

CBSE|DEPARTMENT OF SKILL EDUCATION

ELECTRONICS TECHNOLOGY (SUBJECT CODE-820)

Marking Scheme for Class XII (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.	(b) Semantic noise	1
ii.	(c) Angela Duckworth	1
iii.	(b) Sending fraudulent emails or messages pretending to be a trustworthy entity	1
iv.	(a) Using personal savings and reinvesting profits to grow the business	1
v.	(a) Meeting present needs without compromising future generations' ability to meet their own needs	1
vi.	(d) Quickly recovering from setbacks and adapting to change	1
Q.2	Answer any 5 out of the given 7 questions (1 x 5 = 5 marks)	
i.	(b) By using a vibrating diaphragm and electromagnetic induction	1
ii.	(c) Tape recorder	1
iii.	(a) Higher fidelity and clearer sound reproduction	1
iv.	(c) To display images on the screen	1
v.	(c) Display panel	1
vi.	(c) It adjusts compressor speed based on cooling requirements	1
vii.	(a) An appliance that can communicate with other devices via the internet	1
Q.3	Answer any 6 out of the given 7 questions (1 x 6 = 6 marks)	
i.	(d) All of the above	1
ii.	(b) Ensure the equipment is turned off and unplugged	1
iii.	(a) To prevent damage to the components	1
iv.	(b) Electrostatic Discharge	1
v.	(d) Powder extinguisher	1
vi.	(b) Condenser microphone	1
vii.	(a) By using a vibrating diaphragm and electromagnetic induction	1
Q.4	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
i.	(c) To prevent wind and breath noise	1
ii.	(a) Diaphragm	1
iii.	(a) WAV	1
iv.	(a) Analog to Digital Converter	1
v.	(d) To control tape speed	1
vi.	(d) Video processor	1
Q.5	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
i.	(b) To improve video resolution	1
ii.	(d) OLED	1
iii.	(c) Variable speed operation	1
iv.	(a) By automatically adjusting temperature settings	1
v.	(a) Washing machine	1
vi.	(b) Rectification	1
Q.6	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
i.	(c) Silicon	1
ii.	(b) Rectification	1
iii.	(a) To store electrical energy	1
iv.	(a) Depletion region	1
v.	(b) Voltage amplification	1
vi.	(c) 10	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	Emotional intelligence helps individuals recognize and respond to non-verbal cues, such as body language and tone, enabling more empathetic conversations, like sensing a colleague's discomfort through their posture.		2
Q.8	Self-motivation is the internal drive to achieve goals without external influence. It can be developed by setting clear goals, maintaining discipline, and celebrating small victories, which fosters perseverance toward long-term objectives.		2
Q.9	Terms of Data	Cloud Storage	Local Storage
	Accessibility	Data can be accessed from any device with an internet connection, providing flexibility and remote access.	Data is stored on physical devices such as hard drives, and can only be accessed on the specific device unless manually transferred.
	Security	Security depends on the provider's measures, including encryption and firewalls, but it is vulnerable to hacking and breaches.	Provides greater control over data security but is susceptible to physical risks such as device theft or damage.
Q.10	Market segmentation involves dividing a broad market into smaller groups with similar characteristics to help businesses focus on specific customer needs, enhancing product relevance and marketing efficiency.		2
Q.11	The concept of sustainable development involves meeting the current generation's needs without compromising the ability of future generations to meet theirs. By promoting energy efficiency, the use of renewable energy, and sustainable resource management, it helps reduce global carbon emissions and mitigates the effects of climate change.		2
Answer any 3 out of the given 5 questions in 20–30 words each (2 x3 = 6 marks)			
Q.12	Before working on any electronics, consider following these basic safety precautions to help reduce any hazards. Remove any electronic equipment you're testing or working on from the power source. Never assume the power circuit is off. Test and test again with a voltmeter to confirm.		2
Q.13	The MSDS lists the hazardous ingredients of a product, its physical and chemical characteristics (e.g. flammability, explosive properties), its effect on human health, the chemicals with which it can adversely react, handling precautions, the types of measures that can be used to control exposure, emergency and first aid procedures, and methods to contain a spill. When new regulatory information, such as exposure limits, or new health effects information becomes available, the MSDS must be updated to reflect it.		2
Q.14	Grounding and shielding are two essential techniques for reducing noise, interference, and unwanted signals in your circuit design. They can improve the performance, reliability, and safety of your electrical system, whether you are working with analog, digital, or mixed-signal circuits.		2
Q.15	Unlike classic analog television, which uses continuous analog waves, digital television converts audio and video data into discrete binary (0s and 1s). The move from analog to digital broadcasting has resulted in several benefits and improvements in the delivery and reception of television programs.		2
Q.16	Signal-to-Noise Ratio is typically expressed in terms of decibels. The higher the SNR value, the better the output. The reason is that there's		2

	more useful information (signal) than unwanted data (noise) in a high SNR output. For instance, an SNR of 100dB is better than 70 dB.	
Answer any 2 out of the given 3 questions in 30–50 words each (3x2 = 6 marks)		
Q.17	Inverter AC uses variable speed compressors that adjust the cooling capacity. The non-inverter AC functions using fixed-speed compressor technology which cannot be adjusted and either be switched off or on. Because inverter air conditioners generally maintain more consistent temperatures than non-inverter types, reducing sharp temperature fluctuations, they are able to use less energy to cool or heat the room than non-inverter units.	3
Q.18	Smart thermostats can automatically adjust the heating and cooling of a home based on the time of day, occupancy patterns, and even weather forecasts. Similarly, smart lighting systems can turn off lights in unoccupied rooms or adjust brightness based on the natural light available, thus saving energy. Automated lighting systems adjust brightness and color based on the time of day or specific dining settings, enhancing the customer experience while saving energy. Smart kitchen appliances offer remote programming and monitoring capabilities, allowing for more efficient kitchen operations.	3
Q.19	Personal protective equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards. Personal protective equipment may include items such as gloves, safety glasses and shoes, earplugs or muffs, hard hats, respirators, or coveralls, vests and full-body suits.	3
Answer any 3 out of the given 5 questions in 50–80 words each (4x3 = 12 marks)		
Q.20	The Internet of Things (IoT) allows easy access to information from any location and on any device, at any time. For example, IoT enhances accessibility by providing real-time data, insights, intuitive interfaces, and proactive alerts. It also improves communication between connected electronic devices. Pros of IoT include easy access to information, smart cities, increased productivity, improved communication, and cost savings. However, cons of IoT include complexity, compatibility issues, privacy concerns, potential job displacement, and technology addiction.	4
Q.21	The aspect ratio of a movie is how wide the frame of the movie is versus how tall it is, usually expressed as a ratio. For example, most TVs and computer monitors are 1.77:1 (more often expressed on consumer packaging as 16:9), which means the screen itself is 1.77 times as wide as it is tall. By 2008, 16:10 had become the most common aspect ratio for LCD monitors and laptop displays. Since 2010, however, 16:9 has become the mainstream standard, driven by the 1080p standard for high-definition television and lower manufacturing costs.	4
Q.22	The key differences between recording to tape and digital are: Storage medium: Tape recording uses magnetic tape as the storage medium, while digital recording stores audio data in a digital format on various digital storage media like hard drives, solid-state drives, or optical discs. Sound quality: Digital recording generally provides higher fidelity and better sound quality compared to analog tape, with a wider dynamic range, lower noise, and less audible distortion.	4

	<p>Editing and post-production: Digital audio can be more easily edited, manipulated, and processed in post-production compared to tape, which requires physical splicing and editing.</p> <p>Non-destructive editing: Digital recordings can be edited non-destructively, meaning the original audio data is preserved, whereas tape edits are destructive.</p> <p>Random access: Digital audio allows for faster, random access to any part of the recording, unlike tape which requires linear access.</p> <p>Degradation: Tape recordings are more prone to degradation over time due to physical wear and tear, whereas digital recordings can be copied without loss of quality.</p> <p>High-Quality Sound Capture: One of the most significant advantages of digital audio recording is its ability to capture high-quality sound. Unlike analog recordings, which were prone to degradation and noise interference, digital audio offers pristine clarity and fidelity.</p>	
<p>Q.23</p>	<p>When selecting a microphone for voice recording, several factors need to be considered, including microphone quality, recording range, frequency response, polar patterns, sensitivity, SPL control, and budget constraints. Analyzing these aspects carefully will help you make informed decisions to optimize your vocal recordings and enhance your musical projects. There are different types of microphones, each with its own characteristics. The two main types of voice recording systems are condenser and dynamic microphones.</p> <ul style="list-style-type: none"> • Condenser microphones: Known for their flexibility and wide frequency range, condenser microphones are excellent for capturing the nuances of the voice. They are generally used in a studio environment and are ideal for genres such as pop, rock, and classical music. • Dynamic microphones: Robust and versatile, dynamic microphones are generally preferred for live use. While they may not capture the same level of detail as condenser mics, they handle higher sound pressures better and are suitable for louder types of music such as rock, hip-hop, and more. Consider your recording environment: <p>The recording environment greatly influences your choice of microphone.</p> <ul style="list-style-type: none"> • Studio Recording: When recording primarily in a controlled studio environment, condenser microphones are popular for their sensitivity and ability to capture incredible detail. • Live performance: Dynamic microphones are preferred for live performance due to their durability and ability to handle high SPL (sound pressure level) without distortion. • Frequency Response: Check the frequency response of the microphone, indicating the frequencies it can pick up. A flat, wide-frequency response is generally preferred for vocal recordings, as it allows for a faithful reproduction of the singer's voice. • Polar Patterns: Microphones come with different polar patterns like cardioid, omnidirectional, and figure-8. Cardioid is often recommended for voice recording, as it captures forward sound while minimizing background noise. • Sensitivity and SPL Handling: Sensitivity refers to the ability of the microphone to convert sound into an electrical signal. For voice, a simple soft microphone is generally preferred. In addition, consider the microphone's ability to control SPL, especially if you are recording loud content. 	<p style="text-align: center;">4</p>

Q.24

Safely disposing of electronic waste (e-waste) involves several steps to ensure environmental protection and data security. Here's an outline of the process:

1. Identify E-Waste: Determine which electronic items are no longer needed, including old computers, smartphones, tablets, batteries, and other electronic devices.
2. Data Security:
 - i. Backup Data - Save important files and data from devices to another storage medium or cloud service.
 - ii. Data Wipe - Use specialized software to securely erase data from devices to prevent data theft.
 - iii. Physical Destruction - For highly sensitive information, consider physically destroying the storage medium (e.g., hard drives) to ensure data cannot be retrieved.
3. Research Disposal Options:
 - i. Manufacturer Take-Back Programs - Check if the manufacturer offers a take-back or recycling program.
 - ii. Retailer Recycling Programs - Many electronics retailers offer recycling services.
 - iii. Municipal E-Waste Collection - Local governments often have designated e-waste collection days or drop-off centers.
4. Choose a Certified E-Waste Recycler: Look for e-waste recyclers certified by organizations such as e-Stewards or R2 (Responsible Recycling) to ensure they follow environmentally responsible practices.
5. Preparation for Disposal:
 - i. Remove Batteries - If possible, remove batteries from devices as they often require separate handling.
 - ii. Package E-Waste - Pack e-waste securely for transportation, especially if mailing to a recycler or take-back program.
6. Transportation:
 - i. Drop-off - Take the e-waste to a designated drop-off location, such as a municipal collection site or retailer.
 - ii. Mail-in Programs - If using a mail-in program, follow the provided instructions for shipping the e-waste safely.
7. Recycling and Processing:
 - i. The recycler will process the e-waste, separating and recovering valuable materials such as metals, plastics, and glass.
 - ii. Hazardous components, like lead and mercury, are safely managed to prevent environmental contamination.
8. Documentation and Tracking:
 - i. Obtain documentation or certification from the recycler to verify that the e-waste has been processed responsibly.
 - ii. Some programs offer tracking to show how and where e-waste was recycled.
9. Promote and Educate: Spread awareness about the importance of e-waste recycling and proper disposal methods within your community or organization.

Following these steps ensures that electronic waste is disposed of in an environmentally friendly and secure manner, reducing the risk of pollution and data breaches.

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