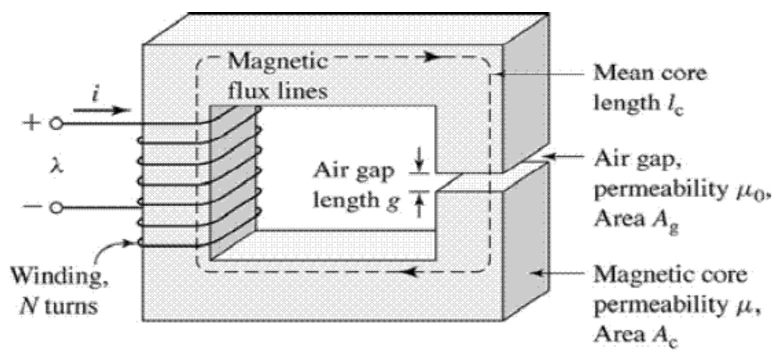
	https://shikshamentor.com/basic-electrical-electronics-engg-for-msbte-k-scheme/ **312302 - Basic Electrical & Electronics Engg (BEE-Sem II)** **As per MSBTE's K Scheme** **CO / CM / IF / AI / AN / CW / DS**

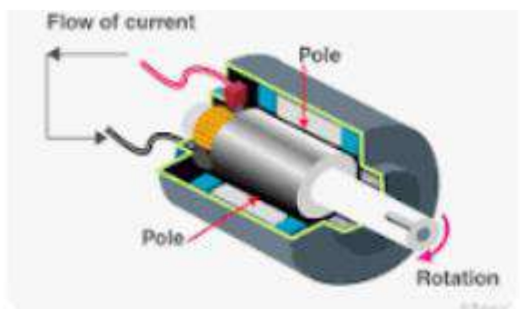
Unit I	**Basic Electrical Fundamentals**	**Marks - 14**
S. N.	**MSBTE Board Asked Questions**	**Marks**
1.	**Permeability in a magnetic circuit corresponds to ....in an electric circuit** **A. Resistance** **B. Resistivity** **C. Conductivity** **D. Conductance** **Answer- C. Conductivity** **Explanation: For electric circuits we define conductance for magnetic circuits we define Permeability.**	**1M**
2.	**Those magnetic materials are best suited for making armature and transformer cores which have ....permeability and ....hysteresis loss** **A. High, high** **B. Low, high** **C. High, low** **D. Low, low** **Answer- C. High, low**	**1M**

	E Explanation: For making transform cores the permeability of material should be high hysteresis loss should be low	
3.	**The property of a material which opposes the creation of magnetic flux in it is known as** **A. Reluctivity** **B. Magnetomotive force** **C. Permeance** **D. Reluctance** **Answer- D. Reluctance** **Explanation: Reluctance is defined as the opposition of magnetic flux in magnetic circuit.**	**1M**
4.	**The unit of magnetic flux is** **A. Henry** **B. Weber** **C. Ampere-turn/weber** **D. Ampere/meter** **Answer- B. Weber** **Explanation: The total number of magnetic lines of force in a magnetic field is called as magnetic flux & its unit is Weber (wb)**	**1M**
5.	**The unit of reluctance is** **A. Meter/henry** **B. Henry/meter** **C. Henry** **D. 1/henry** **Answer-D. 1/henry** **Explanation: The unit of reluctance is ampere-turns per weber i.e 1/Henry.**	**1M**

6.	**Reciprocal of reluctance is** **A. Reluctivity** **B. Permeance** **C. Permiability** **D. Susceptibility** **Answer- B. Permeance** **Explanation: Permeance is reciprocal of reluctance is a measure of magnetic flux for a number of current turns in a magnetic circuit.**	**1M**
7.	**Conductivity is analogous to** **A. Retentivity** **B. Resistivity** **C. Permeability** **D. Inductance** **Answer- C. Permeability** **Explanation:Conductivity of a metallic wire is defined as its ability to allow electric charges or heat to pass through it. It is analogous to permeability. Permeability is the measure of magnetization produced in a material in response to an applied magnetic field.**	**1M**

8.	An air gap is usually inserted in magnetic circuits to A. Increase m.m.f B. Increase the flux C. Prevent saturation D. None of the above Answer-C. Prevent Saturation Explanation: An air gap is usually inserted in magnetic circuits to Prevent saturation. One of main reasons for an Air Gap is to increase the reluctance of the magnetic circuit. The amount of air or another non-magnetic material like a fibre plate or fibre board increases the reluctance of the circuit, thereby increasing the amount of current that we could put in a coil before we reach saturation. Also, the air gaps help the magnetic flux to expand outside the magnetic circuit. 	1M
9.	Magnetic effect of current was discovered by A. Oersted B. Faraday C. Bohr D. Ampere Answer- A. Oersted Explanation: Oersted showed that electricity and magnetism were related phenomena.	1M

10.	**Inside the magnet, the field lines moves** **A. From north to south** **B. from south the north** **C. away from south pole** **D. away from north pole** **Answer: - A. From north to south** **Explanation: According to properties of Magnetic field inside the magnet moves from south to north pole.**	**1M**
11.	**Direction of rotation of a coil in electric motor is determined by** **A. fleming's right hand rule** **B. fleming's left hand rule** **C. faraday law of electromagnetic inductors** **D. None of above** **Answer: - B. Fleming's left hand rule** **Explanation: The Fleming'sleft-hand rule is used to help remember the direction of the magnetic field, the direction of the current, and the direction of magnetic thrust force when a conducting rod is introduced to a magnetic field. It is commonly used to determine the direction of motion of an electric motor.**	**1M**
12.	**We can induce the current in a coil by** **A. moving the coil in a magnetic field** **B. by changing the magnetic field around it** **C. by changing the orientation of the coil in the magnetic field** **D. All of above** **Answer: A. moving the coil in a magnetic field** **Explanation: The method can be used to induce the potential difference across the ends of a coil and hence to induce the**	**1M**

	current.	
13.	A D.C generator works on the principle of A. ohnis law B. Joule's law of heating C. faraday's law of electromagnetic induction. D. none of the above Answer: C. Faraday's law of electromagnetic induction. Explanation: DC generators generate electricity using the principle of Faraday's law of electromagnetic induction. When a conductor is placed in a varying magnetic field, an electromotive force gets induced within the conductor. 	1M
14.	Which among the following is true about Faraday's law of Induction? A. An emf is induced in a conductor when it cuts the magnetic flux B. An emf is induced in a conductor when it moves parallel to the magnetic field C. An emf is induced in a conductor when it moves perpendicular to the magnetic field D. An emf is induced in a conductor when it is just entering a magnetic field Answer: A. An emf is induced in a conductor when it cuts the magnetic flux	1M

	Explanation: According to Faraday's law of electromagnetic induction, an emf is induced in a conductor when it cuts across the flux of a magnetic field. If the two ends of the conductor are connected to an outside circuit, the induced emf causes current to flow in the circuit.	
15.	**What is proportional to the magnitude of the induced emf in the circuit?** **A. Rate of change of current in the circuit** **B. Rate of change of resistance offered** **C. Rate of change of magnetic flux** **D. Rate of change of voltage** **Answer: C. Rate of change of magnetic flux** **Explanation: The magnitude of induced emf is equal is equal to the time rate of change of magnetic flux. It is mathematically expressed as:** **ε = −dϕdt** **The negative sign indicates the direction of the emf induced. This is Faraday's second law of electromagnetic induction.**	**1M**
16.	**Faraday's laws are result of the conservation of which quantity?** **A. Momentum** **B. Energy** **C. Charge** **D. Magnetic field** **Answer: B. Energy** **Explanation: Faraday's laws are result of the conservation of energy. These laws are based on the conversion of electrical energy into mechanical energy. Mechanical energy can be converted into electrical energy such as in the example of a dynamo. In the same way, electrical energy can be converted**	**1M**

	into mechanical energy such as in the example of electric motor. Both of the above examples work on the principle of Faraday's law.	
17.	**The induced emf persists only as long as the change in magnetic flux continues.** **A. True** **B. False** **Answer: A. True** **Explanation: According to Faraday's first law, whenever the amount of magnetic flux linked with a circuit changes, an emf is induced in the circuit. This induced emf persists as long as he change in magnetic flux continues. Therefore, this is a true statement.**	**1M**
18.	**The polarity of induced emf is given by** **A. Ampere's circuital law** **B. Biot-Savart law** **C. Lenz's law** **D. Fleming's right hand rule** **Answer: C. Lenz's law** **Explanation: Lenz's law is used to measure the polarity of induced e.m.f. Ampere's law correlates with the magnetic field induced in a coil. Biot–Savart law describes the magnetic field generated by a constant electric current. Fleming's right-hand rule gives the estimate that in which direction the current will flow.**	**1M**
19.	**When an insulated wire coil is connected to a battery, the pointer of the galvanometer is deflected due to** A. **the induced current produced** B. **the coil acts like a magnet** C. **the number of turns in the coil of the galvanometer is changed** D. **None of these**	**1M**

	Answer: A. the induced current produced **Explanation: A galvanometer measures the amount of current flowing through the circuit. In a current flowing conductor connected to a battery, the pointer of the galvanometer fluctuates and points to the amount of current flowing. Thus a galvanometer measures the amount of induced current in the circuit.**	
20.	**Give the SI unit of self-inductance.** **A. Farad** **B. Ampere** **C. Henry** **D. Maxwell** **Answer: C. Henry** **Explanation: The self-inductance of a coil is said to be one henry if an induced emf of one volt is set up in it when the current in it changes at the rate of one ampere per second. Self-inductance is defined as the induction of a voltage in a current-carrying wire when the current in the wire itself is changing.**	**1M**
21.	**Mutual inductance is called the inertia of electricity.** **A. True** **B. False** **Answer: B. False** **Explanation: Self-induction of a coil is that the property by which it tends to take care of the magnetic flux linked with it and opposes any change within the flux by inducing a current in it. This is the reason why self-induction is named inertia of electricity.**	**1M**
22.	**What is the self-inductance of the coil, if the magnetic flux of 10 microwebers is linked with a coil when a current of 5 mA flows through it?** **A. 20 mH**	**1M**

	B. 5 mH C. 2 mH D. 250 mH Answer: C Explanation: Self-inductance = Magnetic flux x Current Self-inductance = 10×10 ^-6 X 5×10^-3 Self-inductance = 2×10^{-3} H Self-inductance = 2mH	
23.	What are the positive and negative terminals of direct current (DC) known to have? A. fixed polarity B. no polarity C. always negative polarity D. variable polarity Answer:A. Fixed polarity Explanation: The direction and magnitude of the current, in a Direct Current (DC), do not change. Simply, both positive and negative terminals of a battery are always positive and negative. Therefore, the current that flows always is in the same direction between both terminals. Examples: Fuel cells, Batteries, and Solar cells	1M
24.	The peak value of alternating supply is 600 V. What is its rms voltage? a. 410 V b. 312.5 V c. 424.3 V d. 130 V Answer: C. 424.3 V Explanation: Given, the peak value of alternating voltage,	1M

	V_0 = 600 V We have, rms voltage, $V_{rms} = V_0/\sqrt{2}$ = 600/1.414 = 424.3 V	
25.	Find the average value of current when the current that are equidistant are 4A, 5A and 6A. A. 5A B. 6A C. 15A D. 10A Answer: A. 5A Explanation: The average value of current is the sum of all the currents divided by the number of currents. Therefore average current = (5+4+6)/3=5A.	1M
26.	RMS stands for ________ A. Root Mean Square B. Root Mean Sum C. Root Maximum sum D. Root Minimum Sum Answer: A. Root Mean Square Explanation: RMS stands for Root Mean Square. This value of current is obtained by squaring all the current values, finding the average and then finding the square root.	1M
27.	What is the effective value of current? A. RMS current B. Average current C. Instantaneous current D. Total current Answer: A. RMS current Explanation: RMS current is also known as the effective current. RMS stands for Root Mean Square. This value of current is obtained by squaring all the current values, finding the average and then finding the square root.	1M

28.	In a sinusoidal wave, average current is always _______ rms current. A. Greater than B. Less than C. Equal to D. Not related Answer: B. Less than Explanation: The average value of current is the sum of all the currents divided by the number of currents whereas RMS current is obtained by squaring all the current values, finding the average and then finding the square root. Hence RMS current is greater than average current.	1M
29.	For a rectangular wave, average current is ______ rms current. A. Greater than B. Less than C. Equal to D. Not related Answer: C. Equal to Explanation: The rms value is always greater than the average except for a rectangular wave, in which the heating effect remains constant so that the average and the rms values are the same.	1M
30.	The Unit of Magnetic Flux is A. Tesla B. Weber C. Weber - metre D. None of the above Answer: - B. Weber Explanation: The SI unit of magnetic flux is Weber (Wb) or tesla meter squared (Tm^2) named after German physicist Wilhelm Weber.	1M

31.	**EMF Stands for** **A. Electromechanical force** **B. Electromagnetic l force** **C. Electromotive force** **D. None of the above** **Answer: - C. Electromotive force** **Explanation: Electromotive force is defined as the electric potential produced by either an electrochemical cell or by changing the magnetic field. EMF is the commonly used acronym for electromotive force.**	**1M**
32.	2) **Volt is equal to** **A. Joule/Coulomb** **B. Ampere/Seconds** **C. Joule/Seconds** **D. Coulomb/Seconds** **Answer: - A. Joule/Coulomb** **Explanation: One Volt is equal to 1 Joule/Coulomb. There are many different definitions for the Volt, but the most common is equal to 1 Joule/Coulomb. A volt is a unit of electromotive force that measures the potential difference in electric potential between two points. It is also known as a voltage measured in volts (V).**	**1M**
33.	**B in B-H curve is known as** **A. Reluctance** **B. Magnetizing Force** **C. Magnetic flux density** **D. Magnetic Intensity** **Answer: -C. Magnetic flux density** **Explanation: The B-H curve, also known as the magnetization curve or hysteresis curve, is a graphical representation that describes the magnetic properties of a material. It shows the**	**1M**

	relationship between the magnetic field strength (H) and the magnetic flux density (B) of a material.	
34.	The Unit of Magnetic Flux Density is A. Tesla B. Weber C. Weber - metre D. None of the above Answer: - A. Tesla Explanation: The tesla (symbolized T) is the standard unit of magnetic flux density. It is equivalent to one weber per meter squared (1 Wb/m^2).	1M
35.	MMF stands for A. Magnetic Memory field B. Magnetic Material Force C. Magneto Motive Force D. None of the above Answer: - C. Magneto Motive Force Explanation: MMF is the abbreviation used for Magnetomotive force	1M
36.	H in B-H curve is known as A. Reluctance B. Magnetizing Force C. Magnetic flux density D. Magnetic Intensity Answer: - B. Magnetizing force Explanation: Magnetising force is represented by H, and has the unit $A.m^{-}$	1M
37.	Hysteresis in magnetic circuit is phenomenon of A. Lagging of B behind H B. Lagging of H behind B	1M

	C. Setting up constant flux D. None of the above Answer: - A. Lagging of B behind H Explanation: The B-H curve or magnetisation curve is the graph plotted between magnetic flux density (B) and magnetising force (H). The meaning of hysteresis is"lagging". Hysteresis is characterised as a lag of magnetic flux density (B) behind the magnetic field strength (H).	
38.	The SI Unit of Actual Permeability of free space is A. Henry B. Henry/Metre C. Weber - metre D. Farad/Metre Answer: - B. Henry/Metre Explanation: It is a constant of proportionality that exists between magnetic flux density and magnetic field intensity. The SI unit of permeability is Henry/meter.	1M
39.	Magnetic flux passes more readily through A. Wood B. Air C. Iron D. Vacuum Answer: - C. Iron Explanation:The magnetic field lines prefer to pass through iron than because the permeability of iron is much larger.	1M
40.	MMF in magnetic circuit corresponds to in electric circuit A. Potential Difference B. EMF C. Current D. Resistance	1M

	Answer: -B. EMF **Explanation: The magneto motive force, mmf or f, is analogous to the electromotive force i.e EMF and may be considered the factor that sets up the flux.**	
41.	**The B-H curve of_____will not be a straight line** **A. Wood** **B. Air** **C. Soft Iron** **D. Copper** **Answer: - C .Soft Iron** **Explanation: Soft iron is a ferromagnetic material that is commonly used in electromagnets and magnetic circuits due to its high magnetic permeability. Soft iron has a nonlinear B – H curve due to its high saturation magnetization.**	**1M**
42.	**Direction of induced EMF can be found out from** **A. Faradays law** **B. Amperes law** **C. Fleming right hand Rule** **D. Lenz´s law** **Answer: - C. Fleming right hand Rule** **Explanation: Lenz's law suggests that the direction of induced emf opposes the change in magnetic flux. The negative sign in Faraday's law can be related to this law. Lenz's law gives the direction of induced emf with respect to the change in magnetic flux but Fleming's law gives the direction of induced emf more accurately.**	**1M**
43.	**Which of the following material has least area of Hysteresis loop** **A. Wrought Iron** **B. Hard Steel** **C. Soft Iron**	**1M**

	D. Silicon Steel Answer: -C. Soft Iron Explanation: Soft iron has the least hysteresis loop area because it has low coercivity and high permeability. Hysteresis loop area is a measure of the energy loss in a ferromagnetic material when it is repeatedly magnetized and demagnetized.	
44.	If charge Q is 4 coulombs and time t is 1 seconds then current I is A. 1 Ampere B. 5 Ampere C. 3 Ampere D. 4 Ampere Answer: - D. 4 Ampere Explanation: - I = Q/t = 4/1 = 4 A	1M
45.	If 3 joules work is done to charge a body to one coulomb Q then voltage V is A. 1 Volt B. 2 Volt C. 3 Volt D. 4 Volt Answer: - C. 3 Volt Explanation: - V = J/Q	1M
46.	If current I is 7 amperes and time is 1 seconds then charge Q is A. 6 coulombs B. 7 coulombs C. 8 coulombs	1M

	D. 1 coulombs Answer: - B. 7 coulombs Explanation: - Q = I*t	
47.	The unit of frequency is A. Cycle B. Cycle-second C. Hertz/second D. Hertz Answer: - D. Hertz Explanation: Scientist Heinrich Rudolf Hertz was a German physicist who first conclusively proved the existence of the waves which are electromagnetic and this was predicted by James Clerk Maxwell's equations of electromagnetism. The unit that is of frequency is the cycle per second was named "hertz" in his honour.	1M
48.	The frequency of an alternating current is A. The speed with which the alternator runs B. The number of cycles generated in one minute C. The number of waves passing through a point in one second D. The number of electrons passing through a point in one second Answer: -C. The number of waves passing through a point in one second Explanation: The frequency of a wave is the number of waves that pass a point in a certain period of time. Frequency can also be described as the number of waves that pass a point in one second.	1M

49.	**The power factor of an AC circuit is equal to** **A. Cosine of the phase angle** **B. Sine of the phase angle** **C. Unity for a capacitive circuit** **D. Unity for a inductive circuit** **Answer: - A. Cosine of the phase angle** **Explanation: Power factor of an ac circuit is equal to the cosine of the angle between voltage and current.**	**1M**
50.	**If two sinusoids of the same frequency but of different amplitudes and phase angles are subtracted, the resultant is** **A. A sinusoid of the same frequency** **B. A sinusoid of half the original frequency** **C. A sinusoid of double the frequency** **D. Not a sinusoid** **Answer: - A. A sinusoid of the same frequency** **Explanation: - sinusoidal quantities with same frequency can be added or subtracted & the resultant wave has same frequency.**	**1M**
5.1	**Form factor for a sine wave is** **A. 1.414.** **B. 0.707** **C. 1.11.** **D. 0.637** **Answer: - C. 1.11** **Explanation: - form factor=RMS Value/Average Value=1.11**	**1M**

52.	**In an A.C. circuit power is dissipated in** **A. Resistance only** **B. Inductance only** **C. Capacitance only** **D. None of the above** **Answer: - A. Resistance only** **Explanation: - Resistance in a circuit that has a voltage drops across it and dissipates power**	**1M**
	The voltage of domestic supply is 220 V. This value represents **A. Mean value** **B. R.M.S value** **C. Peak value** **D. Average value** **Answer: - B. R.M.S value** **Explanation: - The voltage of domestic ac is 220 V, it represents the root mean square voltage of supply.**	**1M**
53.	**The power consumed in a circuit element will be least when the phase difference between the current and voltage is** **A. 180°** **B. 90°** **C. 60°** **D.0°** **Answer: - B. 90°**	**1M**

	Explanation: The cosine of an angle is maximum when the angle is 0 and minimum when the angle is 90 degrees. Therefore, the power consumed by a circuit element will be least when the phase difference between the current and voltage is 90 degrees.	
54.	The power consumed by 230 volt, 10 ampere and 0.8 power factor circuit is A. 2300 Watt B. 1840 Watt C. 230 Watt D. 1000 Watt Answer: - A. 2300Watt Explanation: P = V*I* Power factor	1M
55.	Power factor of the following pure circuit will be zero A. Resistance B. Inductance C. Capacitance D. Both (B) and (C) Answer: - D. Both (B) and (C) Explanation: For the purely inductive circuit, the power factor is zero, because true power equals zero. For the purely inductive circuit, the power factor is zero, because true power equals zero.	1M
56.	The magnetic flux density in a magnetic field in which flux is 600 Microweber and area is 0.1 m2 A. 6000 microtesla B. 600 microtesla C. 6 tesla D. 0.6 tesla	1M

Answer: - A. 6000microtesla

Explanation= flux/Area

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57. **Can we apply Kirchhoff's law to magnetic circuits?** **1M**

A. Yes

B. No

C. Depends on the circuit

D. Insufficient information provided

Answer: A. Yes

Explanation: Magnetic circuits have an equivalent to the potential difference of electric circuits. This is the magnetic potential difference which allows us to apply Kirchhoff's laws to magnetic circuit analysis.

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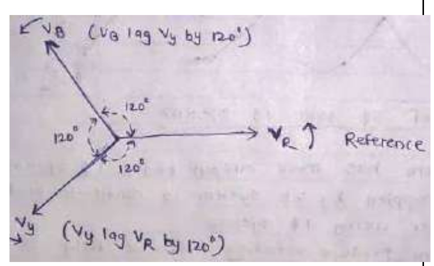
58. **WhichoffollowingisPhasorrepresentationof3phasevoltages?**

(A)

$$V_R = V_m \sin \omega t$$
$$V_y = V_m \sin(\omega t - 120)$$
$$V_B = V_m \sin(\omega t - 240)$$
$$= V_m \sin(\omega t + 120)$$

(B)



(C)

$$V_R = V_m \sin \omega t = V_m \angle 0°$$
$$V_y = V_m \sin(\omega t - 2\pi/3) = V_m \angle -2\pi/3°$$
$$V_B = V_m \sin(\omega t + 2\pi/3) = V_m \angle 2\pi/3°$$

(D)

Noneofthese

Answer:-OptionB

1M

<table>
<tr><td>59.</td><td>Which of following is advantage on 3 Phase AC over 1 Phase AC System?

A. More output power

B. Less space required to produce same power

C. Self-starting of machine is possible

D. All of them

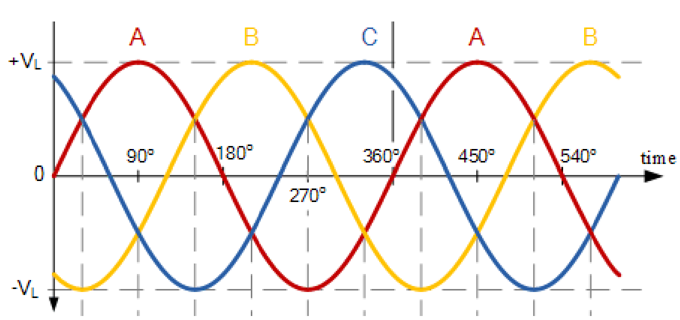
Answer: - D. All of them

Explanation: - To transmit a specific <u>power</u> over a specific distance at a given rated <u>voltage</u>, a three phase system needs less conductor material as compared to the single phase system.

The size of a three phase system operated machine is less than the machine operated at single phase voltage having the same output rating.

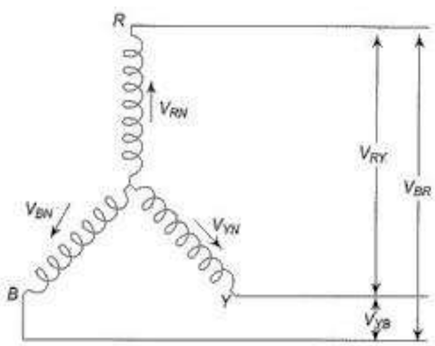
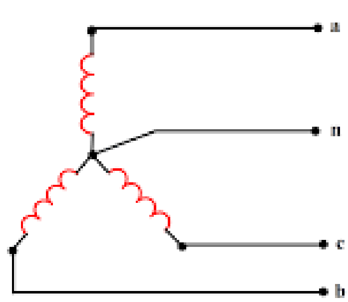
In a three phase power supply system, the less voltage drop occurs from source to the load points,

A three phase supply produces uniform rotating magnetic field therefore three phase motors are simpler in construction, small in size and can be started automatically with smooth operation.</td><td>1M</td></tr>
<tr><td>60.</td><td>Identifythecorrectphasesequence?



(A) B-C-A (B)A-B-C

(C)C-A-B (D)Noneofabove</td><td>1M</td></tr>
</table>

	Answer:-B. A-B-C on:- PhaseSequenceisasequenceinwhich3phasevoltagesreachtheirmaximumposit ivevalues	
61.	**Identify thetype of three phase connection?**  A. ThreePhaseThreeWireStarConnectedSystem B. ThreePhaseFourWireStarConnectedSystem C. ThreePhaseThreeWireDeltaConnectedSystem D. Noneofabove Answer:-A. ThreePhaseThreeWireStarConnectedSystem	**1M**
62.	Identifythetypeofthreephaseconnection?  A. ThreePhaseThreeWireStarConnectedSystem B. ThreePhaseFourWireStarConnectedSystem C. ThreePhaseThreeWireDeltaConnectedSystem D. ssNoneofabove Answer:-B. ThreePhaseFourWireStarConnectedSystem	**1M**

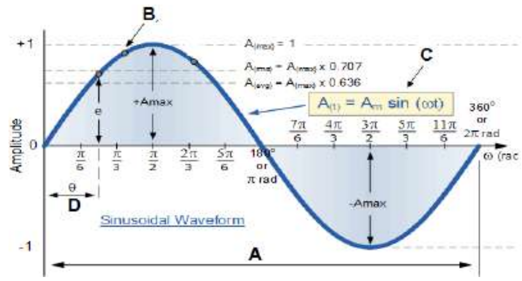
63	AlltherulesandlawsofD.C.circuitalsoapplytoA.C.circuitcontaining A. Capacitanceonly B. Inductanceonly C. Resistanceonly D. All above Answer:-C. Resistance only Explanation:- Resistanceisnotchargeorenergystoringelementofelectricalcircuit.	1M
64	Capacitivereactanceismorewhen A. Capacitanceandfrequencyofsupplyisless B. Capacitanceislessandfrequencyofsupplyismore C. Capacitance is more and frequency of supply is less D. Capacitanceandfrequencyofsupplyismore Answer:-A. Capacitanceandfrequencyofsupplyisless $X_C = \frac{1}{2\pi f C}$	1M
65	Pureinductivecircuit A. Consumessomepoweronaverage B. Doesnottakepoweratallfromaline C. Storeenergyinmagneticfieldandagainreturntosource D. Noneoftheabove Answer:-C. Storeenergyinmagneticfieldandagainreturntosource Explanation:-Nopowerisconsumedinthecircuit.	1M
66	Powerfactorofthefollowingpurecircuitwillbezero A. Resistance B. Inductance C. Capacitance D. Both(B)and(C)	1M

Answer:-D. Both B and C

Explanation:-Power=V*I*cosΦ=V*I*cos(90)=0

67

InfollowingfigureArepresents………………



(A) Timeperiod

(B) Amplitude

(C)Cycle

(D) InstantaneousValue

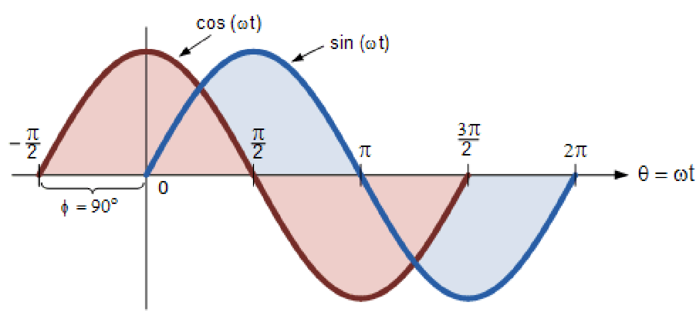
Answer:-A. Time period

Explanation:- The period of a wave is the amount of time it takes for a wave to complete one cycle.

1M

67

InfollowingfigurePhasedifferenceis………………



(A)45º

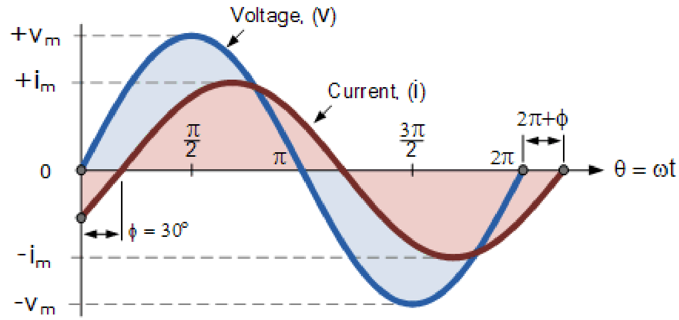
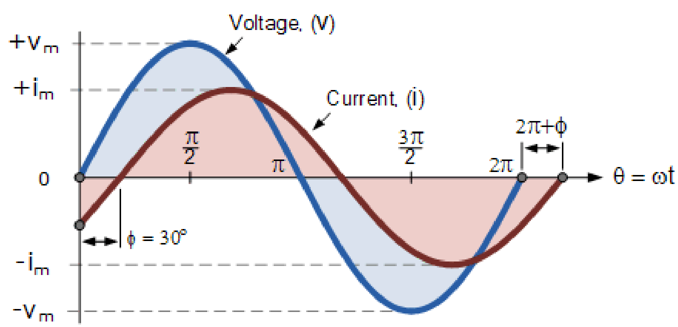
(B)90º

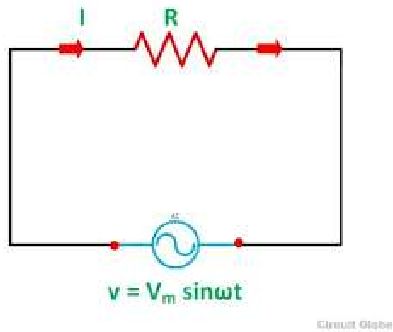
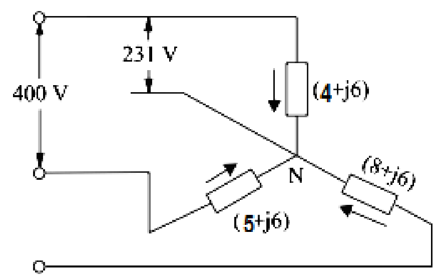
(C)30º

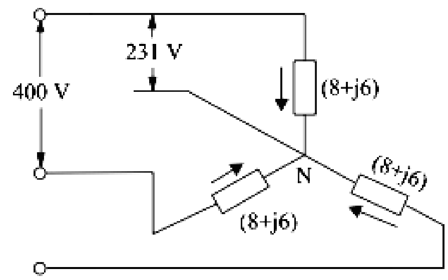
(D)0º

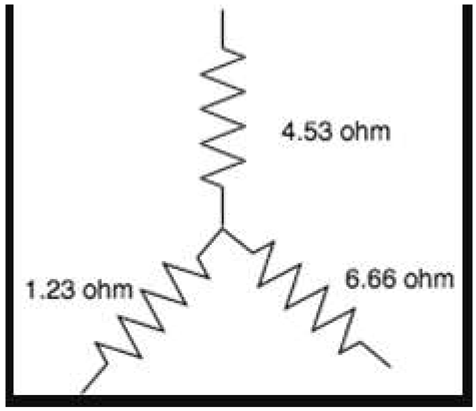
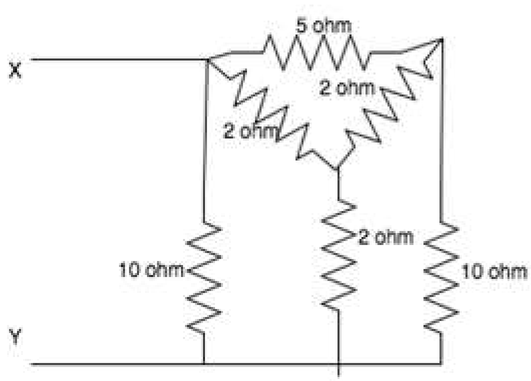
Answer:-B. 90º

1M

68	Infollowingfigure………………  (A) Currentleadsvoltageby30º (B)Currentlagsvoltageby30º (C)Currentleadsvoltageby45º (D)Currentlagsvoltageby45º Answer:-B. Currentlagsvoltageby30º	1M
69	Infollowingfigure………………  (A) Voltageleadscurrentby30º (B)Voltagelagscurrentby30º (C)Voltageleadscurrentby45º (D)Voltagelagscurrentby45º Answer:-A. Voltageleadscurrentby30º	1M

70	FollowingfigurerepresentswhichtypeofACCircuit.....  (A) PureResistive (B)Purecapacitor (C)PureInductive (D)noneofthese Answer:-A. PureResistive **Explanation:-In a purely resistive circuit, all circuit power is dissipated by the resistor(s). Voltage and current are in phase with each other.**	1M
70	 Identifytypeofload (A) UnbalancedStarLoad (B)UnbalancedDeltaLoad (C)BalancedStarLoad (D)BalancedDeltaLoa d Answer:-A. UnbalancedStarLoad Explanation:-Allimpedancesarenotequal	1M

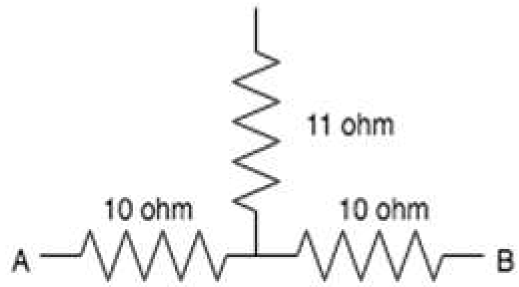
71	Identifytypeofload  (A) UnbalancedStarLoad (B)UnbalancedDeltaLoad (C)BalancedStarLoad (D)BalancedDeltaLoa d Answer:-C. BalancedStarLoad Explanation:-Allimpedancesareequal	1M
78	InbalancedstarorDeltaconnectedloadallphaseandlinevaluesofcurrent&voltag ewillbe……. (A) Unequal (B)Dependsontypeofload (C)Equal (D)Noneofabove Answer:-C. Equal Explanation:-Allimpedancesareequalsoallvalueswillbeequal	1M
79	InUnbalancedstarorDeltaconnectedloadallphaseandlinevaluesofcurrent&vol tagewillbe……. (A) Unequal (B)Dependsontypeofload (C)Equal (D)Noneofabove	1M

	Answer:-A. Unequal Explanation:-Allimpedancesareunequalsoallvalueswillbeunequal	
80	Find the equivalent delta circuit.  A. 9.69 ohm, 35.71 ohm, 6.59 ohm B. 10.69 ohm, 35.71 ohm, 6.59 ohm C. 9.69 ohm, 34.71 ohm, 6.59 ohm D. 10.69 ohm, 35.71 ohm, 7.59 ohm Answer: A. 9.69 ohm, 35.71 ohm, 6.59 ohm Explanation: Using the star to delta conversion: R_1 = 4.53+6.66+4.53*6.66/1.23 = 35.71 ohm R_2 = 4.53+1.23+4.53*1.23/6.66 = 6.59 ohm R_3 = 1.23+6.66+1.23*6.66/4.53 = 9.69 ohm.	1M
81	Find the equivalent resistance between X and Y.  A. 3.33 ohm	1M

	B. 4.34 ohm C. 5.65 ohm D. 2.38 ohm Answer: D. 2.38 ohm Explanation: The 3 2ohm resistors are connected in star, changing them to delta, we have R1=R2=R3= 2+2+2*2/2=6 ohm. The 3 6ohm resistors are connected in parallel to the 10 ohm 5 ohm and 10ohm resistors respectively. This network can be further reduced to a network consisting of a 3.75ohm and 2.73ohm resistor connected in series whose resultant is intern connected in parallel to the 3.75 ohm resistor.	
82	Delta connection is also known as___________ A. Y-connection B. Mesh connection C. Either Y-connection or mesh connection D. Neither Y-connection nor mesh connection Answer: B. Mesh connection Explanation: Delta connection is also known as mesh connection because its structure is like a mesh, that is, a closed loop which is planar.	1M
83	Ra is resistance at A, Rb is resistance at B, Rc is resistance at C in star connection. After transforming to delta, what is resistance between B and C? A. Rc+Rb+Rc*Rb/Ra B. Rc+Rb+Ra*Rb/Rc	1M

<table>
<tr><td></td><td>C. Ra+Rb+Ra*Rc/Rb
D. Rc+Rb+Rc*Ra/Rb

Answer: A. Rc+Rb+Rc*Rb/Ra

Explanation: After converting to the delta, each delta connected resistance is equal to the sum of the two resistances it is connected to+product of the two resistances divided by the remaining resistance. Hence, resistance between B and C = Rc+Rb+Rc*Rb/Ra.</td><td></td></tr>
<tr><td>84</td><td>Find the equivalent resistance between A and B.


A. 32ohm
B. 31ohm
C. 30ohm
D. 29ohm

Answer: D. 29ohm
Explanation: The equivalent resistance between node 1 and node 3 in the star connected circuit is R= (10×10+10×11+11×10)/11=29ohm.</td><td>1M</td></tr>
<tr><td>85</td><td>In a delta-connected load, the relation between line voltage and the phase voltage is?
A. line voltage > phase voltage
B. line voltage < phase voltage
C. line voltage = phase voltage
D. line voltage >= phase voltage</td><td>1M</td></tr>
</table>

	Answer: C. line voltage = phase voltage Explanation: In a delta-connected load, the relation between line voltage and the phase voltage is line voltage = phase voltage	
86	A polyphase system is generated by_____? A. Having two or more generator windings separated by equal electrical angle. B. Having generator windings at equal distances C. None of the above D. A and C Answer: Having two or more generator windings separated by equal electrical angle. Explanation: A generator having two or more electrical windings which are separated by equal electrical angle generates a polyphase electrical system. The electrical angle or displacement depends upon the number of windings or phases. For example, in a three-phase electrical system, the generated voltages are separated from each other by 120° degrees.	1M
87	In a three phase AC circuit, the sum of all three generated voltages is ______ ? A. Infinite (∞) B. Zero (0) C. One (1) D. None of the above Answer: B. Zero (0) Explanation: Three phase voltages are generated by having	1M

	an alternator with three armature windings such that each winding is displaced from the other by 120 degrees. When these windings are placed in a rotating magnetic field or rotated in a stationary magnetic field, electromotive force is generated in each coil, of same magnitude and direction.	
88	For a star connected three phase AC circuit ——— A. Phase voltage is equal to line voltage and phase current is three times the line current B. Phase voltage is square root three times line voltage and phase current is equal to line current C. Phase voltage is equal to line voltage and line current is equal to phase current D. None of the above Answer: B. Phase voltage is square root three times line voltage and phase current is equal to line current Explanation: A star connected AC circuit is achieved by connecting each end of the winding to a common point known as neutral point and leaving the other end of each winding free. While voltage across each coil is the phase voltage, potential difference between each free end is the line voltage.	1M
89	What is the type of current obtained by finding the square of the currents and then finding their average and then fining the square root? A. RMS current B. Average current C. Instantaneous current D. Total current Answer: A. RMS current Explanation: RMS stands for Root Mean Square. This value of current is obtained by squaring all the current values, finding the average and then finding the square root.	1M

90	Find the total current in the circuit if two currents of 4+5j flow in the circuit. A. 4+5j A B. 4A C. 5A D. 8+10j A Answer: D. 8+10j A Explanation: The total current in the circuit is the sum of the two currents where we add the real parts and imaginary parts separately. Therefore, I total= 8+10j A.	1M
91	What is the correct expression of ω? A. ω=2π B. ω=2πf C. ω=πf D. $\omega=2f^2$ Answer: B. ω=2πf Explanation: The correct expression for ω is ω=2πf where f is the angular frequency of the alternating voltage or current.	1M
92	Find the value of ω if the frequency is 5Hz? A. 3.14 rad/s B. 31.4 rad/s C. 34 rad/s D. 341 rad/s Answer: B. 31.4 rad/s Explanation: The expression for ω is ω=2*π*f. Substituting the value of f from the question, we get ω=31.4 rad/s.	1M

93	When one sine wave passes through the zero following the other, it is ________ A. Leading B. Lagging C. Neither leading nor lagging D. Either leading or lagging Answer: B. Lagging Explanation: The sine wave is said to lag because it passes though zero following the other, hence it crosses zero after the first wave, therefore it is said to lag.	1M
94	The time axis of an AC phasor represents? A. Time B. Phase angle C. Voltage D. Current Answer: B. Phase angle Explanation: The time axis while measuring an AC sinusoidal voltage or current represents the phase angle when converting it to a phasor.	1M
95	The length of the phasor represents? A. Magnitude of the quantity B. Direction of the quantity C. Neither magnitude nor direction D. Either magnitude or direction Answer: A. Magnitude of the quantity Explanation: The length of the phasor arrow represents the magnitude of the quantity, whereas the angle between the phasor and the reference represents the phase angle.	1M

96	**The average power supplied to an inductor over one complete alternating current cycle is:** A. **0** B. **IV²** C. **I²** D. **IR²** **Answer: A.0** **Explanation: For a pure inductor circuit, ϕ = 90° (∵ current lags the voltage by 90° in the pure inductive circuit)** **Cos ϕ = Cos 90° = 0** **P = $V_{rms}I_{rms}$ 0** **P = 0 W**	**1M**
97	**Ohm's law for magnetic circuits is ________** **A. F=ϕS** **B. F=ϕ/S** **C. F=ϕ²S** **D. F=ϕ/S²** **Answer: A. F=ϕS** **Explanation: Ohm's law for magnetic circuits states that the MMF is directly proportional to the magnetic flux where reluctance is the constant of proportionality.**	**1M**
98	**What happens to the MMF when the magnetic flux decreases?** **A. Increases** **B. Decreases** **C. Remains constant** **D. Becomes zero**	**1M**

	Answer: B. Decreases **Explanation: Ohm's law for the magnetic circuit's states that the MMF is directly proportional to the magnetic flux hence as the magnetic flux decreases, the MMF also decreases.**	
99	**Calculate the MMF when the magnetic flux is 5Wb and the reluctance is 3A/Wb.** **A. 10At** **B. 10N** **C. 15N** **D. 15At** **Answer: D. 15At** **Explanation: We know that:** **F=ϕS** **Substituting the given values from the question, we get MMF = 15At.**	**1M**
100	**A ring having a cross-sectional area of 500 mm^2, a circumference of 400 mm and ϕ=800microWb has a coil of 200 turns wound around it. Calculate the flux density of the ring.** **A. 1.6T** **B. 2.6T** **C. 3.6T** **D. 4.6T** **Answer: A. 1.6T** **Explanation: ϕ=BA => Flux density B = ϕ/A** **Substituting the values, we get B=1.6T.**	**1M**

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