CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Artificial Intelligence

Subject Code: 417 | Class X

Question Bank – Set 4

Questions in this Booklet

Ch.	Chapter	MCQs	A-R	VSA	SA	LA	CS	All
1	Communication Skills – II	9	0	3	5	0	0	**17**
2	Self-Management Skills – II	9	0	3	5	0	0	**17**
3	Information and Communication Technology Skills – II	9	0	3	5	0	0	**17**
4	Entrepreneurial Skills – II	9	0	3	5	0	0	**17**
5	Green Skills – II	9	0	3	5	0	0	**17**
6	Revisiting AI Project Cycle & Ethical Frameworks for AI	12	3	4	5	2	2	**28**
7	Advanced Concepts of Modeling in AI	12	3	4	5	2	2	**28**
8	Evaluating Models	12	3	4	5	2	2	**28**
9	Computer Vision	12	3	4	5	2	2	**28**
10	Natural Language Processing	12	3	4	5	2	2	**28**
	Total	**105**	**15**	**35**	**50**	**10**	**10**	**225**

MCQs = Multiple Choice; A-R = Assertion–Reason; VSA = Very Short Answer; SA = Short Answer; LA = Long Answer; CS = Case Study / Source-based.

About this booklet: Chapters 1–5 = Part A Employability Skills; Chapters 6–10 = Part B Subject Specific Skills (theory-assessed units). Units 4 (Statistical Data) and 7 (Advance Python) are assessed through practicals only and are therefore not included. Marks: MCQ/A-R/VSA = 1, SA = 2, LA = 4, Case Study = 4. Questions tagged in grey come from CBSE Sample Papers / Board papers; the others are CBSE-pattern practice questions.

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Answer Key (MCQs and Assertion–Reason) **27**

1. Communication Skills – II

Part A, Unit 1

Multiple Choice Questions (MCQs)

Q1. The sentence that states the main idea of a paragraph is the: **[1]**

(a) Concluding sentence (b) Supporting sentence
(c) Topic sentence (d) Transition word

Q2. A rigid chain of command that delays messages is an example of which barrier? **[1]**

(a) Interpersonal (b) Cultural (c) Linguistic (d) Organisational

Q3. Using facts, figures and specific examples in a message makes it: **[1]**

(a) Concrete (b) Careless (c) Complete (d) Casual

Q4. Which kind of sentence expresses strong emotion? **[1]**

(a) Assertive (b) Interrogative (c) Imperative (d) Exclamatory

Q5. Facial expressions, voice tone and posture together form: **[1]**

(a) Written communication (b) Oral communication
(c) Visual communication (d) Non-verbal communication

Q6. A message whose ideas follow a logical sequence and connect smoothly is: **[1]**

(a) Concise (b) Coherent (c) Concrete (d) Courteous

Q7. Which of these is an example of oral communication? **[1]**

(a) A telephone call (b) A facial expression
(c) A traffic sign (d) A bar chart

Q8. Which is NOT one of the 7 Cs of effective communication? **[1]**

(a) Clear (b) Concise (c) Careless (d) Courteous

Q9. Which message reflects the 'Courteous' principle? **[1]**

(a) Send the file now. (b) Could you please send the file? Thank you.
(c) File. Now. (d) Send it, fast

Very Short Answer (VSA)

Q10. Any factor that hinders a message from reaching the receiver as intended is called a _____. **[1]**

Q11. The medium through which a message travels from sender to receiver is called the _____. **[1]**

Q12. The main idea of a paragraph is stated in its _____ sentence. **[1]**

Short Answer (SA)

Q13. What is feedback? Why is it important in the communication cycle? **[2]**

Q14. Explain the difference between subject and predicate with one example. **[2]**

Q15. Classify each sentence as assertive, interrogative, imperative or exclamatory: (i) Where is your bag? (ii) Please close the door. **[2]**

Q16. What is descriptive feedback? Rewrite 'Your report is weak' as descriptive feedback. **[2]**

Q17. Explain the 'Concise' and 'Coherent' principles of effective communication. **[2]**

2. Self-Management Skills – II

Part A, Unit 2

Multiple Choice Questions (MCQs)

Q1. Which of the following does not help in stress management? **[1]**

[Board 2025]

(a) Negative thoughts (b) Healthy food (c) Sound sleep (d) Yoga asanas

Q2. Meditation is useful for stress management because it: **[1]**

(a) Increases anger
(b) Stops all thinking permanently
(c) Improves concentration and calms the mind
(d) Replaces sleep

Q3. Self-regulation is best described as: **[1]**

(a) Controlling others' behaviour
(b) Ignoring rules
(c) Controlling one's own emotions and behaviour
(d) Spending money freely

Q4. Which is a stress-management technique? **[1]**

(a) Skipping meals (b) Overworking (c) Physical exercise (d) Ignoring rest

Q5. Which of the following is not a step to build self-motivation? **[1]**

[Board 2025]

(a) Focusing on your goal
(b) Being indisciplined
(c) Planning to achieve your goal
(d) Finding out your strengths

Q6. Which behaviour shows the ability to work independently? **[1]**

(a) Waiting for instructions at every step
(b) Avoiding all decisions
(c) Taking initiative to complete tasks without constant supervision
(d) Depending on others for every task

Q7. In SMART goals, 'T' stands for: **[1]**

(a) Tangible (b) Trial (c) Tested (d) Time-bound

Q8. Self-motivation means: **[1]**

(a) Driving oneself to achieve goals without external pressure
(b) Being driven only by external rewards
(c) Waiting for others to start
(d) Avoiding challenges

Q9. Why is a nature walk recommended for stress management? **[1]**

(a) It increases screen time
(b) It helps relax and refresh the mind
(c) It adds to work pressure
(d) It reduces sleep

Very Short Answer (VSA)

Q10. Self-awareness is the understanding of one's own strengths, weaknesses and _____. **[1]**

Q11. In SMART goals, the letter 'S' stands for _____. **[1]**

Q12. _____ management means managing one's stress to maintain a healthy body and mind. **[1]**

Short Answer (SA)

Q13. Explain self-regulation. Give one example. **[2]**

Q14. How does setting SMART goals help a student? Explain. **[2]**

Q15. Enlist the four steps that Sameera must have followed for effective time management. **[2]**

[SQP 2022-23; MS 2022-23]

Q16. Explain the importance of working independently at school or in the workplace. **[2]**

Q17. Write two ways in which yoga helps in managing stress. **[2]**

3. Information and Communication Technology Skills – II

Part A, Unit 3

Multiple Choice Questions (MCQs)

Q1. Which malware disguises itself as useful software and then destroys data? **[1]**
(a) Worm (b) Firewall (c) Trojan Horse (d) Anti-virus

Q2. Small pictures on the desktop that open a program or file are called: **[1]**
(a) Menus (b) Tabs (c) Icons (d) Cursors

Q3. Which mouse action opens a file or folder in Windows? **[1]**
(a) Hover (b) Drag (c) Single-click (d) Double-click

Q4. Unwanted advertising e-mails sent in bulk are called: **[1]**
(a) Backup (b) SPAM (c) Shortcut (d) Icon

Q5. Which is an example of an internet scam? **[1]**
(a) A lottery prize that needs a deposit of money to claim
(b) An official school website
(c) An e-mail from your class teacher
(d) A backup on an external drive

Q6. The extension '.jpg' at the end of a file name indicates the: **[1]**
(a) File size (b) File type (c) File colour (d) Date created

Q7. Which of these is a mobile operating system? **[1]**
(a) Microsoft Word (b) Google Android (c) Adobe Photoshop (d) Google Chrome

Q8. The SPAM folder in e-mail software is used to: **[1]**
(a) Store photos (b) Delete all e-mails
(c) Hold passwords (d) Store unwanted mails automatically

Q9. Which term describes a container that holds files and other folders? **[1]**
(a) Cursor (b) Icon (c) Folder (d) Browser

Very Short Answer (VSA)

Q10. A _____ monitors data coming in and out of a computer to block unauthorised access. **[1]**

Q11. Scanning the whole computer for viruses is part of the _____ maintenance schedule. **[1]**

Q12. Software that detects and removes harmful programs is called _____. **[1]**

Short Answer (SA)

Q13. Explain why 'Ram123' is a weaker password than 'R@m!2026q'. **[2]**

Q14. Why should temporary files be removed regularly? Explain. **[2]**

Q15. Explain the purpose of a firewall. **[2]**

Q16. Give two daily maintenance tasks for keeping a computer in good condition. **[2]**

Q17. What is information leakage? Give one example. **[2]**

4. Entrepreneurial Skills – II

Part A, Unit 4

Multiple Choice Questions (MCQs)

Q1. Which of the following is not a task of an entrepreneur? **[1]**

[Board 2023]

(a) Sharing of wealth
(b) Preferably using foreign materials
(c) Fulfilling customer needs
(d) Helping society

Q2. Which of these is NOT a myth about entrepreneurship? **[1]**

(a) Entrepreneurs must take responsibility for their decisions
(b) Entrepreneurs are born, not made
(c) Every business idea must be unique
(d) A lot of money is needed to start a business

Q3. A small shop owner sells the same goods as nearby shops and never tries anything new. He is best called: **[1]**

(a) An entrepreneur
(b) A businessman
(c) A wage-employed person
(d) A consumer

Q4. After many years, an entrepreneur decides to stop running the business and hand over its work. Which stage of the career process is this? **[1]**

(a) Enter (b) Survive (c) Grow (d) Retire

Q5. What is capital in the context of starting a business? **[1]**

(a) Profit earned by the business
(b) Money used to start a business
(c) The workers employed by the business
(d) The customers who buy goods

Q6. Which of the following is NOT a function of an entrepreneur? **[1]**

(a) Making decisions
(b) Managing the business
(c) Avoiding new ideas
(d) Dividing income

Q7. Which of these is a positive impact of entrepreneurs on society? **[1]**

(a) Giving money to build schools and hospitals
(b) Increasing pollution
(c) Ending trade in the market
(d) Reducing employment

Q8. The Enter stage of the entrepreneurial career process is when an entrepreneur: **[1]**

(a) Is thinking about retirement
(b) Is expanding to other cities
(c) Is just entering the market to do business
(d) Is closing the business

Q9. Which of these is a myth about entrepreneurship as a career? **[1]**

(a) Entrepreneurs make decisions every day
(b) Entrepreneurs arrange raw materials
(c) Entrepreneurs help society
(d) Entrepreneurship is always easy and needs no effort

Very Short Answer (VSA)

Q10. Name the quality of an entrepreneur who listens calmly to an angry customer without getting angry. **[1]**

Q11. Name the function in which an entrepreneur spends money to buy material, pay rent and pay salaries. **[1]**

Q12. True or False: Entrepreneurship means working for a fixed salary in an organisation. **[1]**

Short Answer (SA)

Q13. Give any two key roles performed by an entrepreneur. **[2]**

[Board 2023]

Q14. 'Entrepreneurs are born, not made.' Do you agree with this statement? Justify your answer. **[2]**

[SQP 2021-22; MS 2021-22]

Q15. Name two qualities of a successful entrepreneur and explain why each is important. **[2]**

Q16. Explain the function 'creating a new method, idea or product' with an example. **[2]**

Q17. Explain how buying and selling in a market helps a locality grow. **[2]**

5. Green Skills – II

Part A, Unit 5

Multiple Choice Questions (MCQs)

Q1. Using public transport to reduce vehicle emissions is an example of: **[1]**

(a) Industrial pollution (b) Deforestation
(c) Environmental citizenship (d) E-waste generation

Q2. An environmentally responsible person who avoids wastage of water and food shows: **[1]**

(a) Greed (b) Environmental citizenship
(c) Negligence (d) Ignorance

Q3. Assertion (A): Green skills are essential for sustainable development. Reason (R): They help in reducing environmental impact and promote eco-friendly practices. **[1]**

[Board 2025 Comptt]

(a) Both A and R are true, but R is not the correct explanation of A.
(b) Both A and R are true and R is the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

Q4. Which SDG focuses on 'Sustainable Cities and Communities'? **[1]**

(a) SDG 14 (b) SDG 2 (c) SDG 16 (d) SDG 11

Q5. Which SDG deals with 'Zero Hunger'? **[1]**

(a) SDG 10 (b) SDG 12 (c) SDG 16 (d) SDG 2

Q6. Drip irrigation is a method that: **[1]**

(a) Floods the whole field
(b) Burns crop residue
(c) Sprays chemicals on crops
(d) Delivers water slowly to the roots of plants

Q7. In which year were the Sustainable Development Goals launched? **[1]**

(a) 2005 (b) 2015 (c) 2010 (d) 2020

Q8. Organic farming uses which type of fertiliser? **[1]**

(a) Chemical fertilisers (b) Industrial waste
(c) Natural fertilisers such as cow dung (d) Diesel

Q9. Which SDG is 'Gender Equality'? **[1]**

(a) SDG 6 (b) SDG 7 (c) SDG 5 (d) SDG 10

Very Short Answer (VSA)

Q10. True or False: Deforestation is a man-made cause of ecological imbalance. **[1]**

Q11. Fill in: The 2030 Agenda for Sustainable Development was launched at the United Nations Sustainable Development Summit in the year _____. **[1]**

Q12. True or False: Organic farming uses chemical pesticides. **[1]**

Short Answer (SA)

Q13. Name SDG 13 and SDG 15 and state the goal of each. **[2]**

Q14. Why is it important to segregate waste at home? Explain. **[2]**

Q15. Explain environmental citizenship with one example. **[2]**

Q16. Explain how solar energy helps achieve SDG 7 and SDG 13. **[2]**

Q17. Name two types of pollution and state one cause of each. **[2]**

6. Revisiting AI Project Cycle & Ethical Frameworks for AI

Part B, Unit 1

Multiple Choice Questions (MCQs)

Q1. The primary domain of application for Bioethics is: **[1]**

(a) Agriculture (b) Environmental conservation
(c) Information technology (d) Healthcare and life sciences

Q2. The stage of the AI Project Cycle in which data is collected from various reliable and authentic sources is: **[1]**

(a) Data Exploration (b) Modelling (c) Evaluation (d) Data Acquisition

Q3. Identify the incorrect statement from the following: (i) AI models can be broadly categorised into four domains. (ii) Data sciences is one of the domains of AI models. (iii) Price comparison websites are examples of data science. (iv) The information extracted through data science can be used to make decisions. **[1]**

[Board 2023]

(a) Only (i) (b) (ii) and (iv) (c) (i) and (iii) (d) Only (iv)

Q4. Which of the following is NOT a principle of bioethics? **[1]**

(a) Respect for autonomy (b) Do not harm
(c) Maximise processing speed (d) Give justice

Q5. Ethical frameworks for AI can be categorised into: **[1]**

(a) Legal and illegal frameworks (b) Historical and contemporary frameworks
(c) Sector-based and value-based frameworks (d) Theoretical and practical frameworks

Q6. Which AI domain is used in surveillance systems that monitor public spaces, detect suspicious activities and track vehicles? **[1]**

(a) Natural Language Processing (b) Statistical Data
(c) Computer Vision (d) Association models

Q7. Which of the following is NOT a sector in which sector-based ethical frameworks apply? **[1]**

(a) Finance (b) Law enforcement (c) Virtue (d) Agriculture

Q8. Which pair of applications belongs to the Natural Language Processing domain? **[1]**

(a) Face filters and facelock
(b) Email filters and machine translation
(c) Price comparison and recommendation engines
(d) Drone imaging and surveillance

Q9. The bioethics principle of 'non-maleficence' means: **[1]**

(a) Distributing benefits and burdens fairly
(b) Maximising the well-being of individuals and society
(c) Letting patients take their own decisions
(d) Avoiding actions that cause harm

Q10. After a model is evaluated and improved, the AI project cycle ends with the model being: **[1]**

(a) Discarded
(b) Deployed in the real world for users and stakeholders
(c) Re-scoped from the beginning
(d) Stored without use

Q11. Virtue ethics in AI could involve considering whether: **[1]**

(a) Developers, users and regulators uphold ethical values throughout the AI lifecycle
(b) The model runs on the fastest hardware
(c) Data is stored in the cloud
(d) The accuracy metric is above 50%

Q12. Ethics are best described as: **[1]**
(a) A set of values or morals which help us separate right from wrong
(b) A list of computer programs
(c) A data structure
(d) A type of sensor

Assertion–Reason

Q13. **Assertion (A):** In the AI project cycle, Data Acquisition comes before Data Exploration.
Reason (R): Data must first be collected before it can be visually explored and interpreted for patterns. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q14. **Assertion (A):** Frameworks provide a step-by-step guide for solving problems in an organised manner.
Reason (R): A structured approach ensures that all relevant factors and considerations are taken into account. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q15. **Assertion (A):** Ethical frameworks help us ensure that the choices we make do not cause unintended harm.
Reason (R): Ethical frameworks provide a systematic approach to navigating complex moral dilemmas. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Very Short Answer (VSA)

Q16. The last stage of the AI Project Cycle is _____. **[1]**

Q17. In the My Goodness activity, players make _____ decisions on how they would like to make a charitable donation. **[1]**

Q18. The AI domain that deals with the interaction between computers and humans using natural language is _____. **[1]**

Q19. Name the value-based framework that prioritises human rights and dignity. **[1]**

Short Answer (SA)

Q20. Explain the difference between sector-based and value-based ethical frameworks with one example of each. **[2]**

[Board 2026]

Q21. Ajay wants to access data from various sources. Suggest him any two points that he needs to keep in mind while accessing data from any data source. **[2]**

[SQP 2023-24; SQP 2024-25; MS 2023-24; MS 2024-25]

Q22. What is Computer Vision? Give one example of how it is used in agriculture. **[2]**

Q23. What role does data play in AI based applications? Name any two sources of online data collection for building any AI based application. **[2]**

[Board 2024]

Q24. Explain any two of the three value-based ethical frameworks. **[2]**

Long Answer (LA)

Q25. Consider the following scenarios and identify which AI domain would be most appropriate for each, with justification: **[4]**

[Board 2026 (adapted)]

(a) An AI based education platform needs to translate to English language and analyze thousands of student essays to provide instant feedback on grammar, content quality and writing style. [2]

(b) An AI based application installed on a busy crossing in a metropolitan city scans all vehicles driving through that crossing during peak traffic hours and categorizes them into four wheelers and two wheelers. [2]

Q26. What is Bioethics? Explain its four principles in detail. **[4]**

Case Study

Case Study: Bioethics is an ethical framework used in healthcare and life sciences. It deals with ethical issues related to health, medicine, and biological sciences, ensuring that AI applications in healthcare adhere to ethical standards and considerations. Its four principles are: respect for autonomy, do not harm, ensure maximum benefit for all, and give justice.

Q27. Answer the following questions based on the case above. **[4]**

(i) Why is Bioethics called a sector-based framework? Name the sector it is tailored to. [2]

(ii) Mention any two other sectors for which sector-based ethical frameworks may be developed. [2]

Case Study: A city corporation wants to modernize its services using AI. It floats a plan with four ideas: (a) a portal where citizens compare property prices offered by different brokers, (b) cameras at traffic junctions that read number plates of vehicles, (c) a helpline that transcribes citizens' spoken complaints into text records, and (d) software that studies years of water-consumption records to predict shortages.

Q28. Answer the following questions based on the case above. **[4]**

(i) Identify the AI domain for each of the four ideas. [2]

(ii) On what basis are AI models categorised into these domains? Justify the domain you assigned to idea (b). [2]

7. Advanced Concepts of Modeling in AI

Part B, Unit 2

Multiple Choice Questions (MCQs)

Q1. In supervised learning, what is the purpose of the testing dataset? **[1]**

[Board 2026]

(a) To train the model.
(b) To create new features.
(c) To evaluate the model's accuracy.
(d) To label the data.

Q2. Which layer performs most of the computation in a neural network, using weights and biases? **[1]**

(a) Input layer (b) Output layer (c) Testing layer (d) Hidden layer

Q3. In a perceptron, the inputs are combined by: **[1]**

(a) A weighted sum of the inputs plus a bias
(b) Multiplying all inputs together
(c) Sorting the inputs by value
(d) Taking the average of the labels

Q4. In reinforcement learning, an agent learns by: **[1]**

(a) Reading labelled examples only
(b) Copying a fixed rule book
(c) Trial and error with rewards and penalties
(d) Clustering unlabelled data

Q5. The bias in a neural node is used to: **[1]**

(a) Remove noise from the input
(b) Store the training labels
(c) Shift the weighted sum so the node can produce output more flexibly
(d) Count the hidden layers

Q6. Which statement about testing data is true? **[1]**

(a) It is used to train the model's weights.
(b) It always has more rows than the training data.
(c) It is the same as the label column.
(d) It is unseen data used to check the model's accuracy.

Q7. In a perceptron, a larger weight for an input means that input: **[1]**

(a) Is ignored by the model
(b) Is always negative
(c) Is a label
(d) Has more influence on the output

Q8. What is a key advantage of an artificial neural network? **[1]**

(a) It needs a programmer to list all features manually
(b) It extracts data features automatically without explicit programming
(c) It works only with labelled images
(d) It cannot process large data

Q9. In which layers of a neural network is no processing of data done? **[1]**

(a) Hidden and output layers
(b) Only the hidden layers
(c) Input and output layers
(d) Input and hidden layers

Q10. Whenever we want an AI project to be able to predict an output, we need to _____ it first using the data. **[1]**

[Board 2025 (reworded)]

(a) test (b) train (c) deploy (d) label

Q11. Recognising a number such as 5281 written by a finger scribble on a phone screen is an example of: **[1]**

(a) Data acquisition
(b) Text normalisation
(c) Digit recognition (deep learning)
(d) Stemming

Q12. Artificial neural networks are inspired by the structure of the: **[1]**

(a) Solar system (b) Computer keyboard (c) Human brain (d) Printing press

Assertion–Reason

Q13. **Assertion (A):** Supervised learning uses labelled data.
Reason (R): Supervised learning uses rewards and penalties to learn. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q14. **Assertion (A):** Training data must contain labels in supervised learning.
Reason (R): In supervised learning, correct outputs are provided with the examples so that the model learns the correct answers. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q15. **Assertion (A):** Convolutional neural networks are a type of deep learning model.
Reason (R): Deep learning models are used in image processing. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Very Short Answer (VSA)

Q16. _____ learning works on unlabelled data to find hidden patterns. **[1]**

Q17. Count the number of instances (records) in the table above. **[1]**

Student	Study hours	Attendance (%)	Result
Asha	4	90	Pass
Ravi	2	60	Fail
Meena	5	85	Pass
Kabir	1	50	Fail

Q18. State True or False: Machine learning and Deep learning are part of Artificial Intelligence, but not everything that is Machine Learning will be Deep Learning. **[1]**

[Board 2025 Comptt]

Q19. State True or False: The output layer of a neural network performs most of the processing. **[1]**

Short Answer (SA)

Q20. How is reinforcement learning different from supervised and unsupervised learning? **[2]**

[SQP 2025-26]

Q21. Differentiate between the rule-based approach and the learning-based approach. **[2]**

Q22. Explain regression with the help of an example. **[2]**

Q23. State the function of the input layer and the output layer of a neural network. **[2]**

Q24. Why should testing data be kept separate from training data? **[2]**

Long Answer (LA)

Q25. Explain the difference between classification and clustering, with one example of each. **[4]**

Q26. Differentiate between Deep Learning, Artificial Intelligence and Machine Learning, and explain how they are related. **[4]**

[Board 2026 (Venn diagram replaced by text)]

Case Study

Case Study: A retail chain groups its 5,000 customers into clusters based on their purchase amounts and visit frequency, without any predefined customer types.

Q27. Answer the following questions based on the case above. **[4]**

(i) Identify the model used. [1]

(ii) Explain how the clusters are formed. [1]

(iii) Is the data labelled? Give a reason. [1]

(iv) Give one business use of this result. [1]

Case Study: A robot vacuum cleaner learns to avoid obstacles in new rooms. It gets +1 point when it moves freely and –1 point when it bumps into a wall.

Q28. Answer the following questions based on the case above. **[4]**

(i) Name the type of learning used. [1]

(ii) Explain how the robot learns. [1]

(iii) Name the approach used if the programmer had written all the obstacle rules by hand. [1]

(iv) State one advantage of the learning-based approach in this case. [1]

8. Evaluating Models

Part B, Unit 3

Multiple Choice Questions (MCQs)

Q1. Which of the following best defines overfitting? **[1]**
(a) The model performs poorly on training data but well on testing data
(b) The model performs well on training data but poorly on unseen data
(c) The model uses too few features
(d) The model has zero error on every dataset

Q2. TP = 50, FP = 10, FN = 30 and TN = 110. What is the precision? **[1]**
(a) 0.63 (b) 0.83 (c) 0.50 (d) 0.73

Q3. F1 score is the measure of the balance between: **[1]**
[SQP 2024-25; Board 2023]
(a) Accuracy and Precision (b) Precision and Recall
(c) Recall and Accuracy (d) Recall and Reality

Q4. In a spam email detection system, out of 1000 emails received, 300 are spam. The system correctly identifies 240 spam emails as spam, but it also marks 60 legitimate emails as spam. What is the precision of the system? **[1]**
[SQP 2025-26]
(a) 0.80 (b) 0.70 (c) 0.75 (d) 0.90

Q5. A disease test has TP = 45 and FN = 15. What is its recall? **[1]**
(a) 0.45 (b) 0.25 (c) 0.60 (d) 0.75

Q6. What is the primary need for evaluating an AI model's performance in the AI model development process? **[1]**
[Board 2024]
(a) To increase the complexity of the model.
(b) To visualise the data.
(c) To reduce the amount of data used for training.
(d) To assess how well the chosen model will work in future.

Q7. Statement 1: The testing data set is a collection of examples given to the model to analyse and learn. Statement 2: The training data set is used to test the accuracy of the model. Which of the following is correct? **[1]**
[SQP 2025-26]
(a) Both Statement 1 and Statement 2 are correct.
(b) Only Statement 1 is correct.
(c) Both Statement 1 and Statement 2 are incorrect.
(d) Only Statement 2 is correct.

Q8. Why is the F1 score useful? **[1]**
(a) It ignores False Negatives
(b) It always equals accuracy
(c) It uses only True Negatives
(d) It balances precision and recall in a single value

Q9. A model has precision 0.9 and recall 0.9. Its F1 score is: **[1]**
(a) 0.81 (b) 0.90 (c) 1.80 (d) 0.45

Q10. Which of the following scenarios might have a high False Negative (FN) cost? **[1]**
[Board 2025]
(a) Viral Disease Outbreak (b) Spam
(c) Mining (d) Image Search

Q11. A spam filter must avoid sending important emails to the spam folder. Which metric should be prioritised? **[1]**

(a) Recall (b) Precision (c) Training time (d) Error rate

Q12. In a spam filter, a False Positive occurs when: **[1]**

(a) A spam email is placed in the inbox
(b) A spam email is correctly caught
(c) A legitimate email reaches the inbox
(d) A legitimate email is marked as spam

Assertion–Reason

Q13. **Assertion (A):** Underfitting occurs when a model is too simple to capture the patterns in the data.
Reason (R): An underfitted model gives poor accuracy even on its training data. **[1]**

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q14. **Assertion (A):** A confusion matrix is used to evaluate classification models.
Reason (R): For a binary classification problem, a confusion matrix has two rows and two columns. **[1]**

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q15. **Assertion (A):** Recall is the most suitable metric for a fire alarm system.
Reason (R): Recall penalises False Negatives, that is, real fires that the alarm misses. **[1]**

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Very Short Answer (VSA)

Q16. When a model is evaluated on the training data, it always predicts correctly but performs poorly on unseen data. This is known as _____. **[1]**

[SQP 2024-25; Board 2025 Comptt]

Q17. In a fire alarm, a False Negative means the alarm stays silent when a fire is _____. **[1]**

Q18. State True or False: Accuracy is always the best metric to use for an imbalanced dataset. **[1]**

Q19. A model that performs poorly on both training and testing data is said to be suffering from _____. **[1]**

Short Answer (SA)

Q20. Explain the difference between overfitting and underfitting of a model, with one example of each. **[2]**

Q21. Explain the term True Negative with an example. **[2]**

Q22. Give any two characteristics of a Classification Model. **[2]**

[Board 2026]

Q23. What do you mean by evaluation of an AI model? Also explain the concept of overfitting with respect to AI model evaluation. **[2]**

[Board 2024]

Q24. Why can accuracy be misleading for an imbalanced dataset? Explain with an example. **[2]**

Long Answer (LA)

Q25. Explain bias, transparency and accuracy as ethical concerns in the evaluation of an AI model used for loan approval. **[4]**

Q26. A hospital is building one AI model to screen for a serious disease and another AI model to filter spam emails. For each model, identify the metric to be prioritised and justify your answer. **[4]**

Case Study

Case Study: A bank tests a fraud-detection model on 1000 card transactions, of which 20 are actually fraudulent. The model correctly flagged 15 fraudulent transactions (TP) and missed 5 (FN). It wrongly flagged 10 genuine transactions as fraud (FP); the other 970 genuine transactions were correctly passed (TN).

	Reality: Fraud	**Reality: Genuine**
Prediction: Fraud	15 (TP)	10 (FP)
Prediction: Genuine	5 (FN)	970 (TN)

Q27. Answer the following questions based on the case above. **[4]**

(i) How many transactions are True Negatives? [1]

(ii) Calculate the accuracy of the model. [1]

(iii) Calculate the precision of the model. [1]

(iv) Which metric should the bank prioritise: precision or recall? Justify in one line. [1]

Case Study: An AI model tests specimens (blood, urine, cough samples etc.) to diagnose ailments such as diabetes or liver infection. It was tested on a data set of about 630 tests and gave the confusion matrix below.

	Reality: Yes	**Reality: No**
Prediction: Yes	110	60
Prediction: No	50	410

Q28. Answer the following questions based on the case above. **[4]**

[Board 2025]

(a) How many total cases are True Negative? [1]

(b) Calculate the precision. [1]

(c) Calculate the recall. [1]

(d) Calculate the F1 score. [1]

9. Computer Vision

Part B, Unit 5

Multiple Choice Questions (MCQs)

Q1. The numbers 1280×1024, 1920×1080, and 640×480 represent the number of pixels in width and height of an image or display. What is the correct term used to describe this measurement? **[1]**

[SQP 2025-26; MS 2025-26]

(a) Pixel Depth (b) Resolution (c) Colour Depth (d) Classification

Q2. A 100 × 100 grayscale image needs how many bytes (1 byte per pixel)? **[1]**

(a) 1,000 (b) 10,000 (c) 20,000 (d) 30,000

Q3. Which task draws a separate outline for each individual apple in a photo of several apples? **[1]**

(a) Instance segmentation (b) Image classification
(c) Grayscale conversion (d) Image enhancement

Q4. The bounding box in object detection is used to: **[1]**

(a) change the colour of pixels (b) reduce the file size
(c) show the location and size of an object (d) count bytes

Q5. A pixel value of 255 in a grayscale byte image represents: **[1]**

(a) Black (b) 255 colour channels
(c) White (d) Mid grey

Q6. How many bytes are needed to store one pixel of an RGB byte image? **[1]**

(a) 1 (b) 2 (c) 4 (d) 3

Q7. If each channel uses 8 bits, how many colours can an RGB image show? **[1]**

(a) 16,777,216 (b) 256 (c) 65,536 (d) 1,024

Q8. The pooling layer in a CNN is used to: **[1]**

(a) increase image resolution
(b) convert RGB images to grayscale
(c) predict the final class
(d) reduce the size of feature maps while keeping important features

Q9. Which image type needs the most bytes per pixel among these? **[1]**

(a) Grayscale byte image (b) Binary image with 1 bit per pixel
(c) RGB byte image (d) Black-and-white text scan

Q10. Max pooling applied to the 2 × 2 block [[1, 5], [3, 2]] gives: **[1]**

(a) 1 (b) 2 (c) 5 (d) 3

Q11. A grayscale image has how many colour channels? **[1]**

(a) 1 (b) 0 (c) 3 (d) 4

Q12. Which feature of an image is most affected by low resolution? **[1]**

(a) Byte size of the kernel (b) Number of layers in a CNN
(c) Colour channels count (d) Clarity and fine detail

Assertion–Reason

Q13. **Assertion (A):** ReLU makes all negative values in a feature map zero.
Reason (R): ReLU is a pooling layer that reduces the size of the feature map. **[1]**

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q14. **Assertion (A):** A grayscale image stores one intensity value for each pixel.
Reason (R): A grayscale image has only one channel of intensity information. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q15. **Assertion (A):** A byte image pixel uses 16 bits.
Reason (R): One byte consists of 8 bits. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Very Short Answer (VSA)

Q16. A small matrix of weights that slides over an image during convolution is called a _____. **[1]**

Q17. The process of enhancing an image, such as changing its brightness, is called _____. **[1]**

Q18. In a grayscale byte image, the lowest possible pixel value is _____. **[1]**

Q19. The task that assigns a class label to each pixel of an image is called _____. **[1]**

Short Answer (SA)

Q20. Differentiate between grayscale and RGB images. **[2]**

[Board 2024]

Q21. What is a kernel in convolution? Explain its role. **[2]**

Q22. Differentiate between classification + localisation and object detection. **[2]**

Q23. A 640 $\times$ 480 image and a 1920 $\times$ 1080 image are compared. Which has more pixels, and why does that matter? **[2]**

Q24. Give any two key impacts of Computer Vision on medical imaging. **[2]**

[Board 2025]

Long Answer (LA)

Q25. Facial recognition is used in many public places. Discuss two concerns about its use and suggest how each can be addressed. **[4]**

Q26. Explain the convolution operation and its role in Computer Vision. Describe the kernel and how it is used. **[4]**

Case Study

Case Study: A shopping mall installs smart cameras at its entry gates. The system counts every person entering and leaving, estimates the crowd level in each corridor, and alerts staff when a corridor becomes too crowded. To respect privacy, the system stores only the count data and no face images.

Q27. Answer the following questions based on the case above. **[4]**

(i) Which Computer Vision capability lets the system count people automatically at the gates? [1]

(ii) How does the system show responsibility towards people's privacy? [1]

(iii) Give any two benefits of this crowd-alert system to the mall management. [2]

Case Study: A clothing store installs cameras at its trial rooms and on its shelves. The system recognises the item a customer picks up and checks the stock on shelves. Staff get an alert when an item is low in stock.

Q28. Answer the following questions based on the case above. **[4]**

(i) Name the CV technique that recognises the item in the camera image. [1]

(ii) Explain how the system knows that an item is low in stock. [1]

(iii) State two benefits of this system to the store. [2]

10. Natural Language Processing

Part B, Unit 6

Multiple Choice Questions (MCQs)

Q1. Which stage of NLP checks grammar and rejects a sentence whose word order breaks the rules of grammar? **[1]**

(a) Syntactic analysis (parsing) (b) Pragmatic analysis
(c) Discourse integration (d) Lexical analysis

Q2. Which NLP application converts natural speech into text in real time? **[1]**

[Board 2026; SQP 2025-26]

(a) Keyword extraction tool
(b) Translation of books from English to Hindi language
(c) Auto generated captions on YouTube
(d) Classifying raw text into pre-defined groups

Q3. In the context of NLP, which word represents the stem resulting from stemming of 'Studies'? **[1]**

[Board 2025; Board 2025 Comptt]

(a) Study (b) Stud (c) Studi (d) Studied

Q4. A limitation of stemming compared with lemmatisation is that: **[1]**

(a) it needs a dictionary of words (b) it cannot remove affixes
(c) it is slower to execute (d) stemmed words may not be meaningful

Q5. In text normalisation, the whole corpus is divided into sentences, and each sentence is taken as different data. This step is called: **[1]**

[Board 2023; SQP 2020-21; Board 2022]

(a) Text Regulation (b) Sentence Segmentation
(c) Tokenisation (d) Stemming

Q6. Which type of chatbot learns over time and builds on its knowledge from interactions? **[1]**

(a) Script bot (b) Menu bot (c) Keyword bot (d) Smart bot

Q7. The first step of the Bag of Words algorithm is text normalisation. Which task is done in this step? **[1]**

[Board 2025 Comptt]

(a) Creating document vectors (b) Collecting and pre-processing data
(c) Adding the words to a dictionary (d) Creating a vector of words

Q8. Converting 'Computer', 'COMPUTER' and 'computer' to one common case is done so that: **[1]**

(a) the machine treats them as the same word (b) the words are deleted from the corpus
(c) they are converted into numbers (d) they are stored as images

Q9. Bag of Words is mainly used to: **[1]**

(a) Convert text into numerical features (b) Compress audio
(c) Detect faces (d) Draw flowcharts

Q10. A chatbot can answer only the questions that its developers wrote into its rules. This limitation belongs to a: **[1]**

(a) Smart bot (b) Learning bot (c) Neural bot (d) Script bot

Q11. Using IDF = total documents divided by document frequency (before taking the log), a word present in 2 of 10 documents has IDF: **[1]**

(a) 2 (b) 0.2 (c) 5 (d) 10

Q12. Which stage of NLP divides a large chunk of text into paragraphs, sentences and words? **[1]**

(a) Semantic analysis
(b) Discourse integration
(c) Pragmatic analysis
(d) Lexical analysis

Assertion–Reason

Q13. **Assertion (A):** Text classification can be used to filter spam e-mails.
Reason (R): Text classification sorts raw text into predefined categories such as spam and not spam. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q14. **Assertion (A):** The term frequency of a word is always 1.
Reason (R): Term frequency counts how many times a word appears in a document. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q15. **Assertion (A):** Stemming always produces a meaningful dictionary word.
Reason (R): Stemming only removes affixes and does not check whether the resulting stem is meaningful. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Very Short Answer (VSA)

Q16. Mention any two commonly used applications of NLP. **[1]**

[Board 2022]

Q17. Name any two currently popular virtual assistants. **[1]**

[Board 2022]

Q18. Ayushi wanted to know the term used for the whole textual data from all the documents taken together. What is this term? **[1]**

[SQP 2022-23; SQP 2021-22 (T2)]

Q19. Count the number of unique words (vocabulary) in the two sentences 'Cats chase mice.' and 'Dogs chase cats.' after converting to lowercase. **[1]**

Short Answer (SA)

Q20. With reference to data processing, expand the term TF-IDF. Also give any two applications of TF-IDF. **[2]**

[Board 2023; SQP 2021-22 (T2)]

Q21. Define chatbot. What are its types? **[2]**

[Board 2023]

Q22. Give two applications of sentiment analysis. **[2]**

Q23. Explain the term text normalisation in data processing. **[2]**

[SQP 2020-21]

Q24. State the difference between term frequency (TF) and document frequency (DF) of a word. **[2]**

Long Answer (LA)

Q25. A restaurant chain wants to use sentiment analysis on online reviews. Explain what sentiment analysis is, how it helps the business, and one limitation. **[4]**

Q26. Describe the uses of keyword extraction and automatic summarisation for an online news portal. **[4]**

Case Study

Case Study: Samiksha is performing text normalisation on the segmented sentences below. Document 1: 'Akash and Ajay are best friends.' Document 2: 'Akash likes to play football but Ajay prefers to play online games.'

Q27. Answer the following questions based on the case above. **[4]**

[SQP 2022-23]

(i) Convert both sentences to lowercase, remove the full stops, and tokenise them. [1]

(ii) Remove the stop words (and, are, to, but) and write the remaining tokens of each document. [2]

(iii) Why should the text be converted to a common case? [1]

Case Study: An online store collects customer feedback in several languages. Its NLP team plans four tools: (A) label each review as positive, negative or neutral; (B) extract the most-mentioned product features such as 'battery' and 'camera'; (C) sort reviews into 'delivery', 'product' and 'service' groups; (D) convert Hindi reviews into English.

Q28. Answer the following questions based on the case above. **[4]**

(i) Name the NLP application for tool (A). [1]

(ii) Name the NLP application for tool (B). [1]

(iii) Name the NLP application for tool (C). [1]

(iv) Name the NLP application for tool (D) and state one benefit for the store. [1]

Answer Key (MCQs and Assertion–Reason)

Ch. 1: Q1-(c), Q2-(d), Q3-(a), Q4-(d), Q5-(d), Q6-(b), Q7-(a), Q8-(c), Q9-(b)

Ch. 2: Q1-(a), Q2-(c), Q3-(c), Q4-(c), Q5-(b), Q6-(c), Q7-(d), Q8-(a), Q9-(b)

Ch. 3: Q1-(c), Q2-(c), Q3-(d), Q4-(b), Q5-(a), Q6-(b), Q7-(b), Q8-(d), Q9-(c)

Ch. 4: Q1-(b), Q2-(a), Q3-(b), Q4-(d), Q5-(b), Q6-(c), Q7-(a), Q8-(c), Q9-(d)

Ch. 5: Q1-(c), Q2-(b), Q3-(b), Q4-(d), Q5-(d), Q6-(d), Q7-(b), Q8-(c), Q9-(c)

Ch. 6: Q1-(d), Q2-(d), Q3-(a), Q4-(c), Q5-(c), Q6-(c), Q7-(c), Q8-(b), Q9-(d), Q10-(b), Q11-(a), Q12-(a), Q13-(a), Q14-(a), Q15-(a)

Ch. 7: Q1-(c), Q2-(d), Q3-(a), Q4-(c), Q5-(c), Q6-(d), Q7-(d), Q8-(b), Q9-(c), Q10-(b), Q11-(c), Q12-(c), Q13-(c), Q14-(a), Q15-(b)

Ch. 8: Q1-(b), Q2-(b), Q3-(b), Q4-(a), Q5-(d), Q6-(d), Q7-(c), Q8-(d), Q9-(b), Q10-(a), Q11-(b), Q12-(d), Q13-(a), Q14-(b), Q15-(a)

Ch. 9: Q1-(b), Q2-(b), Q3-(a), Q4-(c), Q5-(c), Q6-(d), Q7-(a), Q8-(d), Q9-(c), Q10-(c), Q11-(a), Q12-(d), Q13-(c), Q14-(a), Q15-(d)

Ch. 10: Q1-(a), Q2-(c), Q3-(c), Q4-(d), Q5-(b), Q6-(d), Q7-(b), Q8-(a), Q9-(a), Q10-(d), Q11-(c), Q12-(d), Q13-(a), Q14-(d), Q15-(d)