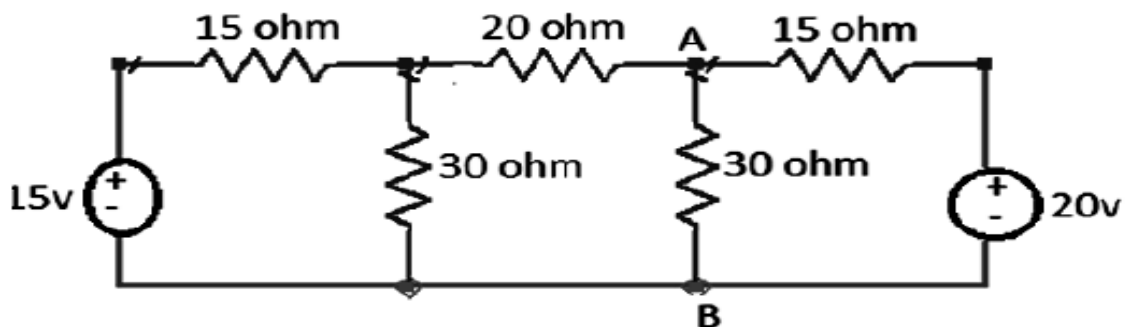


2. a) Explain ideal and practical independent sources[L2] 5*2=10M

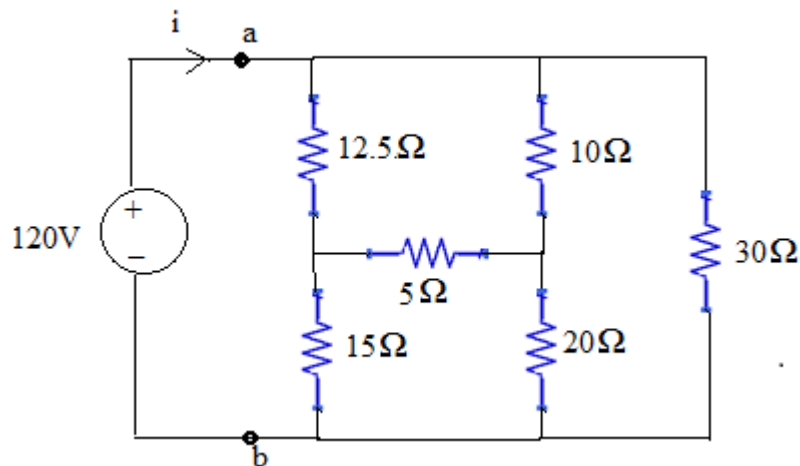
b) Determine the current in the 10 ohm resistance and find V_s in the circuit shown.[L4]



3. a) Determine the current in branch A-B.[L4] 5*2=10M

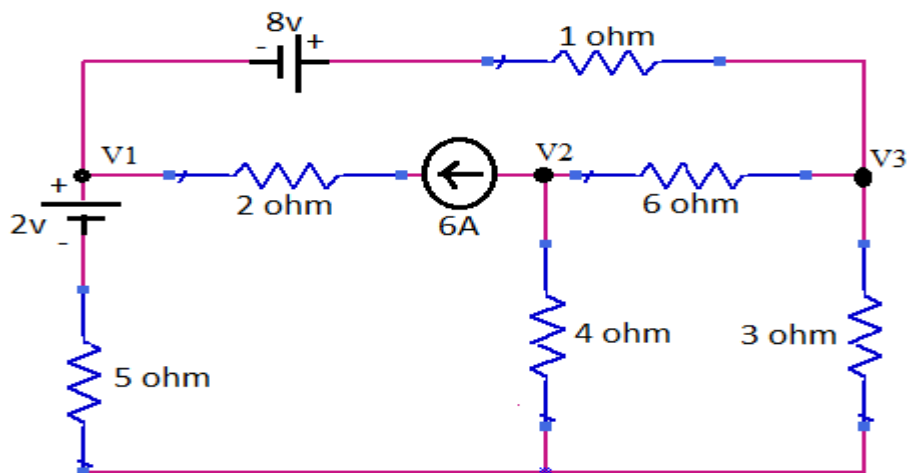


b) Obtain the equivalent resistance R_{ab} for the circuit and use it to find the current i [L4]



4. Find the average and effective value of a 50 Hz pure sine wave of maximum value 10M 2V and determine the (i) peak to peak value (ii) Peak factor (iii) form factor (iv) instantaneous value at 10 ms (v) instantaneous value at $\pi/2$ radians.[L1,L4]

5. a) Using nodal analysis find the node voltages V_1 , V_2 and V_3 from the below circuit[L3] 5*2=10M



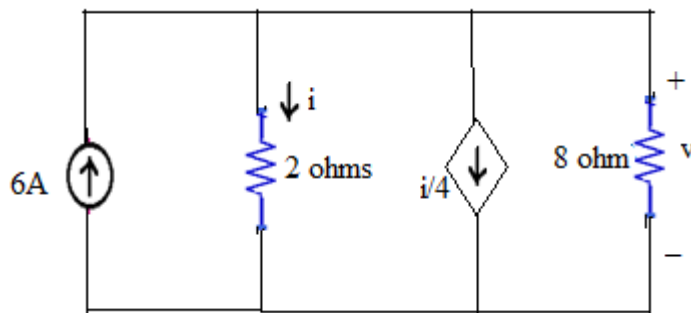
b) When a DC voltage is applied to a capacitor, the voltage across its terminals is found to build up in accordance with $V_c = 500(1 - e^{-100t})$. After a lapse of 0.01s, the current flow is equal to 2mA.

- i) Find the value of capacitance in microfarads.
- ii) How much energy is stored in the electric field at this time.[L4]

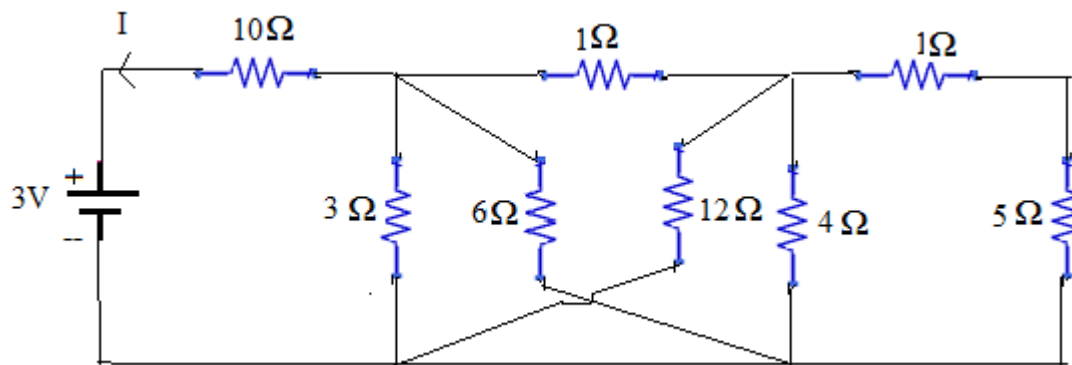
6. Using star to delta and delta to star transformation derive the resistance equations.[L4] 10M

7. a) Find v , i and also prove that total power in the circuit is zero [L2,L4]

5*2=10M

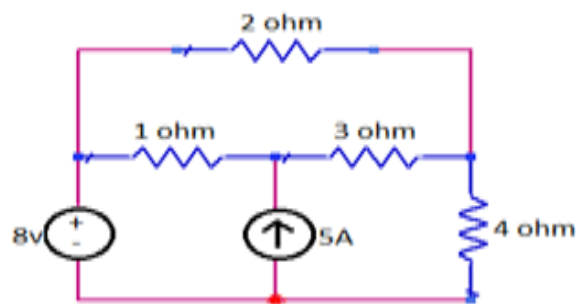


b) Find the equivalent conductance G_{eq} for the circuit shown in figure and also find the total current I and voltage across 3 ohm resistor [L4]



8. a) Find the node voltages for the circuit shown below by Nodal Analysis [L3]

5*2=10M



b) Find the form factor and peak factor of the half wave rectified sine wave of $V_m = 10V$ [L4]

$$v = V_m \sin \omega t \quad \text{for } 0 < \omega t < \pi$$

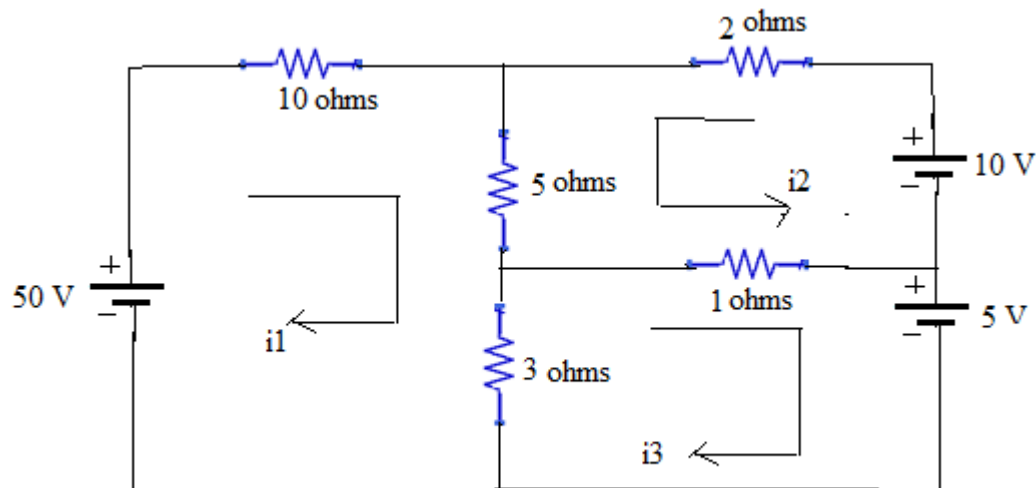
$$v = 0 \quad \text{for } \pi < \omega t < 2\pi$$

9. a) Write short notes on i) voltage ii) current iii) Energy iv) Inductance.

5*2=10M

v) Capacitance [L1]

b) Apply KVL and determine the mesh current i_2 in the circuit shown. [L3]



10. a) What is current division rule[L1]

2M

b) What is power and law of conservation of energy [L1]

2M

c) A energy source forces a constant current of 2A for 10s to flow through a lightbulb.

If 2.3 KJ is given off in the form of light and heat energy, calculate the voltage drop across the bulb[L4]

2M

d) Write down any two properties of a capacitor[L1]

2M

e) A sine wave has a frequency of 60 KHz. How many cycles does it complete in 20ms? [L4]

2M

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UNIT – I

Introduction to DC and AC circuits

1. The peak factor of a pure sinusoidal wave is []
A) 1.414 B) 1 C) 1.11 D) Zero
2. The unit of conductance is []
A) Henry B) Farads C) Seimens D) ohm
3. The potential difference between two points is given by []
A) dw/dt B) dw/dq C) dq/dt D) dt/dq
4. The algebraic sum of power at any instant of time must be []
A) Zero B) -1 C) 1 D) None
5. The dependent sources are usually designated by _____ shaped symbols []
A) square B) rectangle C) Diamond D) None
6. The unit of voltage controlled current source is []
A) Volts B) Joules C) ohms D) Amperes
7. Which of the following will remain the same in all parts of a series circuit? []
A) Voltage B) Current C) Power D) Resistance
8. If the peak value of the sine wave is 5V, what is the rms value? []
A) 0.707V B) 3.535V C) 5V D) 1.17 V
9. What is the average value of the sine wave over a full cycle? []
A) V_m B) $\frac{V_m}{\sqrt{2}}$ C) Zero D) $\sqrt{2}V_m$

10. Which of the following will remain the same in a parallel circuit? []
A) Voltage B) Current C) Power D) Resistance
11. The unit of energy is []
A) Watts/sec B)Watt-hours C)Watts/hours D) Watt-sec
12. Which is not a passive element in the options given below? []
A) Resistors B) Inductors C) Generators D) Capacitance
13. The element that acts as short circuit to d.c is []
A) Inductor B) Resistor C) Capacitor D)Voltage source
14. A short circuit will have []
A) a small current flow B) a large current flow
C) no current flow D) some current flow
15. Kirchhoff's second law is based on law of conservation of []
A) charge B) energy C) momentum D) mass.
16. The charge on an electron is known to be 1.6×10^{-19} coulomb. In a circuit the current flowing is 1 A. How many electrons will be flowing through the circuit in a second. []
A) 1.6×10^{19} B) 1.6×10^{-19} C) 0.625×10^{19} D) 0.625×10^{12}
17. The number of cycles per second is called []
A) Time period B) frequency C) both A&B D) none
18. The combined resistance of two equal resistors connected in parallel is equal to []
A) One half the resistance of one resistor. B) Twice the resistance of one resistor.
C) Four times the resistance of one resistor. D) One fourth the resistance of one resistor.
19. Current is considered as the movement of []
A) electrons B) protons C) charge D) nuclei
20. A network that does not have either voltage or current sources is called []
A) Active network. B) Passive network.
C) Resistive network. D) Dummy network.
21. Which of the following is not the same as watt? []

- A) joule/sec
B) amperes/volt
C) amperes x volts
D) (amperes)² x ohm
22. One kilowatt hour of electrical energy is the same as []
A) 36×10^5 watts
B) 36×10^5 ergs
C) 36×10^5 joules
D) None.
23. A circuit contains two un-equal resistances in parallel []
A) current is same in both
B) potential difference across each is same
C) large current flows in larger resistor
D) smaller resistance has smaller conductance.
24. A 2 mH, a 3.3 mH, and a 0.2 mH inductor are connected in series. The total inductance is []
A) 10.2 mH
B) 55 mH
C) 5.5mH
D) 12mH
25. The current through a 120 mH coil is changing at a rate of 150 mA/s. The voltage induced across the coil is []
A) 1.8 mV
B) 2.5 mV
C) 180mV
D) 18mV
26. A 0.1 μ F and 0.3 μ F capacitors are connected in parallel. The total capacitance is []
A) 0.4 μ F
B) 0.075 μ F
C) 0.075 nF
D) 0.4nF
27. A 2 mH and 3.3 mH inductor are connected in parallel. The total inductance is []
A) 5.3 mH
B) 12.45 mH
C) 1.245 mH
D) 0.1245mH
28. A 0.1 μ F, 0.3 μ F and 0.2 μ F capacitors are connected in series. The total capacitance is []
A) 55 nF
B) 55 μ F
C) 55 mF
D) 55F
29. The capacitor stores energy in []
A) Electrostatic field
B) Electric field
C) Electromagnetic field
D) magnetic field
30. The inductor stores energy in []
A) Electrostatic field
B) Electric field
C) Electromagnetic field
D) magnetic field
31. Kirchhoff's first law is based on law of conservation of []

- A) charge B) energy C) momentum D) mass.
32. The capacitor acts as a []
A) open circuit to d.c B) short circuit to d.c
C) open circuit to a.c D) short circuit to a.c
33. In a Pure Resistor, the voltage is []
A) In phase with the current B) is out of phase with the current
C) lags behind the current by 90° D) leads the current by 90°
34. If the current flowing in the 2H inductor is 1A, what is the energy stored? []
A) 1 J B) 3 J C) 2 J D) 4 J
35. If the voltage across the 1F capacitor is 2V, what is the energy stored? []
A) 1 J B) 3 J C) 2 J D) 4 J
36. The period of a sin wave is 20ms. What is the frequency? []
A) 20Hz B) 15Hz C) 50Hz D) None
37. The peak value of a sine wave is 20 volts. The instantaneous voltage at a point $\pi/4$ []
radians along horizontal axis is given by
A) 3 V B) 10 V C) 12 V D) 14.14 V
38. A 60 mH, a 120 mH, and 75mH inductors are connected in parallel. The total []
inductance is
A) 9.9 mH B) 40 mH C) 36 mH D) 26 mH
39. Which of the following is not an electrical quantity []
A) Voltage B) Current C) Distance D) Power
40. _____ is the measure of heating effect of the wave []
A) average value B) peak value
C) rms value D) instantaneous value

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