

# CBSE | DEPARTMENT OF SKILL EDUCATION

## ELECTRICAL TECHNOLOGY (SUBJECT CODE-819)

### MARKING SCHEME FOR CLASS XI (SESSION 2023-2024)

Max. Time: 3 Hours

Max. Marks: 60

#### General Instructions:

1. Please read the instructions carefully.
2. This Question Paper consists of **24 questions** in two sections – Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.
4. **Out of the given (6 + 18 =) 24 questions, a candidate has to answer (6 + 11 =) 17 questions in the allotted (maximum) time of 3 hours.**
5. All questions of a particular section must be attempted in the correct order.
6. **SECTION A - OBJECTIVE TYPE QUESTIONS (30 MARKS):**
  - i. This section has 06 questions.
  - ii. There is no negative marking.
  - iii. Do as per the instructions given.
  - iv. Marks allotted are mentioned against each question/part.
7. **SECTION B – SUBJECTIVE TYPE QUESTIONS (30 MARKS):**
  - i. This section contains 18 questions.
  - ii. A candidate has to do 11 questions.
  - iii. Do as per the instructions given.
  - iv. Marks allotted are mentioned against each question/part.

#### SECTION A: OBJECTIVE TYPE QUESTIONS

Q. No.	QUESTION	Source Material (NCERT/PSSCIVE/ CBSE Study Material)	Unit/ Chap. No.	Page no. of source material	Marks
<b>Q. 1</b>	<b>Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)</b>				
I.	Listening	PSSCIVE Book Class XI(ELHA) Book Name: Employability Skills	U-1	3	1
II.	False	PSSCIVE Book Class XI(ELHA) Book Name: Employability Skills	U-2	77	1
III.	Minimize	NCERT	U-3	29	1
IV.	Core value	NCERT	U-4	54	1
V.	All of the above	PSSCIVE Book Class XI(ELHA) Book Name: Employability Skills	U-5	189	1
VI.	Ctrl+n	PSSCIVE Book Class XI(ELHA) Book Name: Employability Skills	U-3	108	1
<b>Q. 2</b>	<b>Answer any 5 out of the given 7 questions (1 x 5 = 5 marks)</b>				
i.	True	CBSE Study material	U-1	7	1
ii.	12.5Ω	CBSE Study material	U-2	20	1
III.	False	CBSE Study material	U-9	307	1
iv.	Farads	CBSE Study material	U-3	103	1
v.	Copper	CBSE Study material	U-8	298	1
vi.	Joining of two metal pices.	CBSE Study material	U-8	301	1

vii.	An electrical drawing is a type of technical drawing that shows information about power, lighting, and communication for engineers.	CBSE Study material	U-10	320	1
<b>Q. 3</b>	<b>Answer any 6 out of the given 7 questions (1 x 6 = 6 marks)</b>				
i.	Watt	CBSE Study material	U-1	8	1
ii	True	CBSE Study material	U-2	23	1
III.	All of these	CBSE Study material	U-2	19	1
iv.	True	CBSE Study material	U-3	38	1
v.	Ampere hour rating	CBSE Study material	U-3	39	1
vi.	rad	CBSE Study material	U-1	13	1
vii	It is a process in which two or more items are joined together by melting and putting a filler metal (solder) into the joint.	CBSE Study material	U-8	298	1
<b>Q. 4</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>				
i.	True	CBSE Study material	U-11	313	1
ii	True	CBSE Study material	U-10	320	1
III.	True	CBSE Study material	U-11	334	1
iv.	True	CBSE Study material	U-2	5	1
v.	Lead 37% ,Tin 63%	CBSE Study material	U-8	303	1
vi.	Compact Fluorescent Lamp	CBSE Study material	U-4	86	1
<b>Q. 5</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>				
i.	True	CBSE Study material	U-5	103	1
ii	True	CBSE Study material	U-4	84s	1
III.	Short circuiting	CBSE Study material	U-11	334	1
iv.	True	CBSE Study material	U-7	373	1
v.	The current and capacity increases	CBSE Study material	U-3	39	1
vi.	All of these	CBSE Study material	U-8	304	1
<b>Q. 6</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>				
i.	True	CBSE Study material	U-9	311	1
ii	All of these	CBSE Study material	U-10	320	1
III.	North-South	CBSE Study material	U-6	222	1
iv.	690 kJ	CBSE Study material	U-4	79	1
v.	True	CBSE Study material	U-6	226	1
vi.	$XL = 3.7699\Omega$	CBSE Study material	U-7	276	1

## **SECTION B: SUBJECTIVE TYPE QUESTIONS**

Q. No.	QUESTION	Source Material (NCERT/PSSCIVE/ CBSE Study Material)	Unit/ Chap. No.	Page no. of source material	Marks
<b>Answer any 3 out of the given 5 questions on Employability Skills in 20 – 30 words each (2 x 3 = 6 marks)</b>					
<b>Q. 7</b>	Communication is the 'sharing' of information between two or more individuals or within the group to reach a common understanding. The word 'communication' comes from the Latin word Communicate, meaning 'to share'.	NCERT	U-1	12	2

<u>Q. 8</u>	Self-motivation is simply the force within you that drives you to do things. Self-motivation is what pushes us to achieve our goals, feel happy and improve our quality of life. In other words, it is our ability to do the things that need to be done without someone or something influencing us.	NCERT	U-2	103	2
<u>Q. 9</u>	There are many advantages of using a word processor. Some of these are: <ul style="list-style-type: none"> <li>• If you want to add something extra or remove, you can easily do it in a word document.</li> <li>• When making a resume (bio-data), it is important not to make any spelling mistakes. A word processor helps you check spelling and grammar</li> <li>• If you are writing a long report and you need to work on it for several days, you can save the report and get back to it whenever required</li> <li>• You can make the document attractive by adding different colors, text styles and text sizes.</li> </ul>	NCERT	U-3	117	2
<u>Q. 10</u>	Four basic qualities of an entrepreneur: <u>Confidence:</u> - Confidence means to believe in one's self and one's approach. an entrepreneur to take the first step of starting a new business and then trying new things to grow the business. <u>Independence:</u> - Independence means one's ability to work alone and have the confidences to make one's own decisions. <u>Perseverance:</u> - Perseverance means not to give up and keep going even when a difficult situation comes up. <u>Open-mindedness:</u> Open-mindedness means to be open to trying new things and being open to other's feedback.	NCERT	U-4	154	2
<u>Q. 11</u>	• Swachh Bharat Abhiyan (SBA) or Swachh Bharat Mission (SBM) or Clean India Mission This mission aims to clean up Indian cities, towns, and villages. One of its main aims is to achieve an Open-Defecation Free India by October 2, 2019, the 150th anniversary of the birth of Mahatma Gandhi, by constructing toilets across the country.	NCERT	U-5	190	2
<b>Answer any 3 out of the given 5 questions in 20 – 30 words each (2 x 3 = 6 marks)</b>					
<u>Q. 12</u>	Ohm's Law deals with the relationship between voltage and current. The potential difference (voltage) across an ideal	CBSE Study material	U-1	19	2

	<p>conductor is proportional to the current through it. The constant of proportionality is called the "resistance", R.</p> <p>Ohm's Law is given by: <math>V = I R</math> Where V is the potential difference between two points which include a resistance R. I is the current flowing through the resistance</p>				
<u>Q. 13</u>	<p><b>Advantages of primary cell:-</b> Small in size, light in weight Longer service per charge, No risk of leakage of chemicals, Transportation is easy, Easily available in most places, used in portable electronic devices.</p> <p><b>Disadvantages of primary cell:-</b> It cannot be recharged once it loses its electrical power. Not ideally suited for heavy loads. Limited capacity of charge storage. Shorter life span, Need to be replaced frequently Disposal: Contain toxic chemicals that can harm the environment</p>	CBSE Study material	<b>U-3</b>	<b>37</b>	<b>2</b>
<u>Q. 14</u>	<p>The quality factor (or Q) of a capacitor is the ratio of its reactance to its resistance at a given frequency, and is a measure of its efficiency. The higher the Q factor of the Capacitor, the closer it approaches the behavior of an ideal, lossless, capacitor. The Q factor of a capacitor can be found through the following formula: <math>Q = X_c / R_c</math></p>	CBSE Study material	<b>U-5</b>	<b>116</b>	<b>2</b>
<u>Q. 15</u>	<p><b>Soldering:</b> It is a process in which two or more items are joined together by melting and putting filler metal (solder) into the joint, the filler metal having a lower melting point than the adjoining .Solder is a metal alloy used to create a permanent bond between metal parts. Soldering filler metals melts below 450°C</p> <p><b>Brazing:</b> Brazing is a metal-joining process in which two or more metal items are joined together by melting and flowing a filler metal into the joint, the filler metal having a lower melting point than the adjoining metal. Melting point of filler metal is more than 450°C. Brazing is used for mechanical jobs due to high temperature involved</p>	CBSE Study material	<b>U-8</b>	<b>298 &amp; 301</b>	<b>2</b>
<u>Q. 16</u>	<p>Engineering drawing is a type of technical drawing that is used to convey information about an object. It is a graphical language of engineers to convey ones idea effectively</p>	CBSE Study material	<b>U-10</b>	<b>320</b>	<b>2</b>

	easily, conveniently Engineering drawing is called universal language of engineers because it is spoken, read, written and understand in its own way similar everywhere in the world. Engineering drawing has its own grammar in terms of projection, Conventional representation, and types of lines, Abbreviation, Symbols and various geometric constructions.				
<b>Answer any 2 out of the given 3 questions in 30– 50 words each (3 x 2 = 6 marks)</b>					
<b>Q. 17</b>	<p>1. When electric current flows through a metal wire, the wire gets heated up. This is called the heating effect of current. Example: a glowing electric bulb become warm, an electric heater produces heat when current flows through it.</p> <p>2. When an electric current flows through a wire, it produces magnetic effect around it. magnetic effect of current is used in many objects like, electric bell, motor, generators, transformers, fan etc.</p>	CBSE Study material	<b>U-4</b>	<b>76</b>	<b>3</b>
<b>Q. 18</b>	In an inductor AC circuit voltage leads current by phase angle difference is $90^\circ$ . Energy stored in building up current is returned back to current source. Hence average power consumed In 1 cycle is zero. The current across the inductor changes to equalize the current passing through it. The inductors acts as an ordinary wire and has zero internal resistance	CBSE Study material	<b>U-7</b>	<b>273</b>	<b>3</b>
<b>Q. 19</b>	<p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• The PMMC consumes less power and has great accuracy.</li> <li>• It has a uniformly divided scale and can cover an arc of 270 degrees.</li> <li>• The PMMC has a high torque to weight ratio.</li> <li>• It can be modified as ammeter or voltmeter with suitable resistance.</li> <li>• It has efficient damping characteristics and is not affected by stray magnetic field.</li> <li>• It produces no losses due to hysteresis.</li> </ul> <p><b>Disadvantage</b></p> <ul style="list-style-type: none"> <li>• The moving coil instrument can only be used on D.C supply as the reversal of current produces a reversal of torque on the coil.</li> <li>• It's very delicate and sometimes uses AC circuit with a rectifier.</li> </ul>	CBSE Study material	<b>U-9</b>	<b>311</b>	<b>3</b>

- It's costly as compared to moving coil iron instruments.
- It may show an error due to loss of magnetism of permanent magnet.

Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)

<p><b>Q. 20</b></p>	<p><b>Factors which effects the resistance of conductors:</b></p> <p>1. <b>Length of the conductor:</b> Resistance is directly proportional to the length of the conductor.</p> <p>2. <b>Area of cross section:</b> Resistance decreases with increase of cross section of the conductors.</p> <p>3. <b>Material of the conductor:</b> resistance depend on the material of the conductor</p> <p>4. <b>Temperature:</b> Resistance increase or decrease with temperature.</p> <p>5. <b>Conductivity of material:</b> Different material has different conductivity.</p> <p><b>Temperature coefficient of resistance:</b> It is measuring the resistance values over an appropriate temperature range. It is the relative change in resistance per degree change in temperature.</p>	<p>CBSE Study material</p>	<p><b>U-1</b></p>	<p><b>15 &amp; 16</b></p>	<p><b>4</b></p>
<p><b>Q. 21</b></p>	<p><b>(a) Fuel Cell:</b> The fuel cell represents the fourth category of batteries. Fuel cells are similar to batteries except for the fact that that all active materials are not an integral part of the device. In fuel cells, active materials are fed into batteries from an outside source. Application of fuel cells has been in cryogenic fuels used in space vehicles d into batteries from an outside source.</p> <p><b>(b) WET CELL:</b> Wet cell, sometimes called flooded, are made from a glass or plastic container filled with sulfuric acid in which lead plates are submerged. Application of wet cell are in automobiles, trucks, RVs, motorized wheelchairs, golf carts and emergency power backup systems in household and industrial applications.</p> <p><b>(c) DRY CELL:</b> dry cell that do not contain liquid that can be spilled. Main difference between wet cell and dry cell is that the sulfuric acid is not in liquid from, and therefore leaking is much less of a hazard. The smaller types of dry cell batteries, such as alkaline or nickel-cadmium, usually Cannot be manufactured in sizes or prices that could compete with the wet cell.</p>	<p>CBSE Study material</p>	<p><b>U-3</b></p>	<p><b>38</b></p>	<p><b>4</b></p>

<p><b>Q. 22</b></p>	<p><b>Faradays law of electromagnetic induction:</b></p> <ol style="list-style-type: none"> <li>1. It state that whenever a conductor is placed in a varying magnetic field, an electromotive force is induced.</li> <li>2. If the conductor is a closed loop, current is produced. This current is called induced current.</li> <li>3. Whenever a conductor is rotated in magnetic field emf is induced which are induced emf</li> <li>4. Electromotive force is the voltage produced by non-electrical sources.</li> </ol> <p><b>Self-induced emf :</b></p> <ol style="list-style-type: none"> <li>1. emf to be induced in a coil or circuit due to change in the flow of current in the same coil or circuit.</li> <li>2. It is the property of coils.</li> <li>3. Self-induced emf of coil depends on its dimensions.</li> </ol> <p><b>Mutually induced emf:</b></p> <ol style="list-style-type: none"> <li>1. emf to be induced in a coil or circuit due to change in the flow of current in a neighboring coil or circuit</li> <li>2. It is the property of a pair of coils.</li> <li>3. Mutually induced emf depends on their dimension as well as respective orientations.</li> </ol>	<p>CBSE Study material</p>	<p><b>U-6</b></p>	<p><b>223</b></p>	<p><b>4</b></p>
<p><b>Q. 23</b></p>	<p><b>Dynamometer type wattmeter:</b></p> <ul style="list-style-type: none"> <li>• It is an instrument which can measure power in single or three phase ac circuits. It gives reading directly in watts.</li> <li>• The wattmeter has two different coils namely voltage coil and current coil. The voltage coil is also called as pressure coil. It is the moving coil.</li> <li>• The current coil is the fixed coil. It is connected in series with the load. The resistance of current coil is small due to its large cross sectional area and small number of turns.</li> <li>• The voltage coil is always connected across the supply to measure the voltage. The resistance of voltage coil is large. It is made up of thin wire with large number of turns.</li> <li>• Dynamometer type wattmeter can be used for a.c as well as d.c measurements. It is free from hysteresis errors and the scale of the wattmeter is uniform.</li> </ul>	<p>CBSE Study material</p>	<p><b>U-9</b></p>	<p><b>312</b></p>	<p><b>4</b></p>

<p><b>Q. 24</b></p>	<p><b>Importance of safety devices:</b></p> <p><b>1. Switches:</b> Switch is device which controls the flow of electron. Control is of binary type i.e. either it allows the electron flow or it stops the electron flow completely.</p> <p>Safety switches protect you from electric shock. They turn off the electricity supply within milliseconds if an electric fault is detected. Switch is used to make or break an electric circuit.</p> <p><b>2. Fuses:</b> The primary use of an electric fuse is to protect electrical equipment from excessive current and to prevent short circuits.</p> <p>Each fuse have a maximum current handling capability or current rating above that current the fuse wire is blown away and protect the whole system from damage. It also protects overheating from excess current. Electrical fuse play the role of miniature circuit breakers.</p> <p><b>3. Earthing wire:</b> Earthing is grounding the astray currents in the circuit. Earthing give protection from electric overload. It helps to direct the current where we want. It stabilizes the voltage level.</p> <p>Earthing is used to protect you from an electric shock. It provides a path for a fault current to flow to earth. It also causes the protective device to switch off the electric circuit that has the fault.</p>	<p>CBSE Study material</p>	<p><b>U-11</b></p>	<p><b>333</b></p>	<p><b>4</b></p>
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