Note: Apart from the marking instructions, a teacher can evaluate at his discretion.

नोट: अंकन निर्देशों के अलावा, एक शिक्षक अपने विवेकानुसार मूल्यांकन कर सकता है।

Marking Scheme-12th COMPUTER SCIENCE (CPU)

Model Question Paper 2025-26

(2025-26)

(SUBJECT CODE: 906)

Maximum Marks: 40 Time: 2:30 hours

General Instructions:

i. This question paper is divided into 4 Sections - A, B and C and D.

ii. **Section A** consists of 1 question (10 parts -Objective Type of 1 mark each).

iii. **Section B** consists of 4 questions (2-5). Each question carries 1 mark.

iv. **Section C** consists of 7 questions (6-12). Each question carries 2 marks.

v. **Section D** consists of 3 questions (13-15). Each question carries 4 marks.

		SECTION A **(Each part of the question carries 1 Mark)**	
1(i)		Which SQL function is used to retrieve the smallest value from a specific column in a database table? a) LEAST () b) MIN () c) SMALLEST () d) BOTTOM ()	1
	Ans	b) MIN()	
		1 Mark for correct identification.	
1(ii)		Which of the following is a valid Python exception handling clause? a) if-else b) try-finally c) while-try d) for-except	1
	Ans	b) try-finally	
		1 Mark for correct identification of the clause.	
1(iii)		Which type of cable carries data in the form of light signals? a) Twisted Pair Cable b) Coaxial Cable c) Fiber Optic Cable d) Ethernet Cable	1
	Ans	c) Fiber Optic Cable	
		1 Mark for correct identification of type of cable.	

1(iv)		Which of the following is not a type of malware? a) Adware b) Trojan c) Repeater d) Worm	1
	Ans	c) Repeater	
		1 Mark for correct identification.	
1(v)		Full form of SMTP is _____ Protocol.	1
	Ans	Simple Mail Transfer	
		1 Mark for writing the correct Full Form.	
1(vi)		_____ is the largest type of network that spans over countries or even continents.	1
	Ans	WAN or Wide area Network	
		1 Mark for writing the correct type of network. Note: Do not deduct mark for any spelling mistakes.	
1(vii)		Mesh topology is more expensive than other topologies because of its high cable requirement. (True/False)	1
	Ans	True	
		1 Mark for correct identification.	
1(viii)		In a queue, the insertion of elements happens at the front end, and the deletion occurs at the rear end. (True/False)	1
	Ans	False	
		1 Mark for correct identification.	
		Direction: In the questions given below, there are two statements marked as **Assertion (A)** and **Reason (R)**. **Choose the correct option** out of the choices given below in each question:	
1(ix)		**Assertion (A):** A stack follows the LIFO (Last In, First Out) principle. **Reason (R):** In a stack, the element inserted first is always removed first. a) Both (A) and (R) are true, and (R) is the correct explanation of (A). b) Both (A) and (R) are true, but (R) is not the correct explanation of (A). c) (A) is true, but (R) is false. d) (A) is false, but (R) is true.	1
	Ans	c) (A) is **true** but (R) is **false**.	

		1 Mark for correct identification.	
1(x)		**Assertion (A):** A router is used to connect multiple networks and direct data packets between them. **Reason (R):** A router operates only within a Local Area Network (LAN). a) Both (A) and (R) are true, and (R) is the correct explanation of (A). b) Both (A) and (R) are true, but (R) is not the correct explanation of (A). c) (A) is true, but (R) is false. d) (A) is false, but (R) is true.	1
	Ans	c) (A) is **true** but (R) is **false**.	
		1 Mark for correct identification.	
		SECTION B **(Each question carries 1 mark)**	
2.		What is the syntax of the close**()** method in Python while working with files?	1
	Ans	**Syntax for close()** file.close()	
		1 mark for correct syntax. deduct ½ marks for each syntactical mistake.	
3.		What does the **INSERT** command do in SQL?	1
	Ans	The INSERT command in SQL is used to add new records (rows) into a table.	
		1 Mark for correct usage of INSERT Command.	
4.		What is stack in data structure?	1
	Ans	A stack is a linear data structure that follows the **LIFO** (Last In, First Out) principle, where the last item added is the first to be removed.	
		1 mark for any correct definition of Stack.	
5.		Write the names of any two commonly used networking devices.	1
	Ans	• Router • Switch • Hub • Modem • Network Interface Card (NIC) **OR** **Any other network device other then above.**	

		½ marks for each correct networking device. Do not deduct marks for spelling mistakes.	
		OR	
		What do you understand by the term computer network?	
	Ans	Two or more computers connected to share resources is called a computer network.	
		1 mark for any correct definition of computer network.	
		SECTION C **(Each question carries 2 marks)**	
6.		**Case Study Question:** Rahul recently downloaded a free game from an unknown website. After installing it, he noticed his computer slowed down significantly. On further inspection, he found that the game was silently running other unknown programs in the background and sending unusual data over the internet.	2
	(i)	**What type of malware is most likely responsible for this behaviour?** a) Worm b) Spyware c) Trojan d) Ransomware	
	Ans	c) Trojan	
		1 Mark for correct identification.	
	(ii)	**What is a common purpose of this malware?** a) To display unwanted ads b) To steal personal data or control the system secretly c) To demand money for unlocking files d) To delete important files	
		b) To steal personal data or control the system secretly	
		1 Mark for correct identification.	
7.		How is a Spyware different from an adware?	2
	Ans	**Differences between Spyware and Adware:** **Spyware** 1. Secretly collects and sends user information without consent.	

		2. Mainly designed to monitor user activities and steal sensitive data. **Adware** 1. Displays unwanted advertisements to the user. 2. Mainly designed to generate revenue by showing ads, not necessarily to steal data.	
		1 mark each for any correct difference between the two. (Max 2 differences)	
8.		Describe any two SQL aggregate functions with examples.	2
	Ans	**SQL Aggregate Functions** **SUM():** Calculates the total sum of a numeric column. Example: SELECT SUM(Salary) FROM Employees; This query calculates the total salary of all employees. **COUNT():** Counts the number of rows in a column or table. Example: SELECT COUNT(*) FROM Employees; This query counts the total number of employees in the table. **AVG():** Calculates the average value of a numeric column. Example: SELECT AVG(Salary) FROM Employees; This query calculates the average salary of employees. **MIN():** Finds the minimum value in a column. Example: SELECT MIN(Salary) FROM Employees; This query finds the lowest salary among employees. **MAX():** Finds the maximum value in a column. Example: SELECT MAX(Salary) FROM Employees; This query finds the highest salary among employees.	
		½ marks for any correct aggregate functions name. ½ marks for correct definition of the above functions. 1 mark for correct example of the respective functions stated above (1/2 marks each). Do not deduct marks for any spelling mistakes.	
		OR	

		Consider the following table named “Product”, showing details of products being sold in a grocery shop. **PCode** | **PName** | **UPrice** | **Manufacturer** P01 | Washing Powder | 120 | Surf P02 | Toothpaste | 54 | Colgate P03 | Soap | 25 | Lux P04 | Toothpaste | 65 | Pepsodent P05 | Soap | 38 | Dove P06 | Shampoo | 245 | Sunsilk Write an SQL query to create the "Product" table with appropriate data types including primary key declaration.	
	Ans	**SQL Query to Create the "Product" Table:** **CREATE TABLE** Product (PCode **VARCHAR (5) NOT NULL PRIMARY KEY**, PName **VARCHAR (50) NOT NULL**, UPrice **INT NOT NULL**, Manufacturer **VARCHAR (50) NOT NULL**);	
		2 marks for correct SQL query with correct syntax. Deduct ½ mars for each syntax error.	
9.		When is the **ImportError** built-in exception raised? Provide an example to support your answer.	2
	Ans	**a) ImportError:** This error occurs when you try to import a module that doesn't exist or is not found in the Python environment. Example: import non_existent_module **# This will raise ImportError because the module doesn't exist**	
		1 Mark for any correct explanation of ImportError build-in exception. 1 Mark for correct example.	
10.		Explain any two network topologies.	2
	Ans	**Different types of network topologies:** 1. **Bus Topology**: All devices are connected to a single central cable (the bus). Data sent by one device is	

		accessible to all devices on the network. It's easy to implement but can be inefficient with many devices. 2. **Star Topology**: All devices are connected to a central hub or switch. Data travels through the hub to reach the destination device. It is easy to manage and scale, but if the hub fails, the entire network is affected. 3. **Ring Topology**: Devices are connected in a circular fashion, and data travels in one direction around the ring. Each device has exactly two neighbors. It provides efficient data transfer, but a failure in any device can disrupt the whole network. 4. **Mesh Topology**: Every device is connected to every other device. This provides high redundancy and reliability, as multiple paths exist for data to travel. However, it requires more cabling and can be complex to manage. 5. **Hybrid Topology**: A combination of two or more different types of topologies (e.g., star and bus). This can take advantage of the strengths of different topologies to suit specific network requirements. 6. **Tree Topology**: A variation of the star topology, where groups of star-configured networks are connected to a central bus or backbone. This structure is scalable and hierarchical, making it suitable for large networks.	
		½ marks each for naming any correct network topology. ½ marks each for any correct definition of respective topology. Full marks to draw diagrams with details even without explanation.	
11.		Define the following: a) Throwing an exception b) Catching an exception	2
	Ans	**a) Throwing an exception:** It means signaling an error in the program using the **throw** keyword. **b) Catching an exception:** It means handling an error using a **try-catch** block to prevent the program from crashing.	
		1 mark for any correct explanation of **throwing an exception**. 1 mark for any correct explanation of **catching an exception**. Give ½ marks each if the student writes only keywords and not explain the exceptions.	
		OR	
		Write the file mode in python that will be used for opening the following files.	

		a) A text file "example.txt" in both read and write mode. b) A binary file "bfile.dat" in write mode.	
	Ans	**a) A text file "example.txt" in both read and write mode:** File mode: 'r+' **b) A binary file "bfile.dat" in write mode:** File mode: 'wb'	
		1 Mark each for writing correct file modes.	
12.		**Case Study Question:** Priya is attending her online class through a video conferencing app. During the session, her video and audio keep buffering. She checks her internet speed and finds that her current download speed is only 512 Kbps, which is much lower than the required speed for smooth streaming.	2
	(i)	**What does Kbps stand for?** a) KiloBytes per second b) KiloBits per second c) KiloBeams per second d) KiloBauds per second	
	Ans	b) KiloBits per second	
		1 Mark each for correct identification.	
	(ii)	**Which of the following speeds is higher than 512 Kbps?** a) 256 Kbps b) 128 Kbps c) 1 Mbps d) 64 Kbps	
	Ans	c) 1 Mbps	
		1 Mark each for correct identification.	
		SECTION D **(Each question carries 4 Mark)**	
13.		Write a Python program to implement a queue.	4

	Ans	**# Initialize an empty list to represent the queue**
		queue = [ ]
		# Function to insert an element into the queue (enqueue)
		def enqueue(element):
		  queue.append(element)
		  print(f'{element} added to the queue')
		# Function to remove an element from the queue (dequeue)
		def dequeue():
		  if len(queue) < 1:
		  print("Queue is empty! Cannot dequeue.")
		  return None
		  else:	

		removed_element = queue.pop(0) print(f'{removed_element} removed from the queue') **# Add elements to the queue (enqueue)** enqueue("P1") enqueue("P2") enqueue("P3") **# Display the current state of the queue** print("Current queue:", queue) **# Remove elements from the queue (dequeue)** dequeue() dequeue() **# Display the current state of the queue after deletion** print("Current queue after dequeue:", queue) **# Try to dequeue when the queue is empty** dequeue() **Sample Output:** P1 added to the queue P2 added to the queue P3 added to the queue Current queue: ['P1', 'P2', 'P3'] P1 removed from the queue P2 removed from the queue Current queue after dequeue: ['P3'] Queue is empty! Cannot dequeue.	
		2 Marks for Enqueue/ Inserting element operation in queue in any program. 2 Marks for Dequeue/ Deleting element operation in queue in any program. Deduct ½ marks if there is any syntax error while writing program. Give 1 mark if only diagrams or example is given.	
		OR	
		Explain the concept of selection sort with an example.	
		Selection sort: • It is a simple and efficient sorting algorithm that works by repeatedly selecting the smallest (or largest) element from the unsorted portion of the list and moving it to the sorted portion of the list. • The algorithm repeatedly selects the smallest (or largest) element from the unsorted portion of the list and swaps it with the first element of the unsorted portion.	

- This process is repeated for the remaining unsorted portion of the list until the entire list is sorted.

Let us consider the following array as an example:
{64, 25, 12, 22, 11}

First pass:
For the first position in the sorted array, the whole array is traversed from index 0 to 4 sequentially. The first position where **64** is stored presently, after traversing whole array it is clear that **11** is the lowest value.

64	25	12	22	11

Thus, replace 64 with 11. After one iteration **11**, which happens to be the least value in the array, tends to appear in the first position of the sorted list.

11	25	12	22	64

Second Pass:
For the second position, where 25 is present, again traverse the rest of the array in a sequential manner.

11	**25**	12	22	64

After traversing, we found that **12** is the second lowest value in the array and it should appear at the second place in the array, thus swap these values.

11	**12**	25	22	64

Third Pass:
Now, for third place, where **25** is present again traverse the rest of the array and find the third least value present in the array.

11	12	**25**	22	64

While traversing, **22** came out to be the third least value and it should appear at the third place in the array, thus swap **22** with element present at third position.

		<table><tr><td>11</td><td>12</td><td>22</td><td>25</td><td>64</td></tr></table> **Fourth pass:** Similarly, for fourth position traverse the rest of the array and find the fourth least element in the array As **25** is the 4th lowest value hence, it will place at the fourth position. <table><tr><td>11</td><td>12</td><td>22</td><td>25</td><td>64</td></tr></table> **Fifth Pass:** At last the largest value present in the array automatically get placed at the last position in the array The resulted array is the sorted array. <table><tr><td>11</td><td>12</td><td>22</td><td>25</td><td>64</td></tr></table>	
		1 mark for any correct definition of selection sort. 3 marks for correctly explaining the concept of selection sort with example. Deduct 1/2 marks for each mistake in any step/pass. Do not deduct any marks if explained correctly and no definition is given.	
14.		What is RDBMS? Explain the following terms in the context of the relational data model: i) Domain ii) Tuple iii) Relation	4
	Ans	**RDBMS (Relational Database Management System):** An RDBMS is a system used to store and manage data in tables, which are organized into rows and columns. It helps in easily retrieving, updating, and managing large amounts of data. Examples of RDBMS include MySQL, Oracle, and SQL Server. **i) Domain:** A domain is the set of possible values that a column (attribute) in a table can have. For example, the domain of an Age column could be any number between 0 and 150. **ii) Tuple:** A tuple is a single row in a table. It contains all the data for one record. For example, in a table of students, one tuple might include (101, "John", 20) as a student's information.	

iii) Relation:

A relation is a table in a database. It consists of rows (tuples) and columns (attributes). Each relation (table) stores data about a specific topic, like a table for students or employees.

½ marks for full form and ½ marks for any correct definition of RDBMS.

1 mark each for any correct explanation of domain, tuple and relation each.

½ marks each if only example is given for these terms without their definitions.

Ignore any spelling mistakes in Hindi as well as in English if the meaning of the word is understood.

OR

The **XYZ School** maintains records of its students and their subjects in two tables: **STUDENT** and **SUBJECT**. The tables contain the following data:

STUDENT Table:

RollNumber	Name	Address	Grade	StudentID
1001	Aarav	Delhi	A	S001
1002	Riya	Noida	B	S002
1003	Rahul	Gurgaon	A	S003

SUBJECT Table:

StudentID	SubjectName	Marks
S001	Math	85
S001	Science	90
S002	English	75
S003	History	80

a) Identify the candidate key/s in the STUDENT table.

b) Write an SQL query to retrieve the SubjectName and Marks for all subjects of the student with StudentID S001.

c) What is the degree of the SUBJECT table?

d) What is the cardinality of the STUDENT table?

Ans a) The **StudentID** is the candidate key.

		b) **SQL Query** to retrieve the SubjectName and Marks for all subjects of the student with StudentID S001**:** **SELECT** SubjectName, Marks **FROM SUBJECT** **WHERE** StudentID = 'S001'; c) The degree of the SUBJECT table is **3**. d) The cardinality of the STUDENT table is **3**.	
		1 mark each for each correct answer.	
15.		What do you understand by Data Transfer Rate (DTR)? Explain the different units of data transfer rate, such as bps, Kbps, Mbps, Gbps, and Tbps. Also, explain how increasing the bandwidth of a network affects the DTR.	4
	Ans	**Data Transfer Rate (DTR):** Data Transfer Rate (DTR) refers to the speed at which data is transmitted over a network or between devices. It is typically measured in bits per second (bps) and indicates how much data can be transferred in a given amount of time. **Different Units of Data Transfer Rate:** 1. **bps (bits per second):** The basic unit of data transfer rate, representing one bit of data transferred per second. A speed of 100 bps means 100 bits of data are transferred per second. 2. **Kbps (kilobits per second):** 1 Kbps equals 1,000 bits per second. It is used for lower data transfer rates. 3. **Mbps (megabits per second):** 1 Mbps equals 1,000,000 bits per second. It is commonly used for broadband and high-speed internet connections. 4. **Gbps (gigabits per second):** 1 Gbps equals 1,000,000,000 bits per second. It is used in high-performance networks such as fiber optics. 5. **Tbps (terabits per second):** 1 Tbps equals 1,000,000,000,000 bits per second. It is typically used in large-scale data centers and advanced network infrastructure. **Effect of Increasing Bandwidth on DTR:** When the bandwidth of a network is increased, **the data transfer rate (DTR) also increases.**	
		1 mark for any correct definition of Data Transfer Rate.	

		½ marks each for any correct explanation of all types of DTR Units. ½ marks for the relation between bandwidth and DTR.	
		OR	
		Write short note on the following: a) FTP b) Bluetooth c) HTTP d) Wi-Fi	
		a) FTP (File Transfer Protocol): FTP is a protocol used for transferring files between a client and a server over a network. It allows users to upload, download, and manage files remotely. Example: Transferring files from a computer to a web server. **b) Bluetooth:** Bluetooth is a wireless technology that allows devices to communicate with each other over short distances (up to 100 meters). It is commonly used for connecting devices like headphones, speakers, and smartphones. **c) HTTP (HyperText Transfer Protocol):** HTTP is a protocol used for transferring data over the web. It allows web browsers to request and display web pages from servers. Example: When you enter a website address, your browser uses HTTP to retrieve the page. **d) Wi-Fi (Wireless Fidelity):** Wi-Fi is a type of network that uses wireless communication to connect devices like laptops, smartphones, and printers within a limited area, such as a home or office.	
		1 mark for any correct explanation of FTP. 1 mark for any correct explanation of Bluetooth. 1 mark for any correct explanation of HTTP. 1 mark for any correct explanation of Wi-Fi. Give ½ marks each only if full form is given without definition for FTP, HTTP and Wi-Fi.	