MARKING SCHEME OF

Model Question Paper 2025-26

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-COMPUTER SCIENCE (CPU)

(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)		The **function** in a computer system responsible for performing arithmetic operations is: a) Cache b) ALU c) Registers d) Control Unit	**1**
	Ans	b) ALU	
		1 Mark for correct identification of the related term.	
1(ii)		What is the binary representation of $(705)_8$? a) 111000101 b) 110101001 c) 100011110 d) 101101010	**1**
	Ans	a) 111000101	
		1 Mark for correct identification.	
1(iii)		In the context of computers, which of the following is a number system used? a) Geometric b) Alphabetical	**1**

		c) Exponential d) Decimal	
	Ans	d) Decimal	
		1 Mark for correct identification.	
1(iv)		Nishika found a crumpled paper under her desk. She picked it up and opened it. It contained some text which was struck off thrice. But she could still figure out easily that the struck off text was the email ID and password of Naman, her classmate. What is ethically correct for Nishika to do? a) Use the email ID and password to access Naman's account. b) Approach Naman, inform him about finding the paper. c) Share the information with other classmates. d) None of these	**1**
	Ans	b) Approach Naman, inform him about finding the paper.	
		1 Mark for correct identification.	
1(v)		Criminal activities or offences carried out in a digital environment can be considered as _____	**1**
	Ans	Cybercrime	
		1 Mark for writing the correct activity. Note: Do not deduct mark for any spelling mistake.	
1(vi)		The speed of a microprocessor is measured in _____.	**1**
	Ans	Giga Hertz or GHZ or GHz or ghz or Ghz	
		1 Mark for writing any correct unit above. Note: Do not deduct mark for any spelling mistakes.	
1(vii)		Machine Learning is a subsystem of Artificial Intelligence. (True/ False)	**1**
	Ans	True	
		1 Mark for correct identification.	
1(viii)		RAM is a primary memory device. (True/ False)	**1**
	Ans	True	
		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:** Flowcharts help in understanding the logic of an algorithm. **Reason:** Flowcharts are only used in math's problems. I. Both (A) and (R) are correct and (R) is correct explanation of (A). II. Both (A) and (R) are correct and (R) is not the correct explanation of (A). III. (A) is **true** but (R) is **false**. IV. (A) is **false** but (R) is **true**.	**1**
	Ans	III. (A) is **true** but (R) is **false**.	
		1 Mark for correct identification.	
1(x)		**Assertion (A):** Arithmetic operators in Python are used for mathematical calculations. **Reason:** These operators, including addition (+), subtraction (-), multiplication (∗), division (/), and modulus (%), perform basic arithmetic operations on numbers. I. Both (A) and (R) are correct and (R) is correct explanation of (A). II. Both (A) and (R) are correct and (R) is not the correct explanation of (A). III. (A) is **true** but (R) is **false**. IV. (A) is **false** but (R) is **true**	**1**
	Ans	I. Both (A) and (R) are correct and (R) is correct explanation of (A).	
		1 Mark for correct identification.	
		SECTION B **(Each question carries 1 mark)**	
2.		What is a Flowchart?	**1**
	Ans	A flowchart is a visual representation of an algorithm.	
		1 Mark for any correct definition of Flowchart.	
		OR	
		What is an algorithm?	

		The step by step procedure to solve a specific problem is called algorithm.	
		1 Mark for any correct definition of Alogorithm.	
3.		What is the full form of IoT?	**1**
	Ans	Internet of Things	
		1 Mark for correct Full Form. Deduct ½ marks for any spelling mistake.	
4.		What is Computer?	**1**
	Ans	Computer is an electronic device which takes input from the user, process it and gives output to the user.	
		1 Mark for any correct definition of Computer.	
5.		What is **string** data type in python?	**1**
	Ans	A string in Python is a sequence of characters enclosed in single (' '), double (" "), or triple ('" "' or """ """) quotes, used to represent textual data.	
		1 Mark for any correct definition of String data type.	
		SECTION C **(Each question carries 2 marks)**	
6.		Explain the purpose of a "while loop" in python programming and provide the basic syntax for its implementation.	**2**
	Ans	A **while loop** in Python is used to repeatedly execute a block of code **as long as a given condition is true**. It is useful when the number of iterations is not known in advance. The basic **syntax** for a "while loop" in Python is as follows:	
		while condition: **# block of statements**	
		For example, A simple "while loop" that prints each element of a list could look like this: count = 1 while count <= 5:	

		print(count) count = count+1 **Output:** 1 2 3 4 5	
		1 Mark for any correct explanation of the purpose of a "while" statement in python programming. 1 Mark for correct syntax. Deduct ½ mark for any syntax error. Give full 1 mark for an example, even if no syntax is provided, as long as it uses the 'while' loop in Python programming.	
7.		How will Python evaluate the following expression? **5 + 20 * ((13 * 2) - 9) / 20**	**2**
	Ans	Python evaluates expressions following the order of operations, also known as PEMDAS: 1. **Parentheses**: Solve expressions within parentheses first. 2. **Exponents**: Evaluate exponents. 3. **Multiplication and Division**: Perform multiplication and division from left to right. 4. **Addition and Subtraction**: Finally, perform addition and subtraction from left to right. So for given expression: **5 + 20 * ((13 * 2) - 9) / 20** 1. Solve the expression in innermost parentheses: 13∗2=26 2. Substitute the result back into the expression: 5+20∗(26−9)/20 3. Solve the expression inside the parentheses: 26−9=17	

		4. Substitute the result back into the expression: 5+20∗17/20 5. Multiply: 20∗17=340 6. Substitute the result back into the expression: 2+340/20 7. Divide: 340/20=17 8. Substitute the result back into the expression: 2+17 Finally, perform the addition: 2+17 which equals 19 So, the result of the expression is **19**	
		1½ marks for any correct calculations. ½ marks for correct answer.	
		OR	
		Write a python program to find sum of three numbers.	
	Ans	**#Python Program to find the sum of three numbers** num1 = 10 num2 = 20 num3 = 30 result = num1 + num2 + num3 print(result) **Output:** **60**	
		½ marks for declaring the three variables. ½ marks for writing the formulae. ½ marks for using print function. ½ marks for writing the output. Deduct ½ marks for each syntax error.	
8.		Do the following conversions: (i) $(10101111)_2$ = $(?)_{16}$ (ii) $(23D)_{16}$ = $(?)_2$	**2**
	Ans	**(i) $(10101111)_2$ = $(?)_{16}$** **Step 1:** Group binary digits in 4s from right to left 10101111= 1010 1111 **Step 2:** Convert each 4-bit group to hexadecimal Now we know that 1010=**A** in hexadecimal	

		and 1111=**F** in hexadecimal i.e. **$(10101111)_2 = (AF)_{16}$** **Hence the result is $(AF)_{16}$** **(ii) $(23D)_{16} = (?)_2$** **Step 1:** Convert each hexadecimal digit to its 4-bit binary equivalent i.e. 2 = 0010 3 = 0011 D = 1011 **Step 2:** Hence the answer/result after conversion is : **$(23D)_{16} = (00100111011)_2$ OR $(100111011)_2$**	
		1 mark for the correct answer in hexadecimal number system. 1 mark for the correct answer in binary number system. Do not deduct any marks if the process is not written. Give ½ mark for each correct process even if the final answer is wrong.	
9.		Explain any two differences between primary and secondary memory.	**2**
	Ans	**1. Speed:** • **Primary memory** is very fast. • **Secondary memory** is slower than primary memory. **2. Storage:** • **Primary memory** stores data temporarily and has less storage space (like RAM). • **Secondary memory** stores data permanently and has more storage space (like hard disk or pen drive).	
		1 Mark each for any correct difference (1/2 marks each side). Deduct 1/2 marks if examples are not given. Do not deduct marks for any spelling mistake.	
10.		Priya is passionate about technology and is designing an app to help elderly people schedule doctor appointments easily. She is currently	**2**

		finalizing the flow of the app and the logic for appointment booking. She plans to use a structured approach to solve the problem.	
i.		**Once Priya completes her algorithm and logic design, what should be her next step?** a) Deploy the app immediately. b) Begin coding based on the finalized logic. c) Change the app's name before moving ahead. d) Take a break and start a new project.	
	Ans	b) Begin coding based on the finalized logic.	
		1 mark for correct identification.	
ii.		**After the coding phase is completed, what should Priya focus on next?** a) Ignore testing and prepare the launch event. b) Conduct thorough testing on different devices and scenarios. c) Add more features before any testing. d) Submit the app to app stores without testing.	
	Ans	b) Conduct thorough testing on different devices and scenarios.	
		1 mark for correct identification.	
11.		Define the following terms: a) Phishing b) Cyberbullying	**2**
	Ans	**a) Phishing:** Phishing is a cybercrime where attackers send fake emails or messages to trick people into giving their personal or financial information like passwords, ATM PIN, or credit card numbers. **b) Cyberbullying:** Cyberbullying is the act of bullying or harassing someone using digital platforms like social media, messages, or emails repeatedly to hurt or threaten them.	
		1 Mark for any correct definition of Phishing. 1 Mark for any correct definition of Cyberbullying.	
		OR	
		Explain Social Media and its Etiquettes.	
		Social Media: Social media is a way to connect with people through apps like WhatsApp, Facebook, and Instagram. We can share messages, photos, and videos with friends and family.	

		Social Media Etiquettes: These are good habits we should follow while using social media. Some common etiquettes are: • Be respectful and polite. • Don't share fake news. • Think before you post anything. • Don't use bad language. • Ask before sharing someone's photo or video.	
		1 Mark for any correct explanation/definition of social media. 1 Mark for explaining Social Media Etiquettes with example/without example.	
12.		Rahul uses his smartphone and computer for long hours every day. Recently, he has been experiencing eye strain and headaches. He is worried about how technology use is affecting his health.	
i.		**What health problem is Rahul most likely experiencing due to long screen time?** a) Toothache b) Eye strain c) Stomach ache d) Hearing loss	
	Ans	b) Eye strain	
		1 mark for correct identification.	
ii.		**Which of the following is a good way to reduce the negative health effects of technology use?** a) Taking regular breaks from screen b) Using the device continuously without breaks c) Ignoring health symptoms d) Using only in dark rooms	
	Ans	a) Taking regular breaks from screen	
		1 mark for correct identification.	
		SECTION D **(Each question carries 4 Mark)**	
13.		Give the **output** of the following when **num1 = 4, num2 = 3, num3 = 2** i) num1 += num2 + num3 print (num1) ii) num1 = num1 ** (num2 + num3)	**4**

		print (num1) iii) num1 **= num2 + num3 print(num1) iv) num1 = '5' + '5' print(num1)	
	Ans	i) **num1 += num2 + num3** num1 = 4, num2 = 3, num3 = 2 num1 += num2 + num3 ***# Equivalent to num1 = num1 + num2 + num3*** print(num1) **Output: 9** ii) **num1 = num1 ** (num2 + num3)** num1 = 4, num2 = 3, num3 = 2 num1 = num1 ** (num2 + num3) # ***Equivalent to*** num1= num1 $^{(num2 + num3)}$ (i.e. $4^{3+2} = 4^5 = 1024$) print(num1) **Output: 1024** iii) **num1 **= num2 + num3** num1 = 4, num2 = 3, num3 = 2 num1 **= num2 + num3 # *Equivalent to* num1 = num1 ** (num2 + num3) # ***Equivalent to*** num1= num1 $^{(num2 + num3)}$ (i.e. $4^{3+2} = 4^5 = 1024$) print(num1) **Output: 1024** iv) **num1 = '5' + '5'** num1 = '5' + '5' print(num1) **Output: '55'** **# Because the + operator concatenates the two strings instead of performing numerical addition.**	
		1 mark each for each correct output of the given codes. 1/2 marks each if process is explained but output is wrong.	

OR

What is an operator? Explain any 3 relational operators with example in Python Programming language.

Ans

Operator:

An operator is used to perform specific mathematical or logical operation on given values / operands. For Example: +, *, /, > etc.

Relational Operators:

Relational operator compares the values of the operands on its either side and determines the relationship among them.

Assume the Python variables num1 = 10, num2 = 0, num3 = 10, str1 = "Good", str2 = "Afternoon" for the following examples:

Operator	Operation	Description	Example (Try in Lab)
==	Equals to	If the values of two operands are equal, then the condition is True, otherwise it is False	>>> num1 == num2 False >> str1 == str2 False

!=	Not equal to	If values of two operands are not equal, then condition is True, otherwise it is False	>>> num1 != num2
			True
			>>> str1 != str2
			True
			>>> num1 != num3
			False

>	Greater than	If the value of the left-side operand is greater than the value of the right-side operand, then condition is True, otherwise it is False	>>> num1 > num2
			True
			>>> str1 > str2
			True

<	Less than	If the value of the left-side operand is less than the value of the right-side operand, then condition is True, otherwise it is False	>>> num1 < num3
			False
			>>> str2 < str1
			True

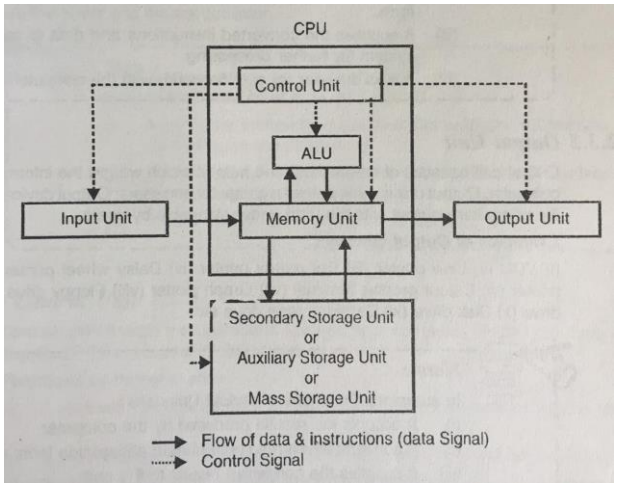
>=	Greater than or equal to	If the value of the left-side operand is greater than or equal to the value of the right-side operand, then condition is True, otherwise it is False	>>> num1 >= num2
			True
			>>> num2 >= num3
			False
			>>> str1 >= str2
			True

<=	Less than or equal to	If the value of the left operand is less than or equal to the value of the right operand, then is True otherwise it is False	>>> num1 <= num2
			False
			>>> num2 <= num3
			True
			>>> str1 <= str2
			False

1 mark for any correct definition of operator.

1 mark each for explaining any three relational operators with examples.

Deduct 1/2 marks each for not giving example (with or without programming) of the respective relational operator.

14.		Draw the block diagram of a computer system. Briefly write about the functionality of each component.	**4**
	Ans	 **The block diagram of a computer system** A computer system includes a central processing unit (CPU), memory, input/output devices and storage devices. All these components function together to give output. **Functionality of each component** **Central Processing Unit (CPU)** It is the electronic circuitry of a computer that carries out the actual processing and usually referred as the **brain of the computer**. It is commonly called processor also. **Arithmetic Logic Unit (ALU)** ALU performs all the arithmetic and logic operations that need to be done as per the instruction in a program. **Control Unit (CU)** It controls sequential instruction execution, interprets instructions and guides data flow through the computer's memory, ALU and input or output devices. **Input Unit** The unit through which input is given to a computer is termed as input unit. The devices in this unit convert the input data into a digital form that is acceptable by the computer system. For ex. keyboard, mouse, scanner, touch screen, etc.	

		Memory Unit: **Main Memory:** Data entered through input device is temporarily stored in the main memory (also called RAM) of the computer system. **Secondary memory:** For permanent storage and future use, the data as well as instructions are stored permanently in additional storage locations called secondary memory. **Output Unit** The unit that displays or physically produce the output from a computer is called output unit. It converts digital information into human understandable form. For example, monitor, projector, headphone, speaker, printer, etc.	
		2 mark for any correct labelled diagram of a computer system. 2 mark for correct explanation of all components. Deduct 1/2 marks for each mistake in diagram.	
		OR	
		Explain the need for an operating system. Also, list and explain any three important functions of an operating system.	
	Ans	**Need for Operating System:** An Operating System (OS) is needed because it allows users to **interact with the computer hardware** easily. It manages hardware and software resources, so users can run programs, save files, and use devices like the keyboard, mouse, and printer without any difficulty. **Important Functions of an Operating System (Any 3 can be explained):** 1. **Memory Management:** The OS keeps track of all memory used and free. It gives memory to different programs when needed and frees it after use. 2. **Process Management:** It manages all running programs (processes). It decides which process runs first and how long it should run. 3. **File Management:** It helps in creating, saving, reading, writing, and deleting files. It also keeps files organized in folders.	

		4. **Device Management:** The OS controls all input/output devices like keyboard, mouse, printer, etc. It uses drivers to communicate with these devices. 5. **Security and Protection:** The OS protects data and resources from unauthorized access. It uses passwords and permissions to keep data safe. 6. **User Interface:** The OS provides a user-friendly interface, like Windows or Linux screens, so users can easily interact with the computer.	
		1 mark for explaining need of an Operating System. 1 mark each for any correct function of the operating system. (Max 3 marks)	
15.		Write a short note on each of the following: i) Sensors ii) Smart Cities	**4**
	Ans	**i) Sensors:** A sensor is a device that takes input from the physical environment and uses built-in computing resources to perform predefined functions upon detection of specific input and then process data before passing it on. **For example** accelerometer and gyroscope which are used in our mobile phones. The display of our mobile changes to vertical or horizontal with respect to the way we hold our mobile. The accelerometer sensor in the mobile phones detects the orientation of the phone. The Gyroscope sensors, tracks rotation or twist of your hand and add to the information supplied by the accelerometer. • Sensors are very commonly used as monitoring and observing elements in real world applications. • The evolution of smart electronic sensors is contributing in a large way to the evolution of IoT. • It will lead to creation of new sensor-based, intelligent systems. **ii) Smart Cities:** Smart cities makes use of computer and communication technology along with Internet of Things (IoT) to manage and distribute resources of a city efficiently. • There are many challenges due to rapid urbanisation in management of resources like land water, waste, air pollution, traffic congestions etc.	

		• Many city planners around the world look for smarter ways to manage them and make cities sustainable and liveable. • It can be achieved with smart building which uses sensors to detect earthquake tremors and then warn nearby buildings so that they can prepare themselves accordingly, smart bridge uses wireless sensors to detect any loose bolt, cable or crack. Then this information can be sent across a network of sensor nodes to a centralised computer for further analysis so that further action can be taken by the city authorities.	
		2 marks for any correct explanation of Sensors 2 mark for any correct explanation of Smart Cities	
		OR	
		Explain the following along with their applications. i) Big Data ii) Robotics	
	Ans	**i) Big Data:** Big data is a term for handling massive and varied datasets, requiring advanced tools to analyze and derive meaningful insights. It is the data sets of enormous volume and complexity. • There is around **2.5 quintillion** bytes of data created each day • There are over a billion Internet users, and a majority of the world's web traffic is coming from **smartphones**. • The data includes our chats, instant messages, photographs, tweets, blog articles etc. • Such data cannot be processed and analysed using traditional data processing tools. • Various challenges are integration, storage, analysis, searching, processing, transfer, querying and visualisation of such data. **Characteristics of Big Data** **Volume:** The most prominent characteristic of big data is its enormous size. **Velocity:** The rate at which the data under consideration are being generated and stored. **Variety:** A dataset has varied data, such as structured, semi-structured and unstructured data. For eg. Text, images, videos, web-pages etc. **Veracity:** It refers to the trustworthiness of the data because processing incorrect data can give wrong results or mislead the interpretations.	

		Value: Big data possess hidden patterns and useful knowledge which can be of high business value. **ii) Robotics**: Robot is basically a machine capable of carrying out one or more tasks automatically with accuracy. It is programmable by a computer, and follow the instructions given through computer programs. • Robots were initially used and made for doing industrial tasks. • Robot are of many types, such as wheeled robots, legged robots, manipulators and which resemble humans are known as humanoids. • Robots are used in industries, medical science, bionics, scientific research, military, etc. **Some examples of Robots are:** • NASA's Mars Exploration Rover (MER) mission is a robotic space mission to study about the planet Mars. • Sophia is a humanoid that uses artificial intelligence. • Drone is an unmanned aircraft which can be remotely controlled or can fly autonomously through software-controlled flight plans used in many fields, such as journalism, filming and aerial photography etc.	
		2 marks for any correct explanation of Big Data 2 mark for any correct explanation of Robotics	