Unit II	Electrical Machines	Marks - 12
S. N.	MSBTE Board Asked Questions	Marks
1	What is Transformer? a) Transformer is a device used to convert low alternating voltage to a high alternating voltage b) Transformer is a device used to convert alternating current to direct current c) Transformer is a device used to convert low alternating current to a high alternating current d) Transformers are used only for low alternating voltage Answer: a. Transformer is a device used to convert low alternating voltage to a high alternating voltage Explanation: A Transformer is a device used to convert low alternating voltage to a high alternating voltage and vice versa. Transformers are based on the phenomena of mutual induction. A transformer consists of a soft iron coil with two coils wound around it which are not connected to one another.	1M
2	What is the function of a transformer? a) Transformer is used to step down or up the AC voltages and	1M

	currents b) Transformer is used to step down or up the DC voltages and currents c) Transformer converts DC to AC voltages d) Transformer converts AC to DC voltages Answer: a. Transformer is used to step down or up the AC voltages and currents Explanation: A Transformer does not work on DC and operates only on AC, therefore it Step up or Step down the level of AC Voltage or Current, by keeping frequency of the supply unaltered on the secondary side.	
3	What is the working principle of a Transformer? a) Transformer works on the principle of self-induction b) Transformer works on the principle of mutual induction c) Transformer works on the principle of ampere law d) Transformer works on the principle of coulomb law Answer: bTransformer works on the principle of mutual induction Explanation: A transformer is an electrical device used to vary the input voltage. Transformer works on the principle of mutual induction.	1M
4	Transformer ratings are given in _____ a) kVA b) HP c) kVAR d) kW Answer: a. kVA Explanation: There are two types of losses in a transformer, Copper Losses and Iron Losses or Core Losses or Insulation	1M

	Losses. Copper losses (I^2R) depends on current passing through transformer winding while Iron losses or Core Losses or Insulation Losses depends on Voltage. That's why the rating of Transformer is in kVA.	
5	**What is the current transformer?** **a) transformer used with an A.C. voltmeter** **b) transformer used with an A.C. ammeter** **c) transformer used with an D.C. voltmeter** **d) transformer used with an D.C. ammeter** **Answer: b. transformer used with an A.C. ammeter** **Explanation: A transformer used to extend the range of an A.C. ammeter is known as a current transformer. A current transformer is also abbreviated as C.T.**	**1M**
6	**Transformer core is generally made of _____** **a) Cannot be determined** **b) Can be made with any of the above method** **c) By stacking large number of sheets together** **d) Single block of core material** **Answer: c. By stacking large number of sheets together** **Explanation: Transformer core experiences eddy current losses when transformer is in the operations. In order to reduce eddy current losses, it is advisable to use large number of sheets laminated from each other are stick together than using one single block.**	**1M**
7	**The purpose of the transformer core is to provide _____** **a) Low reluctance path** **b) High inductive path** **c) High capacitive path** **d) High reluctance path**	**1M**

	Answer: a. Low reluctance path **Explanation: The purpose of a transformer core is to provide a low-reluctance path for the magnetic flux linking primary and secondary windings. In doing so, the core experiences iron losses due to hysteresis and eddy currents flowing within it which, in turn, show themselves as heating of the core material.**	
8	**Transformers are generally designed for _____** **a) one-time use** **b) off-site problem solving** **c) short-time use** **d) on-site problem solving** **Answer: d. on-site problem solving** **Explanation: Every transformer is designed for use it for multiple years, thus transformers are designed to handle the problems on site itself because it not only saves time but also makes repairing work easy.**	**1M**
9	**Primary winding of a transformer _____** **a) Could either be a low voltage or high voltage winding** **b) Is always a high voltage winding** **c) Cannot be determined** **d) Is always a low voltage winding** **Answer: a. Could either be a low voltage or high voltage winding** **Explanation: Primary winding used in a transformer, can be at higher or lower voltage potential, depending on the number of turns with secondary winding. For step up and step-down transformers primary winding will be at lower and higher potential respectively.**	**1M**

10	An ideal transformer will have maximum efficiency at a load such that _____ a) copper loss > iron loss b) cannot be determined c) copper loss = iron loss d) copper loss < iron loss Answer: c. copper loss = iron loss Explanation: Maximum efficiency of a transformer is defined at that value when copper losses become completely equal to the iron losses. In all other cases the efficiency will be lower than the maximum value.	1M
11	Power transformers are designed to have maximum efficiency at a) Full load b) 50% load c) 80% load d) No load Answer: - a) Full load Explanation: Power transformers are operated on full load hence power transformers are designed to have maximum efficiency at full load.	1M
12	Transformer core are laminated in order to a) Reduce hysteresis loss b) Reduce hysteresis & eddy current loss c) Minimize eddy current loss d) Copper loss Answer: - a) Reduce hysteresis loss Explanation:The iron core of a transformer is laminated to reduce eddy currents. Eddy currents are the small currents that result from the changing magnetic field ...	1M
	Breather is provided in a transformer to a) Absorb moisture of air during breathing	1M

13	**b) Provide cold air in the transformer** **c) The filter of transformer oil** **d) None of above** **Answer: - a) Absorb moisture of air during breathing** **Explanation: The breather is used in the transformer *to filter out the moisture from the air*.**	
14	**The leakage flux in a transformer depends upon the value of** **a) Frequency** **b) Mutual Flux** **c) Load current** **d) Applied Voltage** **Answer: -c) Load current** **Explanation: The leakage flux depends on load current, independent of voltage, frequency, and power factor.**	**1M**
15	**In a transformer ideally the resistance between its primary and secondary is** **a) Zero** **b) Infinite** **c) 1000 ohm** **d) 100 ohm** **Answer: - b) Infinite** **Explanation: An ideal transformer should have infinite resistance between the primary and secondary winding. However, the resistance may be in order of Gega ohms or Tera Ohms depending on the insulation between the primary and secondary winding.**	**1M**
16	**Which winding in a transformer has more number of turns?** **(A) Secondary winding** **(B) Primary winding** **(C) High voltage winding** **(D) Low voltage winding**	**1M**

	Answer: - C. High voltage winding **Explanation: High voltage winding always has a large number of turns, as voltage is directly proportional to the number of turns.**	
17	**An autotransformer can be used as** **(A) Step up device** **(B) Step down device** **(C) Both step up and step down** **(D) None of the above** **Answer: - C Both step up and step down** **Explanation: An autotransformer can be both a step-up and step-down transformer. It is a type of transformer that has a single winding that is shared by both the primary and secondary circuits. This means that the autotransformer can be used to either increase or decrease the voltage, depending on how the windings are connected.**	**1M**
18	**In an Auto Transformer, The Primary and Secondary are_____ Coupled** **(A) Electrically only** **(B) Magnetically only** **(C) Both electrically & magnetically** **(D) None of the above** **Answer: -C Both electrically & magnetically** **Explanation: An auto transformer is a one winding (or) single circuit transformer, in which a portion of the winding is common for both high voltage and low voltage winding. And this entire winding will be placed on a single magnetic core**	**1M**
19	**Which of the following are applications of Auto-transformer?** **(A) Used as switch** **(B) Used as Variac** **(C) Used for voltage correction** **(D) All of the above** **Answer: - D. All of the above**	**1M**

	Explanation: Autotransformer is used as switch, it is used for voltage correction.	
20	**Which of the following is the major disadvantage of Autotransformer?** **(A) No primary and secondary wire isolation** **(B) Insulation failure of primary winding may damage the whole autotransformer** **(C) Individual earthing of winding is not possible** **(D) All of the above** **Answer: - D All of the above** **Explanation: The main disadvantage of the autotransformer is that it does not have electrical isolation between primary and secondary windings. If primary winding may damage the whole autotransformer may fail.) Individual earthing of winding is not possible**	**1M**
21	**The size of the transformer core mainly depends on** **(A) Frequency** **(B) Area of core** **(C) Flux density of core** **(D) Both frequency and area of core** **Answer: - D. Both frequency and area of core** **Explanation:For a given transformer rating, as the frequency increases the product of window area and cross sectional area of the limb decreases; which means the iron required for the core decreases. Therefore as the frequency increases, the transformer becomes lighter and smaller in size.**	**1M**
23	**Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is** **a) Approximately equal to one** **b) Less than one** **c) Great than one** **d) Cannot be found**	**1M**

	Answer: a. Approximately equal to one **Explanation: Copper In auto transformer /copper in two-winding transformer = 1- T2/T1. This means that an auto transformer requires the use of lesser quantity of copper given by the ratio of turns. Hence, if the transformation ratio is approximately equal to one, then the copper saving is good and the copper loss is less.**	
24	**Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is** **a) Approximately equal to one** **b) Less than one** **c) Great than one** **d) Cannot be found** **Answer: a. Approximately equal to one** **Explanation: Copper In auto transformer /copper in two-winding transformer = 1- T2/T1. This means that an auto transformer requires the use of lesser quantity of copper given by the ratio of turns. Hence, if the transformation ratio is approximately equal to one, then the copper saving is good and the copper loss is less.**	**1M**
25	**Total windings present in a autotransformer are _____** **a) 1** **b) 2** **c) 3** **d) 4** **Answer: a. 1** **Explanation: Autotransformer is the special transformer for which the single winding acts as a primary and secondary both. Thus, by taking the appropriate winding into consideration a**	**1M**

	variable secondary voltage is obtained.	
26	What are the modes in which power can be transferred in an autotransformer? a) Conduction b) Induction c) Conduction and Induction d) Cannot be said Answer: c. Conduction and Induction Explanation: In two winding transformer there is no electrical connection between primary and secondary. So, the power is transferred through induction. But in auto-transformer there is a common electrical path between primary and secondary. So, power is transferred through both conduction and induction processes.	1M
27	What will happen if DC shunt motor is connected across AC supply? a) Will run at normal speed b) Will not run c) Will Run at lower speed d) Burn due to heat produced in the field winding Answer: d Burn due to heat produced in the field winding Explanation: In case of parallel field connection, it won't rotate at all and will start humming and will create vibrations, as a torque produced by positive and negative cycle will cancel out each other. DC motor will be heated up and it may burn.	1M
	What will happen if the back emf of a DC motor vanishes suddenly? a) The motor will stop	1M

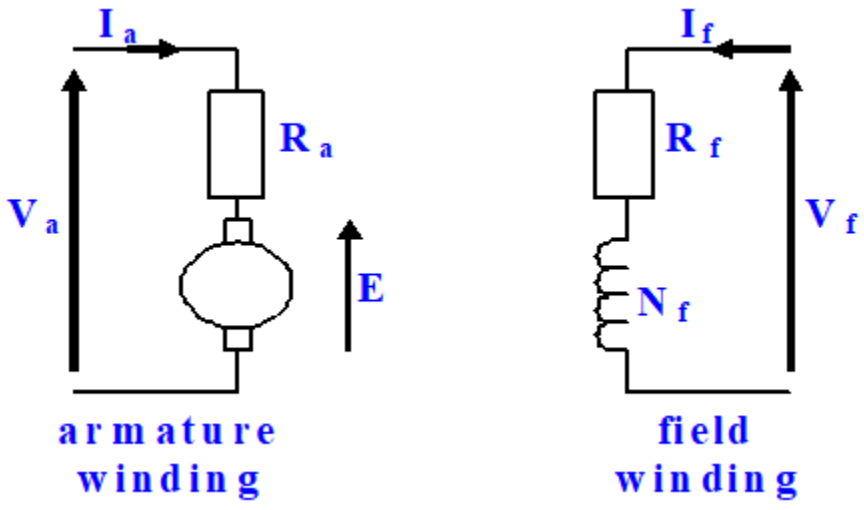
28	b) The motor will continue to run c) The armature may burn d) The motor will run noisy Answer: c. The armature may burn Explanation: If back emf vanishes suddenly, motor circuit will try to retain back emf by drawing more current from supply. If supplying unit didn't trip down by this time, excess current in armature may heat up the armature.	
29	What will happen, with the increase in speed of a DC motor? a) Back emf increase but line current falls. b) Back emf falls and line current increase. c) Both back emf as well as line current increase. d) Both back emf as well as line current fall. Answer: a. Back emf increase but line current falls. Explanation: In case of DC motor, the speed is proportional to the back emf (Ea $\propto$ N). So, with the increase in speed, the back emf also increases. Therefore, armature current is also decreased, in case of series motor, armature current is equal to the line or load current.	1M
30	Which part will surely tell that given motor is DC motor and not an AC type? a) Winding b) Shaft c) Commutator d) Stator Answer: c. Commutator Explanation: All other parts except brushes and commutator	1M

	are same in AC machine when outer looks are only taken in consideration. Commutator is used only in DC machine for providing mechanical rectification and not in AC machine.	
31	Direction of rotation of motor is determined by _____ a) Faraday's law b) Lenz's law c) Coulomb's law d) Fleming's left-hand rule Answer: d. Fleming's left-hand rule Explanation: Flemings laws can be summarized as whenever, a current carrying conductor comes under a magnetic field, there will be a force acting on the conductor and on the other hand, if a conductor is forcefully brought under a magnetic field, there will be an induced current in that conductor.	1M
32	The current drawn by the armature of DC motor is directly proportional to _____ a) Torque b) Speed c) The voltage across the terminals d) Cannot be determined Answer: a. Torque Explanation: From the equation of torque generated in a DC machine, we know that in both DC motor and DC generator, current drawn is directly proportional to the torque required by the machine.	1M
	Which power is mentioned on a name plate of a motor? a) Gross power b) Power drawn in kVA	1M

33	c) Power drawn in kW d) Output power available at the shaft Answer: d. Output power available at the shaft Explanation: Name plate of the motor shows rated values i.e. rated speed, rated current, rated voltage. It also shows output power available at shaft when all other quantities are set to rated values.	
34	Which of the following quantity will decrease if supply voltage is increased? a) Starting torque b) Operating speed c) Full-load current d) Cannot be determined Answer: c. Full-load current Explanation: When supply voltage is increased full load current will decrease in order to keep output power constant, which will decrease torque at that moment, while starting torque will remain as it is, irrespective of any change in supply voltage.	1M
35	The main parts of d.c. motor (a) Yoke (b) Armature core (c) Commentator (d) Brush (e) All of the above Answer: - (e) All of the above Explanation: The main components are: a stator, a rotor, a yoke, poles, armature windings, field windings, commutator, and	1M

	brushes.	
36	**Application of Universal Motor** **(a) Robotics** **(b) Textile industries** **(c) Mixer** **(d) Automotive** **Answer :- (c) Mixer** **Explanation: The Universal motor is used for purposes where speed control and high values of speed are necessary. The various applications of the Universal Motor are as follows:** • **Portable drill machines.** • **Used in hairdryers, grinders, and table fans.** • **A universal motor is also used in blowers, polishers, and kitchen appliances.**	
37	**Where is field winding mounted in a DC machine?** **a) Stator** **b) Rotor** **c) Absent** **d) Anywhere on stator or rotor** **Answer: a. Stator** **Explanation: The field winding (concentrated type) is mounted on salient-poles on the stator and the armature winding (distributed type) is wound in slots on a cylindrical rotor.**	**1M**
	What are the materials used for brushes in dc machines? **a) Iron** **b) Carbon** **c) Aluminum** **d) Steel**	**1M**

38	Answer: b. Carbon Explanation: On some extent carbon brush can act as a self-lubricating brush. On moment, polishes the commutator segments. Damage to the commutators is less when copper brushes are used on occurrence of sparkover.	
39	Function of yoke is to provide the return path for magnetic flux. a) True b) false Answer: a) True Explanation: The function of yoke is that it protects the entire machine from dust and dirt. It also provides mechanical support for the magnetic poles. It acts as the return path for the magnetic flux.	1M
40	Which of the following part is used in construction of DC machine but not in AC machine? a) Armature Winding b) Field winding c) Commutator d) Shaft Answer: c. Commutator Explanation: Commutator is used in mechanical rectification process, to convert induced AC to output DC. In AC machine, we don't need rectification process.	1M
	In normal dc machines operating at full-load conditions, the most powerful electromagnet is _____ a) Field winding b) Interpole Winding c) Interpole and compensating winding together d) Armature winding	1M

41	**Answer: a) Field winding** **Explanation: Electromagnet is more powerful when its MMF is high. At full-load condition, field winding contains maximum ampere turns, hence it is most powerful electromagnet in a DC machine.**	
42	**Which of the following d.c. motor has highest speed at no-load condition?** **A. Cumulative compound motor** **B. Shunt motor** **C. Differentially compound motor** **D. series motor** **Answer: D. series motor** **Explanation: At no load, armature current tends to zero, flux φ tends to zero, where speed is inversely proportional to the flux, and speed will tend to infinity. Thus, no load speed of DC series motor is highest.**	**1M**
43	**Following diagram represents the equivalent circuit of**  **A. Long shunt compound wound motor** **B. Short shunt compound wound motor** **C. Separately excited d.c. motor**	**1M**

	D. Shunt wound d.c. motor Answer: C. Separately excited d.c. motor Explanation: A separate power supply is provided to field in separately excited d.c. motor.	
44	Differentially compound DC motors are used in applications requiring _____ a) High starting torque b) Low starting torque c) Variable speed d) Frequent on-off cycles Answer: b. Low starting torque Explanation: Compound motor shows combine effect of shunt and series field windings. Differential compound series motor gives low starting torque, examined by torque current characteristic. Hence, applications with low starting torque are called in differentially compound DC motor.	1M
45	A universal motor is one which A. Is available universally B. Can be marketed internationally C. Can be operated either on dc or ac supply D. Runs at dangerously high speed on no-load Answer: C. Can be operated either on dc or ac supply Explanation: Universal Motor is a special type of motor that can run on a DC supply or a single-phase AC supply. Since it can run both on AC and DC, it is called a universal motor.	1M
46	Speed of the universal motor is A. Dependent on frequency of supply B. Proportional to frequency of supply C. Independent of frequency of supply D. None of the above	1M

	Answer: C. Independent on frequency of supply **Explanation: Brushed universal motors are largely independent of AC frequency,**	
47	**Which of the following motor can be referred as a universal motor?** **a) DC shunt motor** **b) DC compound motor** **c) Permanent magnet motor** **d) DC series motor** **Answer: d DC series motor** **Explanation: DC series motor can operate on DC and AC. It is a universal motor. Universal motors are those motors that can operate on both DC and AC. DC shunt motor can only operate on DC because of pulsating torque in AC.**	**1M**
48	**Universal motor have which of the following application?** **A. Domestic pump.** **B. Food mixer.** **C. Traction.** **D. Lift.** **Answer: B. Food mixer.** **Explanation: Out of the given options, a food mixer is a common application for a universal motor. Food mixers typically require a motor that can operate on both AC and DC power, allowing for versatile use in different settings. The universal motor's ability to operate on both AC and DC power makes it suitable for powering food mixers, where the user may switch between AC and DC power sources.** **While domestic pumps, traction systems, and lifts can use electric motors, they often require specific types of motors that**	**1M**

	are tailored to their specific requirements, such as induction motors, synchronous motors, or specialized DC motors.	
49	Universal motor is used in vacuum cleaners, table fans and portable drilling machine. a) True b) False Answer: a. True Explanation: The universal motor is dc series motor with ac supply with smaller torque. So it can be used for lower torque applications.	1M
50	The rotor of a stepper motor has no a) Windings b) Commutator c) Brushes d) All of the mentioned Answer: d. All of the mentioned Explanation: A stepper motor has a cylindrical permanent magnet rotor. Thus it does not contain windings, commutator or brushes mounted on it.	1M
51	A stepping motor is a _____ device. a) Mechanical b) Electrical c) Analogue d) Incremental Answer: d) Incremental Explanation: A stepping motor is a motor in which the motion is in the form of steps and is an incremental device in which as the time increases the steps are increased.	1M
	The rotational speed of a given stepper motor is determined solely by the	1M

52	a) Shaft load b) Step pulse frequency c) Polarity of stator current d) Magnitude of stator current. Answer: b. Step pulse frequency Explanation: The stator part of a motor is the stationary part of the motor and rotational speed of a given stepper motor is given by the step pulse frequency.	
53	A stepper motor may be considered as a _____ converter. a) Dc to dc b) Ac to ac c) Dc to ac d) Digital-to-analogue Answer: d. Digital-to-analogue Explanation: A stepper motor is a motor in which the motion is in steps and it is an increemental device and may be considered as a digital to analog converter.	1M
54	Which type of motor uses brushes and a commutator? a) DC motor b) AC motor c) Induction motor d) Synchronous motor Answer: a) DC motor Explanation: DC motors use brushes and a commutator to achieve the conversion of electrical energy into mechanical energy.	1M
	Which type of motor does not require a separate power source for the rotor?	1M

55	a) Synchronous motor b) Induction motor c) Brushless DC motor d) Universal motor Answer: b) Induction motor Explanation: In an induction motor, the rotor is powered by electromagnetic induction from the stator, eliminating the need for a separate power source.	
56	What is the primary function of the stator in an electric motor? a) To provide mechanical support b) To generate a rotating magnetic field c) To convert electrical energy into mechanical energy d) To regulate the motor's speed Answer: b) To generate a rotating magnetic field Explanation: The stator carries the windings that create a rotating magnetic field, which interacts with the rotor to produce motion in an electric motor.	1M
57	Which type of motor is commonly used in household appliances like refrigerators and air conditioners? a) Single-phase induction motor b) Synchronous motor c) Brushless DC motor d) Universal motor Answer: a) Single-phase induction motor Explanation: Single-phase induction motors are widely used in household appliances due to their simplicity, low cost, and reliable performance.	1M

58	**What determines the speed of a DC motor?** **a) Number of poles** **b) Applied voltage** **c) Armature resistance** **d) Back EMF** **Answer: d) Back EMF** **Explanation: The speed of a DC motor is determined by the back electromotive force (EMF) generated in the armature coil, which opposes the applied voltage.**	**1M**
59	**Which type of motor provides the highest starting torque?** **a) DC series motor** **b) DC shunt motor** **c) AC induction motor** **d) Brushless DC motor** **Answer: a) DC series motor** **Explanation: DC series motors provide high starting torque due to their characteristic of high armature current and strong field interaction.**	**1M**
60	**Which motor is suitable for applications requiring variable speed control?** **a) DC motor** **b) AC motor** **c) Stepper motor** **d) Synchronous motor** **Answer: a) DC motor** **Explanation: DC motors are suitable for variable speed control applications as their speed can be easily adjusted by**	**1M**

	controlling the input voltage or current.	
61	**Which motor is commonly used in ceiling fans?** **a) Single-phase induction motor** **b) Synchronous motor** **c) Brushless DC motor** **d) Universal motor** **Answer: a) Single-phase induction motor** **Explanation: Ceiling fans typically use single-phase induction motors due to their cost-effectiveness and reliable performance.**	**1M**
62	**Which type of motor is used in robotics and precision control applications?** **a) Stepper motor** **b) AC induction motor** **c) Synchronous motor** **d) Brushless DC motor** **Answer: a) Stepper motor** **Explanation: Stepper motors are commonly used in robotics and precision control applications due to their ability to move in discrete steps and hold position without the need for feedback.**	**1M**
63	**Which motor is commonly used in electric pumps?** **a) Single-phase induction motor** **b) Synchronous motor** **c) Brushless DC motor** **d) Universal motor** **Answer: a) Single-phase induction motor** **Explanation: Electric pumps often use single-phase induction motors due to their reliability and ability to operate on single-**	**1M**

	phase power supply.	
64	**Which motor type is suitable for high-speed applications?** **a) Brushless DC motor** **b) DC series motor** **c) Induction motor** **d) Universal motor** **Answer: a) Brushless DC motor** **Explanation: Brushless DC motors are suitable for high-speed applications due to their ability to operate at high rotational speeds and provide precise speed control.**	**1M**
65	**Which motor type is commonly used in household washing machines?** **a) Universal motor** **b) Induction motor** **c) Brushless DC motor** **d) Stepper motor** **Answer: b) Induction motor** **Explanation: Household washing machines typically use induction motors due to their reliability, low cost, and ability to handle variable loads.**	**1M**
66	**Which motor type is commonly used in robotic vacuum cleaners?** **a) Brushless DC motor** **b) DC series motor** **c) Induction motor** **d) Stepper motor** **Answer: d) Stepper motor**	**1M**

	Explanation: Robotic vacuum cleaners often use stepper motors for precise control of movement and positioning.	
67	**What is the primary disadvantage of a universal motor?** **a) Limited speed range** **b) Lower efficiency** **c) Larger size** **d) Complex control circuitry** **Answer: b) Lower efficiency** **Explanation: Universal motors have lower efficiency compared to other motor types due to the energy losses associated with their universal commutator.**	**1M**
68	**Which motor type is commonly used in electric fans?** **a) Synchronous motor** **b) DC shunt motor** **c) Induction motor** **d) Universal motor** **Answer: a) Synchronous motor** **Explanation: Electric fans often use synchronous motors due to their ability to operate at a constant speed and maintain synchronization with the power supply frequency.**	**1M**
69	**Which motor type is commonly used in CNC machines and 3D printers?** **a) Stepper motor** **b) DC shunt motor** **c) Synchronous motor** **d) Brushless DC motor** **Answer: a) Stepper motor**	**1M**

	Explanation: CNC machines and 3D printers often use stepper motors due to their precise positioning capabilities and ease of control.	
70	**What is the primary disadvantage of a stepper motor?** **a) Limited speed range** **b) Higher cost** **c) Larger size** **d) Complex control circuitry** **Answer: a) Limited speed range** **Explanation: Stepper motors have a limited speed range compared to other motor types, which can be a disadvantage in certain high-speed applications.**	**1M**
71	**Which motor type is commonly used in electric bicycles?** **a) Brushless DC motor** **b) DC series motor** **c) Induction motor** **d) Universal motor** **Answer: a) Brushless DC motor** **Explanation: Electric bicycles often use brushless DC motors due to their high efficiency, compact size, and ability to provide assistance at various speeds.**	**1M**
72	**Which motor type is commonly used in electric drills and power tools?** **a) Universal motor** **b) Synchronous motor** **c) Induction motor** **d) Brushless DC motor**	**1M**

	Answer: a) Universal motor **Explanation: Electric drills and power tools often use universal motors due to their high power-to-weight ratio and ability to operate on both AC and DC power sources**	
73	**Which motor type is commonly used in electric cars?** **a) Brushless DC motor** **b) Synchronous motor** **c) Induction motor** **d) Universal motor** **Answer: a) Brushless DC motor** **Explanation: Electric cars often use brushless DC motors due to their high efficiency, compact size, and ability to provide high torque at various speeds.**	**1M**
74	**Which motor type is commonly used in dishwashers and washing machines?** **a) Universal motor** **b) Synchronous motor** **c) Induction motor** **d) Brushless DC motor** **Answer: c) Induction motor** **Explanation: Dishwashers and washing machines commonly use induction motors for their reliability, low maintenance, and ability to handle variable loads.**	**1M**
	Differentially compound DC motors are used in applications requiring _____ **a) High starting torque** **b) Low starting torque** **c) Variable speed** **d) Frequent on-off cycles**	**1M**

75	**Answer: b. Low starting torque** **Explanation: Compound motor shows combine effect of shunt and series field windings. Differential compound series motor gives low starting torque, examined by torque current characteristic. Hence, applications with low starting torque are called in differentially compound DC motor.**	
76	**Which DC motor is more preferred for elevators?** **a) Shunt motor** **b) Series motor** **c) Differential compound motor** **d) Cumulative compound motor** **Answer: d. Cumulative compound motor** **Explanation: Cumulative wound DC motors give high starting torque like a series motor and reasonable good speed regulation at high speeds like a shunt dc motor. As this type of motor offers the best of both series and shunt motor, it is practically suitable for most common applications like elevators.**	**1M**
77	**Which DC motor has got maximum self-loading property?** **a) Series motor** **b) Shunt motor** **c) Cumulative compound motor** **d) Differential compound motor** **Answer: d. Differential compound motor** **Explanation: A differentially compound DC motor, flux reduces so sharply at small increase in load at higher values of load. It is advisable that motor should not be used beyond some load**	**1M**

	value, as it may damage itself by self-loading.	
78	For the same H.P. rating and full load speed, which of the following motor has poor starting torque? a) Series motor b) Shunt motor c) Cumulative compound motor d) Differential compound motor Answer: d. Differential compound motor Explanation: In differential compound motor, series field opposes shunt field. It has poor starting torque as the resultant flux is minimized by this opposition. The flux starts decreasing with increase in load. The decrease in flux cause the starting torque to be less than any other DC motor.	1M
79	DC motor is to a drive a load which is almost zero for certain part of the load cycle and peak value for short duration. We will select _____ a) Series motor b) Shunt motor c) Compound motor d) Any DC motors Answer: c. Compound motor Explanation: We can't use series motor as our load is almost zero at some points. Thus, we'll use compound motor which can work on no load also. Cumulative compound motor is provided with flywheel so that this machine can deal with peak value.	1M
	The direction of rotation of universal motor can be reversed the by reversing the flow of current through a) Armature winding	1M

80	b) Field winding c) Either armature winding or field winding d) None of the above Answer: c. Either armature winding or field winding Explanation: The direction of rotation of universal motor can be reversed the by reversing the flow of current through Either armature winding or field winding	
81	Universal motor is used in vacuum cleaners, table fans and portable drilling machine. a) True b) False Answer: a. True Explanation: The universal motor is dc series motor with ac supply with smaller torque. So it can be used for lower torque applications.	1M
82	_____ Generator is used in arc welding purposes. a) Differential compound dc b) Dc series c) Cumulative compounded dc d) Shunt Answer: a. Differential compound dc Explanation: The external characteristics of the differentially compound generator have minimum voltage for the high current voltages. This is best harnessed feature for a high current requirement by the welding application.	1M
83	Which value of the flux is involved in the EMF equation of transformer a) Average value	1M

	b) R.M.S. Value c) Critical value d) Maximum value Answer: Maximum value Explanation: The instantaneous value of the flux is constantly changing, and is not a useful value to consider for the e.m.f. equation of a transformer. Therefore, the value of flux involved in the e.m.f. equation of a transformer is the maximum value.	
84	What criteria's are necessary to consider when selecting a stepper motor? a)Mechanical Motion. b)Inertial Load c)Speed Requirements d) All of the above Answer: d. All of the above Explanation: The key performance specifications for sourcing a stepper motor are voltage, speed, torque, rotor inertia and step angle.	1M
85	Which of the following motor rotates in discrete angular steps? a) Servo motor b) DC motor c) Stepper motor d) Linear Induction Motor (LIM) Answer: c. Stepper motor Explanation: A stepper motor is a brushless DC electric motor whose rotor rotates in discrete angular increments when its stator winding energized in a programmed manner. They have multiple coils that are organized in groups called phases. By energizing each phase in sequence, the motor will rotate, one step at a time.	1M
86	Which type of device is a stepper motor? a) Electromechanical	1M

	b) Electrochemical **c) Embedded system** **d) Electromagnetic** **Answer: a. Electromechanical** **Explanation: A stepper motor is an electromagnetic device which converts the electrical pulses into discrete mechanical movements. The shaft of the electrical motor.**	
87	**Stepper motors are extremely reliable.** **a) True** **b) False** **Answer: a. True** **Explanation: There are no contact brushes in the motor, therefore, the Stepper motors are extremely reliable. The life of the motor depends only upon the life of the bearings. Wide ranges of rotational speed are possible.**	**1M**
88	**Which among the following is not the type of a stepper motor?** **a) Variable reluctance** **b) Permanent magnet** **c) Hybrid** **d) Variable magnet** **Answer: d. Variable magnet** **Explanation: Variable magnet is not the type of a stepper motor. Variable reluctance stepper motor consists of a soft iron multi-toothed rotor and a wound stator. Permanent magnet stepper motors have a rotor made up of the permanent magnet. Hybrid stepper motor provides better performance with respect to step resolution, torque and speed.**	**1M**
89	**A stepper motor is a bad choice whenever control movement is required.** **a) True** **b) False**	**1M**

	Answer: b. False **Explanation: A stepper motor is a good choice whenever control movement is required. They can be used in the applications where there is a need to control rotation angle, speed, position and synchronism. Due to all these reasons, stepper motors are used in many different applications.**	
90	**Which type of stepper motors have low cost and low-resolution motor?** **a) Permanent magnet stepper motor** **b) Variable reluctance stepper motor** **c) Hybrid stepper motor** **d) DC motor** **Answer: a. Permanent magnet stepper motor** **Explanation: The permanent magnet stepper motor has low cost and low-resolution type motor with the step angle of 7.5% to 15%. This type of stepper motor has a rotor made up of the permanent magnet. The other motors mentioned in the option do not have low cost as well as low redundancy.**	**1M**
91	**Which of the following is not the main selection criterion of a stepper motor?** **a) Resolution required** **b) Drive mechanism component required** **c) Torque required** **d) Speed** **Answer: d. Speed** **Explanation: Speed is not the main selection criteria of a stepper motor. The selection criteria of a stepper motor include resolution required, drive mechanism component, operating pattern required such as sequencing, accelerationetc. and torque required**	**1M**

92	What is the formula to calculate the step angle of a stepper motor? a) (360*ph.)/nph b) (ph/nph) c) (nph/ph) d) (360*nph)/ph Answer: a. (360*ph.)/nph Explanation: The step angle is given by (360*ph)/nph where 'nph' is the number of equivalent poles per phase or number of rotor poles, ' ph ' is the number of phases and ' n ' is the total number of poles in all phases.	1M
93	In a DC series motor, if the armature current is halved, the torque of the motor will be equal to a) 100% of the previous value b) 50% of the previous value c) 25% of the previous value d) 10% of the previous value Answer: c 25% of the previous value Explanation: Torque in the case of linear magnetization of DC series motor is directly proportional to square of the armature current. So, armature current is made 1/2th of the original value, then torque will be 1/4th of the original value.	1M
94	The slot edges in a DC machine are made of (A) mild steel (B) silicon steel (C) fibre (D) cast iron	1M

	Answer: D cast iron **Explanation: The outer frame of a dc machine is called as yoke. It is made up of cast iron or steel. It not only provides mechanical strength to the whole assembly but also carries the magnetic flux produced by the field winding.**	
95	**In a shunt dc machine, the armature and field winding resistance are respectively** **(A) of higher values** **(B) of lower values** **(C) high and low** **(D) low and high** **Answer: D low and high** **Explanation: In DC shunt machine the armature resistance is low and field winding resistance is high.**	**1M**
96	**The principle of dynamically induced emf is utilized in** **(A) generator** **(B) transformer** **(C) thermocouple** **(D) choke** **Answer: A Generator** **Explanation: An electric generator works on the principle of electromagnetic induction.**	**1M**
97	**In a transformer, the winding is tapped in the middle** **(A) to avoid the radial forces on the windings** **(B) to reduce the insulation level of the windings** **(C) to provide a mechanical balance to the windings** **(D) to eliminate the axial forces on the windings** **Answer: D to eliminate the axial forces on the windings** **Explanation: In a transformer, the winding is tapped in the middle for voltage regulation and eliminate axial forces**	**1M**
98	**What is the working principle of DC motor?** **a) Fleming's right hand rule** **b) Fleming's left hand rule** **c) Maxwell's second law**	**1M**

	d) Maxwell's third law **Answer: b. Fleming's left hand rule** **Explanation: The working principle of motor Fleming's left hand rule. It states that, when a current carrying conductor is place in a magnetic field then it experiences a force. The direction of force can be determined by Fleming's left hand rule.**	
99	**What is the full form of CPR with respect to motor movement?** **a) Clocks per rotation** **b) Counts per revolution** **c) Counts per rotation** **d) Clocks per revolution** **Answer: b. Counts per revolution** **Explanation: CPR stands for Counts per revolution with respect to motor movement. 2 square pulses are generated at a time by a typical motor encoder, CPR (Counts per revolution) is the is the number of quadrature decode states that exists between these two square pulses**	**1M**
100	**AC motors do not have brushes.** **a) True** **b) False** **Answer: a. True** **Explanation: AC motors do not have brushes. Due to the absence of brush mechanism AC motors have longer life expectancy. DC motors comes in two forms, Brushed and Brushless motors. DC motors without brushes are termed as BLDC (Brushless DC) motors.**	**1M**

Thank You

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