CBSE | DEPARTMENT OF SKILL EDUCATION

ELECTRICAL TECHNOLOGY (SUBJECT CODE 819)

CLASS XII (SESSION 2021-2022)
BLUE-PRINT FOR SAMPLE QUESTION PAPER FOR TERM - II

Max. Time Allowed: 1½ Hours (90 min) **Max. Marks: 30**

PART A - EMPLOYABILITY SKILLS (05 MARKS):

UNIT NO.	NAME OF THE UNIT	NO. OF QUESTIONS - VSA (1 MARK EACH)	NO. OF QUESTIONS - SA (2 MARKS EACH)	NO. OF QUESTIONS - LA (4 MARKS EACH)	TOTAL NUMBER OF QUESTIONS
1	Unit 4 : Entrepreneurial Skills-IV	2	1	-	3
2	Unit 5 : Green Skills-IV	2	1	-	3
TOTAL QUESTIONS		**4**	**2**	**-**	**06**
NO. OF QUESTIONS TO BE ANSWERED		**Any 3**	**Any 1**	**-**	**04**
TOTAL MARKS		**3 x 1 = 3 Marks**	**1 x 2 = 2 Marks**	**-**	**05 Marks**

PART B - SUBJECT SPECIFIC SKILLS (25 MARKS):

UNIT NO.	NAME OF THE UNIT	NO. OF QUESTIONS - VSA (1 MARK EACH)	NO. OF QUESTIONS – SA - I (2 MARKS EACH)	NO. OF QUESTIONS – SA - II (3 MARKS EACH)	NO. OF QUESTIONS - LA (4 MARKS EACH)	TOTAL NUMBER OF QUESTIONS
3	Single Phase AC Motor	1	-	1	-	2
4	Three Phase Induction Motor	1	1	1	-	3
5	Measuring Instruments	1	1	-	1	3
6	Electrical Appliances	4	3	2	2	11
TOTAL QUESTIONS		**07**	**05**	**04**	**03**	**19**
NO. OF QUESTIONS TO BE ANSWERED		**05**	**03**	**02**	**02**	**12**
TOTAL MARKS		**5 x 1= 05 Marks**	**3 x 2 = 06 Marks**	**2 x 3 = 06 Marks**	**2 x 4 = 08 Marks**	**25 Marks**

TOTAL MARKS	05 (Part A) + 25 (Part B) = 30 MARKS

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MARKING SCHEME OF SAMPLE QUESTION PAPER FOR TERM - II

Max. Time Allowed: 1 ½ Hours (90 min) **Max. Marks: 30**

General Instructions:

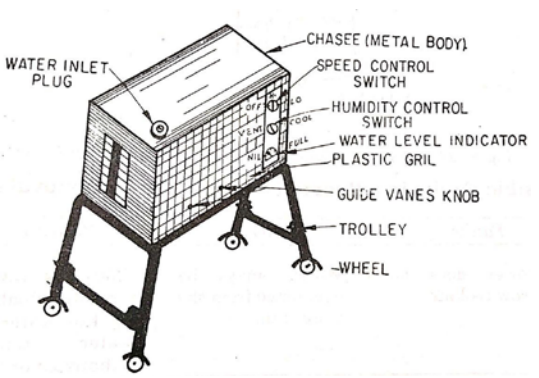
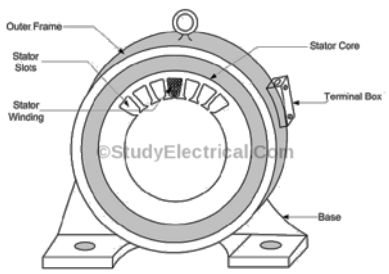
1. Please read the instructions carefully
2. This Question Paper is divided into 03 sections, viz., Section A, Section B and Section C.
3. Section A is of 05 marks and has 06 questions on Employability Skills.
   a) Questions numbers 1 to 4 are one mark questions. Attempt any three questions.
   b) Questions numbers 05 and 06 are two marks questions. Attempt any one question.
4. Section B is of 17 marks and has 16 questions on Subject specific Skills.
   a) Questions numbers 7 to 13 are one mark questions. Attempt any five questions.
   b) Questions numbers 14 to 18 are two marks questions. Attempt any three questions.
5. Section C is of 08 marks and has 03 competency-based questions.
   a) Questions numbers 19 to 21 are four marks questions. Attempt any two questions.
6. Do as per the instructions given in the respective sections.
7. Marks allotted are mentioned against each section/question.

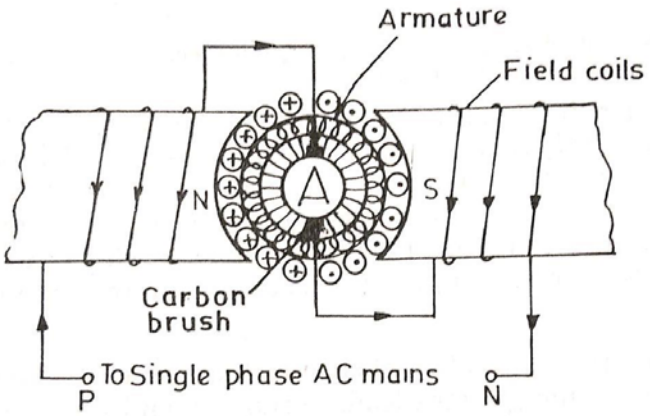
SECTION A (3 + 2 = 5 marks)

Answer any 03 questions out of the given 04 questions		**1 x 3 = 3**
Q.1	Confidence to do everything himself.	**1**
Q.2	Stress, Anxiety, rude behaviour	**1**
Q.3	The material which can not harm the environment.	**1**
Q.4	Reuse, recycle, use less heat, plant trees, replace ordinary light bulbs.	**1**
Answer any 01 question out of the given 02 questions		**1 x 2 = 2**
Q.5	Energy Auditor Chief Sustainability Officer Wind/Solar Energy Engineer	**2**
Q.6	Dream big, try new challenges, plan and execution, recognize opportunity, bounce back from failures	**2**

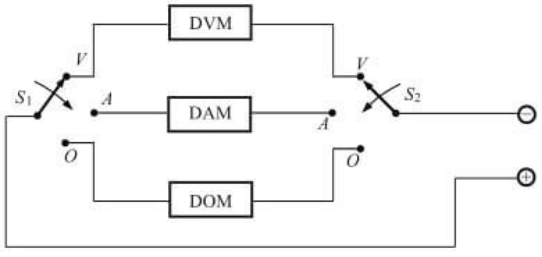
SECTION B (5 + 6 + 6 = 17 marks)

Answer any 05 questions out of the given 07 questions		**1 x 5 = 5**
Q.7	capacitor start motor	**1**
Q.8	Room cooler	**1**
Q.9	110V	**1**
Q.10	High s	**1**
Q.11	Not be changed	**1**
Q.12	Induction	**1**
Q.13	parallel	**1**
Answer any 03 questions out of the given 05 questions		**2 x 3 = 6**
Q.14	1. Before testing water heater, insulate yourself on the dry wood. 2. Test the water heater in series of the electric supply to avoid the risk of failure of supply. 3. Never give direct supply unless you are sure that there is no fault in the water heater to avoid the risk of failure of supply. 4. Use three-wire cord for the supply. 5. The water should be switched on to mains only after it is dipped in the water. 6. Dip the water heater up to the indicated mark and don't allow terminal housing to be immersed in water. 7. First switch off the current then remove water heater from the water. 8. Don't take out the rod from water at once as soon as you switched off the supply. 9. Don't use the immersion heater in other liquids because it is meant for water only and in other liquids, it will have a corroding affect on its surface. Any four among above.	**2**
Q.15	No. An ammeter is a measuring device used to measure the electric current in a circuit. A voltmeter is connected in parallel with a device to measure its voltage, while an ammeter is connected in series with a device to measure its current..	**2**
Q.16	**Artificial respiration** any method of forcing air into the lungs in a person who still has a pulse but whose breathing has stopped. Artificial respiration can be given with no equipment, so that it is an ideal emergency first aid procedure. Ideally, it should be given using a pocket face mask or a bag valve mask; in the absence of emergency resuscitation equipment, **mouth-to-mouth RESUSCITATION** may be done	**2**
Q.17	**POSSIBLE FAULTS** (a) By switching on the supply, if the shaft of the motor does not rotate. (b) the tip bowl leaks. (c) the blades are broken. (d) the switch knob is loose. (e) the motor burns. (f) the blade does not rotate properly (freely).	**2**
Q.18	A commutator is a rotary electrical switch in certain types of electric motors and electrical generators that periodically reverses the current direction between the rotor and the external circuit.	**2**
Answer any 02 questions out of the given 04 questions		**3 x 2 = 6**
Q.19	**Room Cooler** It is used to supply cool air in the hot season. The room cooler consists for two speed capacitor start or capacitor run type motor having extended shaft on both sides. The motor is fitted vertically in the water tank of room cooler. On the top of	**3**

	motor shaft, a air blower is fitted which throws cool air through grill provided in the front of room cooler after sucking from outside through khas-has matting and on the bottom of motor shaft a small water pump is tithed which pump sweater from water tank OT distributing channel fitted on the top of 'wood wool pads' or 'khas-khas matting'. The water from the holes of distributing channel drops on the khas-khas matting and keep it moistened from top to bottom that is why the cool air can be changed according to the choice by the help of guide vanes which are provided on the front chase of the cooler. The speed of the motor or blower can be controlled by the select switch fitted in the front panel of cooler. When switch knob is kept on 'Hi' position, whole of the voltage is applied across running winding and capacitor gets nearly double supply voltage due to transformer action of the auxiliary winding along with running winding and high action of the auxiliary winding along with running winding and high speed of the motor is obtained and we get more cool air from the blower. When the switch knob is kept on 'LO' position, voltage across the running winding is reduced which reduces the speed of the motor and blower throws less cool air out of the grill. The water level of the water in the wait tank of the panel which indicates the level of the water in the water tank of the cooler.  The humidity control valve also provided to regulate the quantity of water fed to distributing channel. On the top of the chase of the cooler a hole is provided to drain out the water from the water tank when the cooler is not be used for a long time. The assembled diagram along with a motor of room cooler.	
Q.20	**Single phase induction motor** Single phase induction motor runs with single phase supply. The efficiency of the single phase induction motor is less than that of the three phase induction motor. Single phase induction motor are extensively used for domestic application like fans, coolers, geysers, mixies, washing machines etc. The rating of single phase induction motor is less than 1 KW or we can say that the single phase moter has fractional horsepower rating. The single phase induction motor looks like a three phase induction motor. It is constructionally same as three phase induction motor except that the starter has a single phase winding instead of 3 phase winding. **Types of single phase induction motor** (1) Split phase motor (2) Capacitor start motor (3) Shaded pole motor (4) Capacitor start capacitor run motor (5) Permanent split capacitor motor	**3**
Q.21	The working of the three-phase induction motor is based on the principle of electromagnetic induction. When three-phase stator winding of an induction motor is energized from a 3 phase supply, a **rotating magnetic field** is set up which rotates around the stator at synchronous speed (N_s). The 3-phase stator winding is wound for a definite number of poles as per the requirement of speed. Greater the number of poles, lesser is the speed of the motor and vice-versa.  When 3-phase supply is given to the stator winding, a rotating magnetic	**3**

	field of constant magnitude is produced. This rotating field induces currents in the rotor by electromagnetic induction.	
Q.22	**Universal Motors:** These motors are exactly same as D.C. series motors. They can be operated both on A.C. (Single Phase) and D.C supply. In these motors, the field and the armature are connected in series with each other. For changing the directions of rotation either armature or field connections are changed. The principle of this motor is the same as that of D.C series motor. The speed of universal motor is inversely proportional to the load i.e. at high load, its speed is low but at small load, its speed is high. The torque of this motor is directly proportional to the current taken by the motor. The motor is started on putting the load. The starting device used with this type of motor is auto-transformer with the help of which the voltage is raised on the motor gradually so that the motor is  saved from high starting current.	**3**

SECTION C (2 x 4 = 8 marks)
(COMPETENCY BASED QUESTIONS)

Answer any 02 questions out of the given 03 questions		
Q.23	A **Digital multimeter** or **DMM** is a test equipment used for resistance, voltage, current measurement and other electrical parameters as per requirement and displaying the results in the mathematical digits form on an LCD or LED readout. It is a type of multimeter which functions digitally. Digital multimeters are widely accepted worldwide as they have better accuracy levels and ranging from simple 3 ½ to 4 ½ digit handheld DMM to very special system DMM.  Digital multimeter is most advanced instruments that make use of modern Integrated circuits for making electrical measurements. Some of its features which make it famous in the eyes of professional technicians are: 1. It is light in weight. 2. Capable of giving more accurate readings. 3. It measures lots of physical quantities like voltage, current, resistance, frequency etc. 4. It is less costly. 5. It measures different electrical parameters at high frequencies with the help of special probes.	**4**

Q.24	**Immersion Rod:** Elements end may touch the corner of the metal tube which is known as short circuit and earth fault. Connections of supply cord may be broken at the terminals; breakage of wire in the plug top which causes discontinuity and known as open circuit. Breakage of element wire in the metal tube or element may burnt which is known as open circuit. Leakage in supply cord which causes short circuit or cord too old. Metal tube may be burst when not dipped inside the water. Terminal housing may be broken which may cause leakage fault. Any screw may be missing which causes loose fitting or connections. **Geyser:** Failing of Supply Mains. Fuses blown or the blades of the main switch do not make contact with main blades or supply is cut off in the main switch. Open and Short Circuit in the Wiring Circuit. Breakage of wire ends from the terminals or breakage inside the wires and touching of wire ends together or bare wire may touch together somewhere Heating Element may be defective. Element may be burnt. It can be checked with series test lamp by disconnecting the main connections Thermostat device may be defective. Setting may be not proper or there may be leakage. **Mixer:** If the tip bowl leaks If the blades are broken If the switch knob is loose If the motor burns If the blade does not rotate properly (freely) **Room Cooler:** Blower does not throw cool air Pump may not be working properly Motor fails to start Room cooler gives shock	**4**
Q.25	**Electric Geysers (Water Heater)** To get the hot water, either continuously or intermittently, an electric water heater is more useful device. It can be easily installed anywhere with the electric power. Its water temperature can easily be regulated automatically by a thermostat. It works on the principle of thermal storage i.e. the water is preheated by immersion water in a storage vessel and is kept for future use. To get the water in a storage vessel and is kept for future use. To get the hot water from time to time, the storing vessel is provided with thick insulation or it is properly legged to dissipate the heat. The heating element is fixed at the bottom horizontally or vertically. As the water heater is switched 'on' the cold water is heated up, becomes lighter and starts moving up while the cold water being heavier comes down. Thus due to this circulation of water, we can get hot water from the outlet valve. If the element is fixed horizontally, the water above it, is heated very slowly but when the element is fixed vertically, the water surrounding this is heated up very soon. So the vertical fitting of the element in the water heater is more referred. Water heater may be classified in the following ways: **(a) Immersion Heater or Rod.** It can be put in any vessel full of water and by switching on, the water is heated up. It is a portable and cheap and has been described before. **(b) Self-contained Heaters.** These are of two types: (1) Non-Pressure type (II) Pressure type These consist of a storage vessel, heavily legged, electrically heated and provided with a thermostat system. (a) **Non-pressure Type Water Heater.** This type of water heater is used at that place where the hot water is required only at one service point e.g. for wash-basins and sinks	**4**

	etc. Such water heaters have an open outlet i.e. not having any stop-cock. Its water is controlled from the inlet side. These contain two cylindrical vessels, one fitted inside the outer. The inner vessel consists of heating chamber made of tinned copper. Inside it, the heating element and thermostat are fixed vertically at the bottom. The outer vessel is made of lead-coated-steel and painter outside with enamel paint. The space between the two vessels is filled with heat resisting insulating material to reduce heat loss. The temperature of the water is controlled automatically with thermostat. The inlet and outlet pipes are chromium plated to avoid corrosion. The cold water flows from the cold water supply pipe (inlet pipe) and enters in the heating chamber and is controlled by a valve. The hot water flows out from the top of the heating chamber through the hot water pipe (outlet pipe). An anti drip device is provided with the hot water pipe to cut off the quick hot water supply and to prevent the water to be drained off through the cold water pipe valve when the supply of cold water fails. As the hot water pipe is an open outlet, when the cold water inlet valve is opened, the cold water rushes into the heating chamber, displaces and forces out an equal quantity of hot water through the hot water outlet pipe. To save the water heater from the developed pressure inside the heating chamber, a vent plug is fitted at the top which allows extra pressure in atmosphere. The wattage of this water heater is about 750 to 2000 W etc. (ii) **Pressure Type Water Heater.** In other words it is called cistern type water heater as it works on atmospheric pressure. This type of water heater is used at that place where the hot water is required at more than one service points with one heater only. This heater gets its supply of cold water from the cistern (over head tank) connected with the water mains and the water controlled with the help of a float valve. The copper pipes connected with the heating chamber are used to supply the hot water under pressure to different service points which are controlled with a tap. The element and thermostat are fixed at the removable plate fitted on the base of the water heater for their easy service and to remove them easily. The water is of 750 to 3000 W. These are of two types: **(i) Constant volume pressure type water heater.** In this water heater, the hot water drained off is replaced equally with cold water having equal volume. So it is called a constant pressure type water heater **(ii) Non-constant volume pressure type water heater.** In this water heater, the rate at which the hot water flows out is not the same at which the cold water enters into the heating chamber. So it is known as non-constant or varying volume pressure type water heater.	