

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior Secondary School Examination, 2026 (XIIth)
SUBJECT NAME : Electrical Technology (Q.P. CODE 819/343)

General Instructions: -

1	The CBSE has decided to introduce On Screen Marking (OSM) for the evaluation of Class XII answer Book with the 2026 Examination.
2	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
3	“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC.”
4	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In Class-XII, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.
5	The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
6	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
7	Evaluators will mark (✓) wherever answer is correct. For wrong answer CROSS 'X' be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
8	If a question has parts, please award marks on the right-hand side for each part in the OSM Portal. Marks awarded for different parts of the question will be totaled up by the OSM System.
9	If a question does not have any parts, marks must be awarded in the left-hand margin in the OSM Portal. This may also be followed strictly.

10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks _____ (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
13	<p>Ensure that you do not make the following common types of errors committed by the Examiner in the past :-</p> <ul style="list-style-type: none"> • Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) • Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
15	The Examiners should acquaint themselves with the guidelines given in the “Guidelines for Spot Evaluation” before starting the actual evaluation.
16	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.
17	If a candidate attempts both alternatives/options in a question, where only one option/alternative is required to be attempted, the Evaluator shall award marks in both the options. The system will take the higher of two scores and disregard the other response.
18	In a question having two options/alternatives, if a candidate has attempted only one, then the evaluator shall mark “NA” (Not Attempted) against the option that has not been attempted by the candidate.

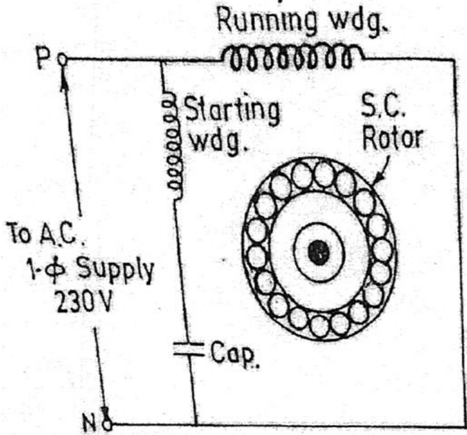
MARKING SCHEME
Electrical Technology (Subject Code-819)
(PAPER CODE : 343) (P3430819)

Q.No.	EXPECTED OUTCOMES/VALUE POINTS	Marks
	SECTION – A Objective Type Questions	
1.	Answer any 4 out of the given 6 questions on Employability skills	4x1=4
(i)	(C) Imperative (Unit-1, Page No:20)	1
(ii)	(A) Self-Confidence (Unit-2, Page No:38)	1
(iii)	Motivation is derived from the word 'Motive'. It indicates a directing behaviour towards a certain goal. (Unit-2, Page No:24)	1
(iv)	(D) graphic (Unit-3, Page No:45)	1
(v)	(i) Environment barriers → Ex. Lack of resources and lack of skilled labour (ii) Personal barriers → Ex. Self doubt and forming a team and team work. (Unit-4, Page No:92,93)	1 (.5x2)
(vi)	(D) Chief sustainability officer (unit-5, Page No:113)	1
2.	Answer any 5 out of the given 7 questions	5x1=5
(i)	(D) Armature resistance	1
(ii)	(B) earth resistance	1
(iii)	(D) 1000 to 3000w	1
(iv)	(C) 3 MVA	1
(v)	(A) blower and fans	1
(vi)	(A) Electrolytic capacitor	1
(vii)	(B) artificial respiration	1
3.	Answer any 6 out of the given 7 questions	6x1=6
(i)	Induced EMF always opposes the causes which produce it.	1
(ii)	By connecting two ends of testing lead to the terminal of plug top of the appliance, if lamp does not glow it means there is an open circuit.	1
(iii)	One complete evolution of its shape until the point i.e ready to repeat itself.	1
(iv)	50 meters	1
(v)	By increasing the rotor resistance.	1
(vi)	These are the handles used to hold the tip on the tested connection.	1
(vii)	Cistern type water heater.	1

4.	Answer any 5 out of the given 6 questions	5x1=5
(i)	True	1
(ii)	True	1
(iii)	False	1
(iv)	True	1
(v)	True	1
(vi)	False	1
5.	Answer any 5 out of the given 6 questions	5x1=5
(i)	Mutual induction	1
(ii)	Selector switch	1
(iii)	Potential transformer	1
(iv)	Non metallic parts	1
(v)	Electrical	1
(vi)	Open circuit	1
6.	Answer any 5 out of the given 6 questions	5x1=5
(i)	(a) auto transformer	1
(ii)	(c) greater than 4 kW	1
(iii)	(d) resistance of the resistor	1
(iv)	(b) 15000 to 17000	1
(v)	(b) less	1
(vi)	(c) steel frame	1
	SECTION – B Subjective Type Questions	
	Answer any 3 out of the given 5 questions on Employability Skills answer each question in 20-30 words	3x2=6
7.	Subjective question – Answer may vary according to student (Unit-1)	½x4=2
8.	Importance of positive thinking in life : (i) A positive thinking makes a person happier, and helps build and maintain relationships (ii) it can help the person make better decisions. Positive attitude helps improve mental and physical health. (Unit-2, Page No:24)	2 1x2
9.	1. Click on Tools and select protect spread sheet 2. A Protect Document dialog box appears 3. Type in a password 4. Type the same password in confirm textbox 5. Click on Ok 6. Now, when you close the file and open, it again, it will ask for the password. Remember this password so, that you can open the file (Unit-3, Page No:60)	2
10.	1. Organisational skills refer to the ability of making optional use of one's time, energy and resources to achieve one's goal. 2. The skills include – Time management, goal setting, Efficiency, managing quality. (Unit-4, Page No:104)	1x2=2

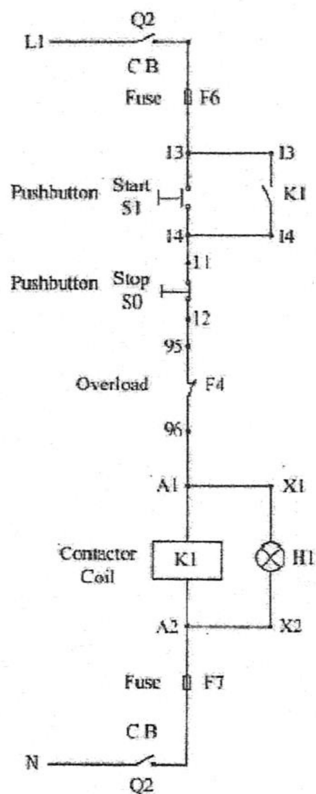
11.	<p>Some ways are :</p> <ol style="list-style-type: none"> 1. Reusing scrap material 2. Ensuring quality control 3. Waste exchange 4. Managing e-waste 5. Use of eco-friendly material <p style="text-align: right;">(Unit-5, Page No:119.120)</p>	<p>2 (any four)</p> <p>(0.5x4)</p>
	Answer any 3 out of the given 5 questions in 20-30 words each	3x2=6
12.	<p>Characteristics Its speed is approx. remain constant and has medium starting torque. Applications</p> <ol style="list-style-type: none"> 1. lathe and drill machine 2. milling and shaper machine 3. blowers and fans 4. spinning and weaving machine in textile industry 5. machine tools 	2
13.	<p>Precautions (Any two)</p> <ol style="list-style-type: none"> 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. 	2
14.	<p>BASIC CONCEPT OF TRANSFORMER The main function of the transformer is to transfer the electrical energy from one circuit to other without any direct electrical connection and without changing of frequency of electrical power. A transformer works on the principle of electromagnetic induction. The primary and secondary coil of the transformer electrically separated but magnetically linked at the same frequency.</p> <p>TYPES OF TRANSFORMER</p> <ol style="list-style-type: none"> 1. Step-up transformer 2. Step-down transformer 3. Voltage transformer 4. Current transformer 5. Auto transformer 	2

15.		2
16.		2
	Answer any 2 out of the given 3 questions in 30 – 50 words each	2x3=6
17.	<p>DC motor classified like shunt series and compound motor. In DC motor commutator provides unidirectional torque.</p> <p>In DC motor one conductor placed in a slot of armature which is under the magnetic field of North Pole. Similarly a conductor which is directly opposite to this conductor is under the effect of South Pole.</p> <p>When a current is passed through in this experience a force which is tangential to the circumference of armature. By applying Fleming left hand rule let the direction of force be downward under the north-pole force on the conductor under the South Pole will be upward. As the force are equal and opposite they form a couple. This force couple provides the turning effect or torque by which motor rotates. This torque is transferred to the shaft of motor and is utilised to drive mechanical load. In this way electrical energy is converted into mechanical energy.</p>	3
18.	<p>Capacitor Start Capacitor Run Motor. This type of motors are similar to capacitor start motors except that the auxiliary (Starting wdg.) and capacitor remain in the circuit all the time even after the motor attains full speed. These motors are very useful because the capacitor remaining in the circuit all the time serves many purposes.</p> <ol style="list-style-type: none"> It improves the overload capacitor of the motor. It improves the power factor. It increases the efficiency of the motor. It reduces the noise of the motor. <p>These motors are used in the drill machines and in the laboratories and office equipments.</p>	3

		
<p>19.</p>	<p>Practically ideal transformer produces some losses most of them transformed into heat which is not dissipated from the transformer properly. The increase in temperature may cause several error. Therefore transformer required colling system for hustle free function.</p> <ol style="list-style-type: none"> 1. Dry type transformer 2. Oil immersed transformer <p>Cooling method for dry type transformers</p> <ol style="list-style-type: none"> 1. Natural air cooled transformer – The small transformer of low rating up to 3MVA are provided cooling through natural passage of environment air. 2. Air blast – in case of air blast cooling more than 3MVA transformer are considered where high pressure air passed to the windings for the cooling purpose. <p>Cooling method for oil immersed transformer</p> <p>Oil Natural Air Natural (ONAN)</p> <p>Due to the presence of heat in the core winding of transformer the oil is heated and flows inside in circular motion the additional cooled oil is filled inside the transformer because of movement the heat is dissipated slowly to the atmosphere and widely used for high rating transformer up to 30 MVA transformer.</p> <p>Oil Natural Air Forced (ONAF)</p> <p>In this method of oil transformer fans placed near by the radiator that turns on and off with increase and decrease in temperature above and below certain value. This type of cooling is used for high rating transformer up to 60MVA transformer.</p> <p>Oil Forced Air Forced (OFAF)</p> <p>In this method of transformer cooling pumping is used to circulate oil. The heat exchanger circulate oil resulting forced and compressed air inside the transformer additional fans sometimes required for cooling purpose. This type of cooling is used for power station and sub station because of their high load capacity.</p>	<p>3</p>

	Answer any 3 of the given 5 questions in 50 – 80 words each.	3x4=12
20.	<p>Possible Faults in a Room Cooler and Their Removals</p> <p>Blower does not throw cool air Check the water level indicator, float and fill up the water in the water tank if exhausted or less</p> <p>Pump may not be working properly Check and replace Check and change the connections to get correct rotation</p> <p>Motor fails to start Check the cord with test lamp and replace. Check the connections and connect them. Check the Motor with test lamp or megger or replace it.</p> <p>Room cooler gives shock. Check and tight Check the motor with test lamp and remove the defect</p> <p>Electric Geyser</p> <p>POSIBLE FAULTS AND THEIR REMEDIES</p> <p>1. Failing of supply Mains. Fuses blow or the blades of the main switch do not make contact with main blades or supply is cut off in the main switch. Fuse elements can be checked physically after switching off the main switch and opening its cover by taking out the grips. Supply can be checked by simple test lamp by connecting it with the main terminals in the main switch. Blades of the main switch can be adjusted with the help of pliers.</p> <p>2. 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.</p> <p>The wire ends can be checked physically. The breakage inside the wires or touching of bare wire can be checked with the help of series test lamp by disconnecting the connections from the water heater and the main switch. By connecting one end of test lamp at one end of wire and other end of test lamp with the other end of the same wire, if the lamp does not glow, there is breakage in the wire, if it gives continuity with another wire, then there is short circuit and fuses will be blown off. Replace the wire or insulate it.</p> <p>3. Heating Element may be defective. Element may be burnt. It can be checked with series test lamp by disconnecting the main connections. If the element is burnt, the lamp will not give any continuity. It can also be tested for earth or leakage fault by touching one end of test lamp to any one terminal of the element and other end of test lamp to the metal part of the element. If there is an earth fault, the lamp will give light, if there is sparking, there will be leakage fault. The element will be replaced in case of earth fault.</p> <p>4. Thermostat device may be defective. Setting may be not proper or there may be leakage.</p> <p>This can also be tested by series test lamp and replaced.</p>	4

<p>21.</p>	<p>Precautions</p> <ol style="list-style-type: none"> 1. It is not used for the application having long duration of starting. i.e. more than 3 seconds. 2. The capacitor start motor should not be started too frequently 3. The voltage rating should not exceed. If voltage exceeds more than 25% the electrolytic capacitor when get damaged <p>Advantages</p> <ol style="list-style-type: none"> 1. It is simple and robust in construction 2. It is less expensive for a small letting up to 1 kW 3. It is used mostly in low power drives 4. It is used in small industrial and domestic application <p>Disadvantages</p> <ol style="list-style-type: none"> 1. It's efficiency is only 50% of the output 2. A starting torques is very low 3. It is not self-starting 4. It is costlier due to the centrifugal switch and capacitor 	<p>4</p>
<p>22.</p>	<p>To start and stop a three phase induction motor by Direct On Line (DOL) Starter. 2- Theory A Direct On Line (DOL) or across the line starter applies the full line voltage to the motor terminals. This is the simplest type of motor starter. A DOL motor starter also has protection devices and, in some cases, condition monitoring. Smaller sizes of direct on-line starters are manually operated; larger sizes use an electromechanical contactor (relay) to switch the motor circuit. Solid-state direct on line starters also exist. A direct on line starter can be used if the high inrush current of the started motor does not cause excessive voltage drop in the supply circuit. The maximum size of a motor allowed on a direct on line starter may be limited by the supply utility for this reason. For example, a utility may require rural customers to use reduced-voltage starters for motors larger than 4kW (5HP). DOL starting is sometimes used to start small water pumps, compressors, fans and conveyor belts. In the case of an asynchronous motor, such as the 3-phase squirrel-cage motor, the motor will draw a high starting current until it has run up to full speed. This starting current is typically 6-7 time greater than the full load current. To reduce the inrush current, larger motor will have reduced voltage starters or variable speed drives in order to minimize voltage dips to the power supply, or series resistance and inductance can be added.</p>	<p>4</p>

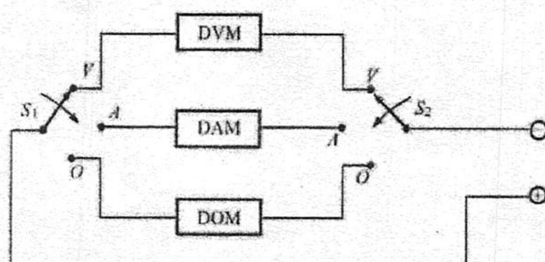


23.

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 function 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

24.	<p>Think before lifting/handling. Plan the lift. Can handling aids be used ? Where is the load going to be placed ? will help be needed with the load ? remove obstructions such as discarded wrapping materials. For a long lift, consider resting the load midway on a table or bench to change grip.</p> <p>Adopt a stable position. The feet should be apart with one leg slightly forward to maintain balance (alongside the load, if it is on the ground). Be prepared to move your feet during the lift to maintain your stability. Avoid tight clothing or unsuitable footwear, which may make this difficult.</p> <p>Get a good hold. Where possible, the load should be hugged as close as possible to the body. This may be better than gripping it tightly with hands only.</p> <p>Start in a good posture. At the start of the lift, slight bending of the back, hips and knees is preferable to fully flexing the back (stooping) or fully flexing the hips and knees (squatting).</p> <p>Don't flex the back any further while lifting. This can happen if the legs begin to straighten before starting to raise the load.</p> <p>Keep the load close to the waist. Keep the load close to the body for as long as possible while lifting. Keep the heaviest side of the load next to the body. If a close approach to the load is not possible, try to slide it towards the body before attempting to lift it.</p> <p>Avoid twisting the back or leaning sideways, especially while the back is bent. Shoulder should be kept level and facing in the same direction as the hips. Turning by moving the feet is better than twisting and lifting at the same time.</p> <p>Keep the head up when handling. Look ahead, not down at the load, once it has been held securely.</p> <p>Move smoothly. The load should not be jerked or snatched as this can make it harder to keep control and can increase the risk of injury.</p> <p>Don't lift or handle more than can be easily managed. There is a difference between what people can lift and what they can safely lift. If in doubt, seek advice or get helps.</p>	4
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