

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

Department of Computer science and engineering

CSE 6th SemesterCONTINUOUS ASSESSMENT TEST - 1 Date: 20th Jan 2025

[19Z601] - Machine Learning

Time: 1 Hour 30 minutes.

Maximum Marks: 50

INSTRUCTIONS:

1. Answer ALL questions. Each Question carries 25 Marks.
2. In each question, subdivision a carries total of 5 marks (one mark for each question), subdivisions b(i) and b(ii) carries 5 marks each and subdivision c carries 10 marks each.
3. Course Outcome Table : Q1: CO 1 and Q2: part of CO 3

1. a .

(5x1 mark = 5 marks)

Write the alphabet of your choice answer in the CA test answer book mentioning question number and subdivision number.

- i. Machine learning involves
 A) Modifying data B) ~~Modifying hypotheses~~ C) Modifying information D) ~~Modifying knowledge~~

- ii. Which among the following is not a central component in learning systems
 A) Performance B) Critic C) Validator D) Generalizer

- iii. A training experience in which the teacher provides informative board states and the correct move in each case is termed as _____ learning
 A) Supervised B) Unsupervised C) Self supervised D) Reinforcement

Write the answer for the following fill in the blanks questions in the CA test answer book mentioning question number and subdivision number.

- iv. Find-S uses positive examples and Candidate Elimination uses positive examples and negative examples

- v. Four modules of a learning system are a) Performance system b) Critic c) Generalizer d) Explanant

b.

(2 x 5 marks = 10 marks)

- i. What are the attributes that add to the complexity of Machine learning? State both the attributes that exist for all AI problems and those that are specifically for Machine learning.
- ii. Show the effect of an inductive bias, by comparing an Inductive system and an equivalent deductive system. You can use an illustrative diagram to highlight the bias usage.

c.

(1x 10 marks = 10 marks)

Define General boundary and Specific boundary and write the candidate-elimination algorithm. Apply this algorithm to the following sequence of positive and negative training examples, describing

the concept of "pairs of people who live in the same house". Each person is represented by an ordered pair of people with each person described by their gender (male or female), hair color, (brown or blonde), height (tall, medium or short) and nationality (US, French, German, Irish, Indian, Japanese or Portuguese)

- +ve ((male, brown, tall, USA) (female, black, short, USA))
- +ve ((male, brown, short, French) (female, black, short, USA))
- -ve ((female, brown, tall, German) (female, black, short, Indian))
- +ve ((male, brown, tall, Irish) (female, brown, short, Irish)).

Consider a hypothesis space defined over these instances, in which each hypothesis is represented by a pair of 4-tuples and where each attribute constraint may be a specific value, "?", or \emptyset . Provide a hand trace of the Candidate-elimination algorithm learning from the above training examples and hypotheses language. Please show the specific and general boundaries of the version space after it has processed each training example.

2. a

(5 x 1 mark = 5 marks)

Write the alphabet of your choice answer in the CA test answer book mentioning question number and subdivision number.

i. Appropriate problems for Decision Tree Learning have the characteristics of
A) Instances are represented by attribute value pairs B) Target function has discrete output values
C) Disjunctive descriptions may be required D) All of the above

ii. Overfitting is caused by
A) Fitting too many times B) Insufficient data C) Allowing noise in the training data D) Using only positive data

iii. Entropy measures
A) Diversity of examples B) Homogeneity of examples C) Diversity of classification
D) Homogeneity of classification

Write the answer for the following fill in the blanks questions in the CA test answer book mentioning question number and subdivision number.

iv. Information gain measures the expected reduction in entropy

v. Occam's Razor is prefer the simpler hypothesis that fits the data.

b.

(2 x 5 marks = 10 marks)

i. Compare ID3 algorithm with Candidate elimination algorithm. View the ID3 algorithm by examining its "search space" and "search strategy".

ii. Given the following set of training examples

Instance	Classification	A1	A2
1	+	T	T
2	+	T	T
3	-	T	F
4	+	F	F
5	-	F	T
6	-	F	T

What is the entropy of this collection of training examples with respect to the target function classification? What is the information gain of a2 relative to these training examples ?

c. Describe the ID3 algorithm. Apply the ID3 algorithm to learn the value for the target attribute "Play Tennis" (1 x 10 marks = 10 marks)

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Wind	No ✓
D2	Sunny	Hot	High	Strong	No ✓
D3	Overcast	Hot	High	Weak	Yes ✓
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes ✓
D14	Rain	Mild	High	Strong	No

Time: 1 Hour 30 minutes.

INSTRUCTIONS:

1. Answer **ALL** questions. Each Question carries 25 Marks.
2. In each question, subdivision a carries total of 5 marks (one mark for each question), subdivisions b(i) and b(ii) carries 5 marks each and subdivision c carries 10 marks each.
3. Course Outcome Table :

Qn. 1	CO 1
-------	------

Qn.2	CO 2
------	------

(5 x 1 mark = 5 marks)

1. a.

Write the alphabet of your choice answer in the CA test answer book mentioning question number and subdivision number.

i. Select the **false** statements from the following.

- A. Context-free grammar specifies syntax rules
- B. Type checking is done before parsing
- C. High-level language programs can be translated to different Intermediate Representations.
- D. Symbol table can be implementation by using array and hash table but not tree

A) B & D only B) A & D only C) B & C only D) A & C only [L2]

ii. Identify the system program that integrates a program's individually compiled modules into an executable form.

A) Interpreter B) Assembler C) Compiler D) Linking Loader [L2]

iii. Which of the following is/are NOT a valid token-type(s):

- A. Type of a variable
- B. scope of a variable
- C. operator
- D. loop

A) D only B) B & D only C) B only D) A & D only [L3]

Write the answer for the following Fill in the blanks questions in the CA test answer book mentioning question number and subdivision number.

iv. The lexical analyzer takes _____ as input and produces a list of _____ as output.

[L1]

v. Register assignment is done in _____ phase of the compiler.

[L1]

b.

i. Briefly discuss any 5 compiler construction tools used to implement various phases of a compiler. (2 x 5 marks = 10 marks)

[L2]

ii. How would you apply the concept of a pass in compiler design to combine multiple phases into a single pass, and what potential advantages or disadvantages might arise from this approach?

[L2]

c. Consider the following code snippet

```
main()
{
    int i,j;
    float x[10];
    for(i=0,j=3; i<10; i++, j=j+2)
    {
        x[i]=j;
    }
}
```

Illustrate the output of various phases of compilation process for the above code snippet. Also illustrate the error handling process (if any) and construct the symbol/literal table. [L5]

(1 x 10 marks = 10 marks)

2. a.

(5 x 1 mark = 5 marks)

Write the alphabet of your choice answer in the CA test answer book mentioning question number and subdivision number.

i. The number of tokens in the following C code is

```
switch(inputvalue)
{
    case 1:a=b+c;break;
    default:a=a++;break; }
```

A) 24 B) 25 C) 26 D) 27

[L2]

ii. The process of searching for matched tokens is typically described using _____

A) Finite automata B) Regular expressions
C) Context free grammar D) Both A and B

[L2]

iii. S1: Lexical analysis can be used infer the type of each variable.

S2: Regular expressions can be used to ensure that all variables are of lower case only.

A) S1 is True and S2 is False B) S1 is False and S2 is False
C) S1 is True and S2 is True D) S1 is False and S2 is True

[L2]

Write the answer for the following Fill in the blanks questions in the CA test answer book mentioning question number and subdivision number.

iv. Consider the expression: (a + + b) + c. The mode of error recovery which skips ahead to the next character and then continues is known as _____.

[L2]

v. If lexeme is very long then _____ buffering scheme cannot be used.

[L1]

b.

(2 x 5 marks = 10 marks)

i. A word is defined by a sequence of upper and lower case letters in the input. Write lex code to print the longest word in a paragraph and number of characters in that word. [L5]

ii. Give a leftmost derivation, a rightmost derivation for the following string 110100. Argue if the grammar is ambiguous or unambiguous. [L4]

$S \rightarrow 1 \ S \ 0 \mid 01$

(1 x 10 marks = 10 marks)

c. Construct ϵ - NFA using Thompson's construction algorithm for the regular expression $10+01^*$ and convert it into DFA. Write the subset construction algorithm. [L5]

$10^+ 0 \ 1^*$

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

Department of CSE

BE CSE G1 & G2

CONTINUOUS ASSESSMENT TEST 1 Date: 21.01.2025

19Z603 - Distributed Computing

Time: 1 Hour 30 minutes.

Maximum Marks: 50

INSTRUCTIONS:

1. Answer **ALL** questions. Each Question carries 25 Marks.
2. In each question, subdivision **a** contains 5 questions and the weightage of each question is one mark, subdivision **b(i)** and **b(ii)** carries 5 marks each and subdivision **c** carries 10 marks each.
3. Subdivisions (a) and (b) will be with no choice and Subdivision (c) may be with choice but not in more than 1 question.
4. Course Outcome Table :

Qn. 1	CO 1
-------	------

Qn.2	CO 2
------	------

1. a

(5 x 1 mark = 5 marks)

Write the alphabet of your choice answer in the CA test answer book mentioning question number and subdivision number.

- i. A file server provides stateless service if L2
- A) The files that it provides are not stored physically on that server.
 - B) The files that it provides are stored physically on that server.
 - C) The server keeps track of information about open files on client machines
 - D) The server does not keep track of information about open files on client machines.

ii. i. All processors are synchronized in distributed system.

ii. A distributed system is defined as a collection of autonomous computers linked by a network with software designed to produce an integrated computing facility. L2

- A) I is True and II is True
- C) I is False and II is True
- B) I is True and II is False
- D) I is False and II is False

iii. The transparency that enables multiple instances of resources to be used, is called

L1

- A) Performance transparency
- C) Concurrency transparency
- B) Scaling transparency
- D) Replication transparency

Write the answer for the following Fill in the blanks questions in the CA test answer book mentioning question number and subdivision number.

better resource-sharing

iv. Distributed systems should be used, when-----is required. L1

v. The transfer of message data between two computers require encoding and decoding of the message data. This operation is known as marshalling. L2

(2 x 5 marks = 10 marks)

b.

i. What is stub? How are they generated? Infer the need behind the development of the RPC architecture that makes the job of distributed application programmers simpler. L3

ii. Suggest suitable server creation semantics for each of the following types of applications. Justify your answers with suitable inferences.

(a) A service is needed only once in a while, and the session for which a client interacts with the server of this service involves the exchange of a single call and a single reply message between the client and server processes.

(b) A service is needed only once in a while, and the session for which a client interacts with the server of this service normally involves the exchange of several call and reply messages between the client and server processes.

(c) A server can service the requests of multiple clients. L4

c.

(1 x 10 marks = 10 marks)

Consider that railway reservation system is implemented using distributed environment. List out the possible types of transparencies need to be incorporated in the system. Justify your answers.

L5

2. a

(5 x 1 mark = 5 marks)

Write the alphabet of your choice answer in the CA test answer book mentioning question number and subdivision number.

i. Select the condition for non faulty clock L1

- A) $1+\epsilon \leq dc/dt \leq 0$ B) $1-\epsilon \leq dc/dt \leq 1+\epsilon$ C) $1-\epsilon \geq dc/dt \leq 1+\epsilon$ D) $1+\epsilon \leq dc/dt \geq 0$

ii. Identify the type of routine L2

```
debit(amount)
{
    if(balance >= amount)
    {
        balance = balance - amount;
        return ("success",balance);
    }
    else return ("Failure",balance);
}
```

- A) An idempotent routine
 B) A non-idempotent routine
C) An idempotent routine using request identifiers
D) A non- idempotent routine using request identifiers

iii. Suggest a call semantics that should be used for making a request to a compilation server to compile a file L2

- A) Exactly-once call semantics
B) At-least-once call semantics
C) May-be call semantics
 D) Last-one call semantics

Write the answer for the following Fill in the blanks questions in the CA test answer book mentioning question number and subdivision number.

iv. In the token passing approach, monitor process regenerates the lost token. L1

v. The ring election algorithm requires N messages for election initiation and ~~N~~ messages on an average for recovery action. L2

b. (2 x 5 marks = 10 marks)

i. What are logical clocks? Describe in detail the approaches for implementation of logical clocks with examples. L3

ii. Discuss the purpose of election algorithm in a distributed system? Formulate the use of bully algorithm with a neat diagram and explain what will happen when two or more processes simultaneously discover that the coordinator has crashed. L4

c. (1 x 10 marks = 10 marks) L5

Consider a distributed system that has three types of resources R1, R2 and R3 with 2,2,2 units each. Processes P1, P2, P3 and P4 are competing for resources as follows.

- i) P1 holding 1 unit of R1 and is requesting for 1 unit for R2.
- ii) P2 holding 2 units of R2 and is requesting 1 unit of each R1 and R3.
- iii) P3 holding 1 unit of R1 and is requesting 1 unit of R2.
- iv) P4 holding 2 units of R3 and is requesting 1 unit of R1.

Determine whether the system is deadlocked. Describe methods to detect deadlocks and to recover from it.

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

Department of Computer Science and Engineering

B E CSE – Semester VI

CONTINUOUS ASSESSMENT TEST I Date: 21/01/2025

19Z604 - Embedded Systems

Time: 1 Hour 30 minutes.

Maximum Marks: 50

INSTRUCTIONS:

1. Answer **ALL** questions. Each Question carries 25 Marks.
2. In each question, subdivision **a** carries a total of 5 marks (one mark for each question), subdivisions **b(i)** and **b(ii)** carries 5 marks each and subdivision **c** carries 10 marks each.

3. Course Outcome Tabl

On 1	CO 1
------	------

On 2	CO 2
------	------

1. a **(5 x 1 mark = 5 marks)**

i. Which one of the following offers CPUs as integrated memory or peripheral interfaces?

A) Microcontroller B) Microprocessor C) Embedded system D) Memory system

ii. The client has requested a Chocolate Vending Machine. The design team has tested three prototypes which were all a failure. As a result of this which of the following metric gets affected?

A) Performance B) Design Flexibility C) Recurring Cost D) Non Recurring Engineering Cost

iii. Which of the following is not done in the product specification phase.

A) Selection of Processor B) Functionality Analysis
B) Development of Common Vision and Goal D) Developmental Tools are fixed

iv. EEMBC benchmark suits are meaningful to test the performance of an Embedded System.

v. A stage in which individual components are integrated and ensured that they are error-free to meet customer requirements is H/W & S/W integration

b. **(2 x 5 marks = 10 marks)**
i. Discuss the co-design and co-verification process and show why it plays an important role in the embedded system design and development process.

ii. Examine why selection of a processor is most crucial in the embedded system and explain the various criterias involved in the selection of processor.

(1 x 10 marks = 10 marks)

c. Consider the Automatic Chocolate Vending Machine (ACVM) contains a Coin insertion slot and Keypad (on the top of the machine) to insert the coin according to the possible denomination like 2, 5 rupees. Then after the coin is inserted, the system directs each coin to the particular port like port 2 and port 5 (coin sorter). It also contains an LCD unit on the top of the machine to display menus, text entered into the ACVM and pictograms, welcome, thank and other messages. Graphic interactions are also available on this machine. The

displays in the ACVM also show the current time and date. The delivery slot in the ACVM is used to collect the chocolate and coins (if refunded). The internet connection port is provided so that the owner can know the status of the ACVM sales from a remote location. Draw the block diagram of ACVM and elaborate on the various phases involved in the design of an Automatic Chocolate Vending Machine.

2.a

(5 x 1 mark = 5 marks)

- i. Which of the following is **NOT TRUE** regarding the row Column Addressing scheme
 - A) Sending the address in 2 chunks slows down the addressing process
 - B) It keeps the Chip Smaller.
 - C) It results in Lower Power Consumption.
 - D) Speed of the Chip is Low
- ii. Pick the **FALSE** statement from the following
 - A) Internal fragmentation occurs if a huge block of memory is given for even a small request.
 - B) External fragmentation occurs when the available memory is distributed throughout the heap.
 - C) In Pooling the entire list of free locations is scanned and adjacent ones are merged
 - D) The problem of dangling pointers often arises when there is more than one pointer to a specific block.
- iii. Which one of the following memory types is best suited for development purposes?
A) EEPROM B) PROM C) FLASH D) UVEPROM
- iv. In what kind of memory would you use to store a user-configurable name for a printer attached to a network that the printer should remember even if the power fails. FLASH
- v. _____ is responsible for allocation and de-allocation of memory in Automatic Allocation

b. (2 x 5 marks = 10 marks)

- i. Discuss the following myths related to dynamic memory allocation.
 - A. The size of memory allocated is same as the size of the memory requested
 - B. No harm in freeing memory more than once
- ii. Elaborate the usage of volatile construct in embedded application development with example.

(1 x 10 marks = 10 marks)

- c. Define reentrancy. List the conditions to be satisfied by the portion of code to call it as reentrant. How do nested and non nested handlers execute Interrupt Service Routines (ISR) with respect to reentrant code?

(or)

Explain how pools can force realtime behavior inside the system by ensuring deterministic time for allocation and freeing of memory. With appropriate examples elaborate how dynamic memory allocation leads to memory leaks and dangling pointers in embedded systems.

Department of CSE

B.E CSE & 6th Semester

CONTINUOUS ASSESSMENT TEST 1 Date: 22.01.2025

19Z034-Wireless LAN

Time: 1 Hour 30 minutes.

Maximum Marks: 50

INSTRUCTIONS:

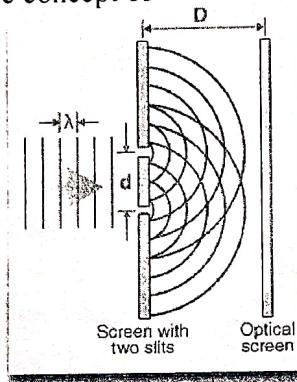
- Answer ALL questions. Each Question carries 25 Marks.
- In each question, subdivision a carries total of 5 marks (one mark for each question), subdivisions b(i) and b(ii) carries 5 marks each and subdivision c carries 10 marks each.
- Course Outcome Table :

Qn. 1	CO1
Qn.2	CO2

(5 x 1 mark = 5 marks)

1. a

- i. The following diagram shows the concept of



- A) Constructive interference
- B) Multipath propagation
- C) fading
- D) Constructive collision

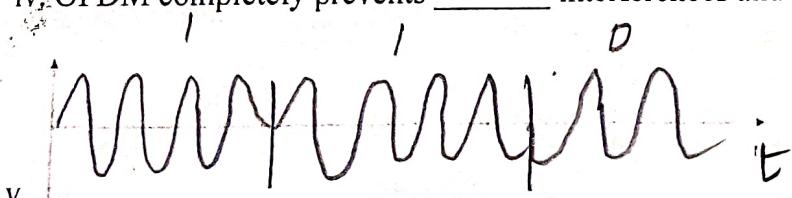
ii. If a transmitter has an input power level of 16dBm and is connected to an antenna with a 8dBi gain using a cable with a 4 dB loss, then the EIRP of the system is _____

- A) 18 dBm
- B) 20 dBm
- C) 28 dBm
- D) 22 dBm

iii. Strongest RSSI value of device indicates

- A) Device is too close to Wi-Fi Router
- B) Device is too far away from Wi-Fi Router
- C) Device is not connected to Wi-Fi Router
- D) Device is connected to Wi-Fi Router by fair distance.

iv. OFDM completely prevents intersymbol interferences and avoids intercarrier interferences



v. Above figure shows phase modulation scheme.

(2 x 5 marks = 10 marks)

b.

i. Compare and contrast between the evolutions of Wi-Fi Standards with respect to Frequency bands, Bandwidth, Max-Throughput, compatibilities and introduction of new methods.

ii. Examine IEEE 802.11a OFDM PMDPHY parameters.

(1 x 10 marks = 10 marks)

c. In a dense urban environment with many Wi-Fi access points, how can OFDM mitigate interference between overlapping networks?

2. a

(5 x 1 mark = 5 marks)

i. Virtual carrier sense of transmission medium to be done in Wi-Fi network

- A) checking frequency of medium
B) preamble field of Wi-Fi header
C) NAV
D) Duration field and NAV

ii. Quality of Service Wireless LAN to be treated with following function

A) DCF

B) EDCF

C) PCF

D) DCF and PCF

iii. Match the following

- | | |
|--------------------|--------------------------|
| a) PS-Poll | - i) fixed field element |
| b) Probe request | - ii) IE element |
| c) Beacon interval | - iii) Control frame |
| d) TIM | - iv) Management frame |
- A) a-ii, b-iv, c-i, d-iii
C) a-iii, b-iv, c-i, d-ii
- B) a-i, b-iv, c-iii, d-ii
D) a-iii, b-ii, c-i, d-iv

iv. OFDM divides the channel into smaller sub-channels and allows multiple devices to transmit simultaneously, reserving frequency resources for each device.

v. RTS/CTS mechanism to reserve the medium, particularly useful for hidden node scenarios.

b.

(2 x 5 marks = 10 marks)

i. How does IEEE 802.11 specification provide the power save operations for preserving battery life of Wi-Fi clients?

ii. How does the A-MPDU (Aggregated MAC Protocol Data Unit) differ from A-MSDU (Aggregated MAC Service Data Unit) in Wi-Fi frame aggregation? And also how does the maximum size of aggregated frames affect Wi-Fi network performance?

c.

(1 x 10 marks = 10 marks)

Create a scenario where a Wi-Fi station connects to a BSS and explain how the different MAC frames to be involved for this station connectivity, and also how the station can automatically reconnect after disconnection.

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Department of Computer Science and Engineering

B.E CSE, 6

CONTINUOUS ASSESSMENT TEST 1 Date: 22/01/2025

19Z027 - XML and Web Services

Time: 1 Hour 30 minutes.

Maximum Marks: 50

INSTRUCTIONS:

1. Answer **ALL** questions. Each Question carries 25 Marks.
2. In each question, subdivision **a** contains 5 questions and the weightage of each question is one mark, subdivision **b(i)** and **b(ii)** carries 5 marks each and subdivision **c** carries 10 marks each.
3. Subdivisions (a) and (b) will be with no choice and Subdivision (c) may be with choice but not in more than 1 question.
4. Course Outcome Table :

Qn. 1	CO 1	Qn.2	CO 2
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1. a

(5 x 1 mark = 5 marks)

Write the alphabet of your choice answer in the CA test answer book mentioning question number and subdivision number.

- i. A _____ corresponds to a fragment of the actual information being represented by the XML document.
 - A) Element Node
 - B) Text Node
 - C) Comment Node
 - D) Attribute Node[L1]
- ii. When an XML document references a DTD or schema _____ can read the DTD/Schema and check that the XML document follows the structure defined by the DTD/Schema.
 - A) Analyzer
 - B) Parser
 - C) Validating Parser
 - D) Semantic Analyzer[L2]

- iii. Identify the TRUE statement

- A) DTD cannot contain character data
- B) DTD permits embedded structured self-documentation
- C) Element and Attribute Declarations are not entirely context sensitive
- D) Markups are allowed in the comments of DTD

Write the answer for the following Fill in the blanks questions in the CA test answer book mentioning question number and subdivision number.

- iv. Say True or False

XML is case sensitive T

[L1]

- v. An XML document can reference a _____ that defines the proper structure of the XML document.

[L2]

b.

(2 x 5 marks = 10 marks)

- i. Create a valid XML document for recipe display.

[L3]

[L4]

ii. Create an external DTD schema for creating student details.

(1 x 10 marks = 10 marks)

c.

Discuss about XML schema with appropriate examples highlighting the need for it in processing XML document.

[L4]

2. a

Write the alphabet of your choice answer in the CA test answer book mentioning question number and subdivision number.

i. A browser loads the _____ file, executes the corresponding transformation and presents the result.

[L1]

A) XSL

B) XSLT

C) DTD

D) XML Schema

ii. When an XSLT processor applies a style sheet to a target document, it finds a _____ rule that is appropriate for the document root and executes the corresponding template body.

[L2]

A) template

B) vertical C) horizontal D) critical

iii. _____ was originally designed as a generalized style sheet intended to fit into the same niche as CSS.

[L1]

A) XSLT

B) XML Schema

C) XSL

D) DTD

Write the answer for the following Fill in the blanks questions in the CA test answer book mentioning question number and subdivision number.

iv. An XML document may contain a VRT (href) that links to an external XSLT. [L1]

v. The value for a variable is assigned through an _____ in a select attribute. [L2]

b.

(2 x 5 marks = 10 marks)

i. Design an XML document and XSLT that displays the names and Aadhar number of persons belonging to a particular college.

[L3]

ii. Write the XSLT syntax to design the following table:

Roll No.	Name	CGPA
2023Z201	Asha	9.5
2023Z202	Ayeesha	9.5

[L4]

(1 x 10 marks = 10 marks)

c. Explain how the data is retrieved using XQuery. Design an XQuery for retrieving the name of the citizens who possess valid PAN card in a city whose monthly income is >Rs.50,000/-.

[L4]