1. What is meant by charge?

Charge is an electrical property of the atomic particles which matter consists. The charge of an electron is so small. Charge in motion represents current. The unit of charge is coulomb.

2. What is meant by Current?

The flow of free electrons in a conductor is called current. Unit is ampere (A).

$I = Q/t$

3. What is meant by Voltage?

The poterntial difference between two points is called as voltage. Unit is Volts (V).

$V=W/Q$, W=work done in joules & Q = charge in coulombs

4. State Ohm's Law.

The potential difference across any two ends of a conductor is directly proportional to the current flowing between the two ends provided the temperature of the conductor remains constant.

5. State Krichoff's Voltage Law

KVL states that the algebraic sum of voltages in a closed path is zero.

6. S**tate Krichoff's current Law.**

KCL states that the algebraic sum of currents in a node is zero.

7. An Electric iron is rated 1000W, 240V. Find the current drawn & resistance of the heating element. $P=V^2/R$; $R= 240^2/1000 = 57.6\Omega$ and I= V/R =240/57.6 = 4.166 A

8. Give notes on Nodal Analysis.

• KCL is used.

• No: of equations = n-1, n=no: of nodes

9. Distinguish between a Loop & Mesh of a circuit (DEC, '10)

The closed path of a network is called a Loop. An elementary form of a loop which cannot be further divided is called a mesh. In other words Mesh is closed path does not contain an other loop within it.

10. Give notes on Mesh Analysis.

• KVL is used

• Here mesh currents are found.

11. Give short notes on resistor.

It is a property of a substance3 which opposes the flow of electrons. It is denoted by R and its unit is Ohm (Ω)

12. Distinguish between a Branch and a node of a circuit.

A pair of network which connects the various points of the network is called branch

A point at which two or more elements are joined together is called node.

13. Distinguish between a mesh and a loop of a circuit.

A mesh is a loop that does not contain other loops. All meshes are loop, but all loops are not meshes.A loop is any closed path of branches

14. **Limitations of Ohm's Law**

• Ohm"s law is not applicable in unilateral networks. Unilateral networks allow the current to flow in one direction. Such types of network consist of elements like a diode, transistor, etc.

• It is not applicable for the non-linear network (network containing non-linear elements such as electric arc etc). In the nonlinear network, the parameter of the network is varied with the voltage and current. Their parameter likes resistance, inductance, capacitance and frequency, etc., not remain constant with the times. So ohms law is not applicable to the nonlinear network. Ohm"s law is used for finding the resistance of the circuit and also for knowing the voltage and current of the circuit.

15. Define D.C. source ,AC Source

DC Source: Any source that produces direct voltage continuously and has ability to deliver direct current is called d.c. source such as batteries and generators etc.

 A.C. source: Any source that produces alternating voltage continuously and has ability to deliver the alternating current is called a.c. source such as alternators, oscillators or signal generators.

16.Write About Independent and dependent sources

There are two types of sources- Voltage source and current source. Sources can be either independent or dependent upon some other quantities. Independent voltage/ current source: The voltage (a.c or d.c.) does not dependent on other voltages or current in the circuit. Symbol for independent voltage and current source Examples of independent voltage source batteries and generators. Examples of independent current source.

17.Difference between Series and Parallel Circuits.

Difference Between Series and Parallel Circuits	
Series	**Parallel**
The same amount of current flows through all the components	The current flowing through each component combines to form the current flow through the source.
In an electrical circuit, components are arranged in a line	In an electrical circuit, components are arranged parallel to each other
When resistors are put in a series circuit, the voltage across each resistor is different even though the current flow is the same through all of them.	When resistors are put in a parallel circuit, the voltage across each of the resistors is the same. Even the polarities are the same
If one component breaks down, the whole circuit will burn out.	Other components will function even if one component breaks down, each has its own independent circuit
If V_t is the total voltage then it is equal to $V_1 + V_2 + V_3$	If V_t is the total voltage then it is equal to $V_1 = V_2 = V_3$

18. What is the difference between ideal and practical source?

Ideal Voltage source don't have a internal resistance, thus output voltage is constant independent of load. On the other hand, Practical voltage source do have a internal resistance which results in reduced effective output voltage during a high current load.

19. What is an ideal source?

(a)   (b)
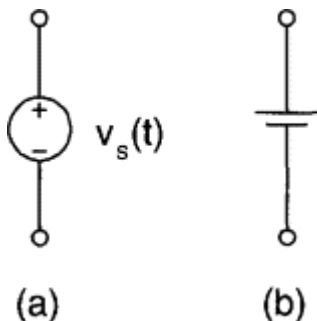
By definition, an ideal voltage source is a two-terminal element with the property that the voltage across the terminals is specified at every instant in time. This voltage does not depend on the current through the source. That is, any current in any direction could possibly flow through the source.

20. What is a practical voltage source example?

A voltage source is a device that is connected to a two-terminal circuit and maintains a constant pressure to allow electrons (electric current) to move through the circuit. Cells, batteries, generators, and other devices that can generate voltage are common practical examples of voltage sources.

UNIT-2

1.What are the three types of power used in AC circuits?
i) Real or Active or True power P=EI cosθ ii) Reactive power Q=EI sinθ iii)Apparent power S=EI

9. Define Real power.
The actual power consumed in an AC circuits is called real power. And P=EI cosθ

10. Define Reactive power.
The power consumed by the pure reactance (Xl or Xc) in an AC circuit is called reactive power. The unit is VAR. and Q=EI sinθ

11. Define Apparent power and Power factor.
The Apparent power (in VA) is the product of the rms values of voltage and current. S = Vrms Irms The Power factor is the cosine of the phase difference between voltage and current. It is also the cosine of theload impedance. And Power factor = cos φ The pf is lagging if the current lags voltage (inductive load) and is leading when the current leads voltage(capacitive load).

12. What is meant by Complex power?
Complex power (in VA) is the product of the rms voltage phasor and the complex conjugate of the rms current phasor. As a complex quantity, its real part is real power, P and its imaginary part is reactive power, Q. and S = P + jQ

13. What are the advantages of 3 phase circuits over single phase circuits?

1. Generation, transmission and distribution of 3 phase power is cheaper 2. More efficient 3. Uniform torque production occurs

14. State the relationship between line voltage & phase voltage and line current & phase current of a 3phase delta connected system.

$V_{ph} = V_L$; $I_{ph} = I_L / \sqrt{3}$

15. State the relationship between line voltage & phase voltage and line current & phase current of a 3phase star connected system.

$V_{ph} = V_L / \sqrt{3}$; $I_{ph} = I_L$

16. Write the expression for the instantaneous values of emfs in a 3 phase circuit.

$V_R = V_m \sin wt$; $V_Y = V_m \sin (wt-120^0)$; $V_B = V_m \sin (wt-240^0)$

17.Give some method available for measuring three-phase power.

i. Single wattmeter method. 2. Two-wattmeter method. 3. Three-wattmeter method.

18. Define power factor.

Power factor is defined as the cosine of angle between voltage and current. If φ is the angle between voltageand current then $\cos \varphi$ is called as the power factor. 19. Explain the concept of balanced load

19 Give notes on Nodal Analysis.

• KCL is used.

• No: of equations = n-1, n=no: of nodes

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25. Define line currents and phase currents?

• The currents flowing in the lines are called as line currents

• The currents flowing through phase are called phase currents

26. Define line voltage and phase voltage?

The voltage across one phase and neutral is called line voltage & the voltage between two lines is called phase voltage

27. Give the phase value & Line value of a star connected system.

$$V_L = \sqrt{3}V_{ph}$$

28. Give the phase value and line valued of a delta connected system.

29. What is the power equation for a star connected system?

$$P = \sqrt{3}I_L V_L \cos\Phi \ W$$

30. What is the power equation for a delta connected system?

$$P = \sqrt{3}\, I_c V_c \cos\Phi \; W$$

31. What is meant by Real power?

Real power means the useful power transfer from source to load. Unit is watts.

32. What is meant by apparent power?

Apparent power is the product of voltage and current and it is not true power. Unit is VA

33. What is reactive power?

If we consider the circuit as purely inductive the output power is reactive power. Its unit is VAR