

CBSE|DEPARTMENT OF SKILL EDUCATION

ELECTRONICS TECHNOLOGY (SUBJECT CODE-820)

Marking Scheme for Class XI (Session 2024 - 2025)

Max. Time: 2 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 2 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 38 questions. A candidate has to do 30 questions.
 - ii. Marks allotted are mentioned against each question/part.
 - iii. There is no negative marking.
 - iv. Do as per the instructions given.
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.1	Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)	
i.	(c) Audience analysis	1
ii.	(b) Self-regulation	1
iii.	(a) It connects different network protocols.	1
iv.	(b) Issuing stocks to raise funds	1
v.	(a) The total amount of carbon dioxide emissions directly and indirectly caused by an individual, organization, or product	1
vi.	(b) Self-reflection and mindfulness	1
Q.2	Answer any 5 out of the given 7 questions (1 x 5 = 5 marks)	
i.	(d) 20 volts	1
ii.	(c) Semiconductor	1
iii.	(b) Electrons	1
iv.	(c) Diffusion	1
v.	(c) Emitter and collector	1
vi.	(b) To control the current flow	1
vii.	(b) Negative	1
Q.3	Answer any 6 out of the given 7 questions (1 x 6 = 6 marks)	
i.	(b) Base	1
ii.	(d) To reduce distortion	1
iii.	(a) Protons	1
iv.	(c) Electron	1
v.	(c) Time	1
vi.	(c) To deflect the electron beam	1
vii.	(a) Proton	1
Q.4	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
i.	(c) Ohm	1
ii.	(a) It doubles	1
iii.	(c) 10 volts	1
iv.	(c) Silicon	1
v.	(b) Holes	1
vi.	(c) Doping	1
Q.5	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
i.	(a) Base and emitter	1
ii.	(d) To control the flow of carriers	1
iii.	(b) Base	1
iv.	(d) To reduce noise	1
v.	(a) The ratio of input to output voltage	1
vi.	(b) Silicon	1
Q.6	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
i.	(c) Holes	1
ii.	d) Boron	1
iii.	b) Doping	1
iv.	b) Electrons	1
v.	b) Signal amplification	1
vi.	a) Base-emitter junction	1

SECTION B: SUBJECTIVE TYPE QUESTIONS

**Answer any 3 out of the given 5 questions on Employability Skills (2 x 3 = 6 marks)
Answer each question in 20–30 words.**

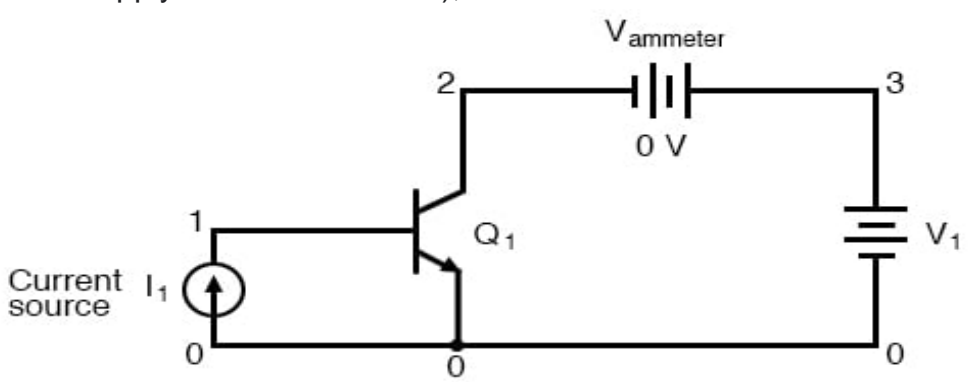
Q.7	Formal	Informal	
	Structured pathways, like official emails or memos. Example: A company-wide email from the CEO.	Unofficial, casual conversations. Example: Chatting with colleagues during lunch.	2
Q.8	Self-regulation involves managing emotions and behaviors, which is essential for personal and professional success, as it fosters resilience and effective decision-making.		2
Q.9	Encryption converts data into a coded form to prevent unauthorized access. It is crucial to safeguard sensitive information during transmission.		2
Q.10	Market research offers valuable insights into consumer needs and trends, essential for making informed decisions and reducing risks in the early stages of business.		2
Q.11	Sustainable agriculture safeguards the environment and improves long-term productivity. Methods such as crop rotation and agroforestry contribute to soil health and biodiversity.		2
Answer any 3 out of the given 5 questions in 20–30 words each (2 x3 = 6 marks)			
Q.12	The electrical conductivity of semiconductors increases with increasing temperature. This is due to the fact that with an increase in temperature, a large number of electrons from the valence band can jump to the conduction band.		2
Q.13	Both AC and DC describe the types of current flow in a circuit. In direct current (DC), the electric charge (current) only flows in one direction. Electric charge in alternating current (AC), on the other hand, changes direction periodically.		2
Q.14	The conductivity of semiconductors is increased by adding an appropriate amount of suitable impurity or doping. Doping can be done with an impurity that is electron-rich or electron-deficient as compared to the intrinsic semiconductor, silicon or germanium. Such impurities introduce electronic defects in them.		2
Q.15	On the p side, the holes constitute the dominant carriers and so are called majority carriers. A few thermally generated electrons will also exist on the p side; these are termed minority carriers. On the n side, the electrons are the majority carriers, while the holes are the minority carriers.		2
Q.16	The operation of the NPN transistor is based on the flow of electrons. The electrons flow from the collector to the emitter when the base voltage is less than the collector voltage. This flow of electrons creates a current from the collector to the emitter.		2

Answer any 2 out of the given 3 questions in 30–50 words each (3x2 = 6 marks)

Q.17	Semiconductors are known as the 'Brains of Modern Electronics'. Semiconductors are elements with a conductivity value between conductors and insulators. Example: Silicon, Germanium, Arsenide, and the elements near the 'metalloid staircase' on the periodic table.	3
Q.18	<p>The diode is a semiconductor device which allows the current to flow only in one direction, whereas the transistor transfers the resistance from the low-resistance region to high resistance region. ... The BJT uses both the electrons and hole as a charge carrier, and the FET is a unipolar transistor.</p> <p>A diode is two terminal semiconductor switching device which allows current flow only in one direction. A transistor is three terminal semiconductor device which is capable of switching and amplifying the signals. A diode is constructed by joining a P-type semiconductor material with an N-type semiconductor material.</p>	3
Q.19	The cathode-ray oscilloscope (CRO) displays waveforms by plotting voltage over time. It consists of a cathode-ray tube (CRT) and various circuits. The CRT uses an electron gun to generate a focused electron beam that is deflected by electric fields to scan a fluorescent screen, creating a visual display.	3

Answer any 3 out of the given 5 questions in 50–80 words each (4x3 = 12 marks)

Q.20	<p>Feedback Amplifiers are designed to use feedback for better output production. A part of the output is taken as feedback and used as input to minimize the losses. An amplifier is a device that amplifies the signal applied to its input.</p> <p>Negative feedback makes it possible to set the gain and cutoff frequency to the desired values, thereby improving their stability and reducing performance variation, part-to-part variation, and sensitivity to temperature and other environmental parameters.</p>	4
Q.21	<p>Transistor Biasing is the process of setting a transistors DC operating voltage or current conditions to the correct level so that any AC input signal can be amplified correctly by the transistor. Necessary of transistor biasing.</p> <p>Class A amplifiers are biased to operate in the linear region for the entire 360-degree input signal cycle. The biasing scheme aims to keep the transistor conducting continuously, even when there is no input signal. Biasing methods include fixed bias, self-bias (automatic bias), and collector current feedback bias.</p>	4
Q.22	<p>PNP switches ON by a low signal whereas NPN switches ON by a high signal. In PNP transistors, the P represents the polarity of the emitter terminal and N represents the polarity of the base terminal. In NPN, N represents the negatively charged coating of the material whereas P represents the positively charged layer.</p> <p>the PNP transistor operates with holes as the majority charge carriers, which is the opposite of the NPN transistor that operates with electrons as the majority charge carriers. In a PNP transistor, when a small negative voltage is applied to the base-emitter junction, the junction becomes forward-biased.</p>	4

<p>Q.23</p>	<p>A bipolar junction transistor is a three-terminal semiconductor device that consists of two pn junctions which are able to amplify or magnify a signal. It is a currently controlled device. The three terminals of the BJT are the base, the collector, and the emitter.</p> <p>When a transistor is in the fully off state (like an open switch), it is said to be cutoff. Conversely, when it is fully conductive between emitter and collector (passing as much current through the collector as the collector power supply and load will allow), it is said to be saturated.</p> 	<p>4</p>
<p>Q.24</p>	<p>The negative half cycle decreases the forward bias voltage across the emitter base junction. The decreasing collector base voltage decreases the collector current in the whole collector resistor R_c. Thus, the amplified load resistor appears across the collector resistor.</p> <p>The current gain of the common emitter amplifier is defined as the ratio of the change in collector current to the change in base current. The voltage gain is defined as the product of the current gain and the ratio of the output resistance of the collector to the input resistance of the base circuits.</p>	<p>4</p>