

# CBCS SCHEME

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18CS71

## Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 Artificial Intelligence and Machine Learning

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Define Artificial Intelligence. What are the applications of Artificial Intelligence? (08 Marks)  
b. A water jug problem states "You are provided with two jugs, first one with 4-gallon capacity and the second one with 3-gallon capacity. Neither have any measuring markers on it. How can you get exactly 2-gallons of water into 4-gallon jug?"  
i) Write down to production rules for the above problem.  
ii) Write any one solution to the above problem. (12 Marks)

OR

- 2 a. Develop A\* search algorithm for AI applications. (10 Marks)  
b. Explain problem characteristics with respect to heuristic search. (10 Marks)

### Module-2

- 3 a. Explain the four approaches to knowledge representation. (10 Marks)  
b. Discuss the following set of sentences into WFF in predicate logic and hence find the answer with proof for the question whether the Marcus is loyal to Caesar or not.  
i) Marcus was a man.  
ii) Marcus was a Pompeian.  
iii) All Pompeian's were Romans.  
iv) Caesar was a ruler.  
v) All Romans were either loyal to Caesar or hated him.  
vi) Everyone is loyal to someone.  
vii) People only try to assassinate rulers they are not loyal to.  
viii) Marcus tried to assassinate Caesar.  
ix) All mans are person. (10 Marks)

OR

- 4 a. Write Find S Algorithm and discuss issues with the algorithm. (10 Marks)  
b. Describe the Candidate Elimination algorithm. Find the maximum general hypothesis and maximum specific hypothesis for the training examples given in the table using candidate elimination algorithm.

Day	Sky	Air Temp.	Humidity	Wind	Water	Forecast	Enjoy Sport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Warm	Change	Yes

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg,  $42+8=50$ , will be treated as malpractice.

**Module-3**

- 5 a. Define decision tree. Construct the decision tree to represent the following Boolean functions:  
 i)  $A \wedge \neg B$       ii)  $A \vee [B \wedge C]$       iii)  $A \text{ XOR } B$       (06 Marks)  
 b. Write the ID3 algorithm.      (08 Marks)  
 c. What do you mean by gain and entropy? How it is used to build the decision tree? (06 Marks)

**OR**

- 6 a. Define artificial neural networks. Discover what are the appropriate problems for neural network.      (06 Marks)  
 b. Define perceptron. Explain the concept of single perceptron with neat diagram.      (06 Marks)  
 c. Explain the back propagation algorithm with example.      (08 Marks)

**Module-4**

- 7 a. What is Baye's theorem and maximum posterior hypothesis?      (05 Marks)  
 b. Derive an equation for MAP hypothesis using Baye's theorem.      (05 Marks)  
 c. Consider a football game between two rival teams: Team - A and Team - B. Suppose Team - A wins 95% of the time and Team - B wins the remaining matches. Among the games won by Team - A only 30% of them come from playing on Team - B's football field. On the other hand, 75% of the victories for Team - B are obtained while playing at home. If Team - B is to host the next match between the two teams which team will most likely emerge as the winner?      (10 Marks)

**OR**

- 8 a. Discuss the Naïve Baye's classifier.      (10 Marks)  
 b. Discuss Minimum Description length principle in brief.      (10 Marks)

**Module-5**

- 9 a. Explain K-nearest neighbor learning algorithm.      (10 Marks)  
 b. Define : i) Simple Error      ii) True Error.      (04 Marks)  
 c. What is reinforcement learning?      (06 Marks)

**OR**

- 10 a. Explain locally weighted linear regression.      (10 Marks)  
 b. Define expected value, variance standard deviation and estimate bias of a random variable.      (05 Marks)  
 c. Explain Q-learning with example.      (05 Marks)

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18CS72

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024

## Big Data and Analytics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. How is Data Architecture layers used for analytics? Explain with functions of each layer. (10 Marks)
- b. Briefly describe the three fundamental services offered by Cloud Computing. (10 Marks)

OR

- 2 a. List the features of Grid Computing. How does it differ from clusters and cloud computing. (10 Marks)
- b. Why is Data quality important in discovering new knowledge and decision making? (10 Marks)

### Module-2

- 3 a. List Hadoop core components and explain with appropriate diagram. (10 Marks)
- b. Explain the working of the Hadoop Map Reduce frame work. (10 Marks)

OR

- 4 a. Explain the working of Hadoop – 2 Execution model (YARN Model). (10 Marks)
- b. With a diagram, explain the concept of APACHE Sqoop to acquire relational data. (10 Marks)

### Module-3

- 5 a. Define NOSQL Explain Big Data NOSQL or Not – only SQL with its features, transactions and solutions. (10 Marks)
- b. Describe graph database characteristic, typical used and examples. (10 Marks)

OR

- 6 a. Explain Mongo DB with its features. (10 Marks)
- b. Compare and contrast RDBMS and Mongo DB databases. (05 Marks)
- c. What are the different ways of handling Big Data Problems? (05 Marks)

### Module-4

- 7 a. Describe the Hive architecture components along with Hive Built – in functions. (10 Marks)
- b. Explain with respect to Hive QL :
  - i) Hive QL Data Definition Language (DDL).
  - ii) Hive QL Data Manipulation Language (DML). (10 Marks)

OR

- 8 a. Explain the architecture, feature and applications of PIG. (10 Marks)
- b. Illustrate by considering an example the working of the Map Reduce programming model. (10 Marks)

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**Module-5**

- 9 a. How does regression analysis predict the value of the dependent variable in case of linear regression? (10 Marks)
- b. Explain with example and algorithm, the working principle of Apriori process for adopting the subset of frequent item sets as a frequent itemset. (10 Marks)

**OR**

- 10 a. Define Web Mining. Discuss the broad classification of web mining and their applications. (10 Marks)
- b. Define the term Social network. Explain social network as graphs with Centralities , Ranking and Anomaly Detection. (10 Marks)

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18CS733

## Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 Advanced Computer Architectures

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain Flynn's classification of computer architecture. (08 Marks)  
b. Explain the architecture of vector super computer with neat diagram. (08 Marks)  
c. Write a note on elements of Modern computer system. (04 Marks)

OR

- 2 a. What are the conditions of parallelism? Explain the types of data dependence. (08 Marks)  
b. Explain with neat diagram of operational model of SIMD computers. (06 Marks)  
c. Explain PRAM model. (06 Marks)

### Module-2

- 3 a. Distinguish between typical RISC and CISC processor architecture. (06 Marks)  
b. Explain address translation mechanism using TLB and page table. (08 Marks)  
c. Explain Hierarchical memory technology with locality of reference. (06 Marks)

OR

- 4 a. Explain the architecture of VLIW processor and its pipeline operations. (06 Marks)  
b. Explain typical superscalar RISC processor architecture. (10 Marks)  
c. Write note on Page Replacement Policies. (04 Marks)

### Module-3

- 5 a. With diagrams, explain the central arbitration and distribution arbitration. (10 Marks)  
b. Explain any two Mapping techniques with diagram. (10 Marks)

OR

- 6 a. What are the different models for Linear pipeline processor? Explain. (08 Marks)  
b. Explain the sequential and weak consistency model. (08 Marks)  
c. What are the issues in cache performance? Explain any two issues. (04 Marks)

### Module-4

- 7 a. Explain Message passing mechanisms with message Routing scheme. (10 Marks)  
b. Explain snoopy Bus protocols with its approaches. (10 Marks)

OR

- 8 a. Explain hierarchical Bus system with neat diagram. (10 Marks)  
b. What are the different vector access memory schemes? Explain any of them. (10 Marks)

### Module-5

- 9 a. Explain the concurrent OOP and an actor models in object oriented model. (10 Marks)  
b. What are the issues in using shared variable model? (10 Marks)

OR

- 10 a. Explain different language features of parallelism. (10 Marks)  
b. Explain the dynamic scheduling of a pipeline using Tomasulo's algorithm. (10 Marks)

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## Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 User Interface Design

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Define GUI. Write the difference between GUI and webpage design. (10 Marks)  
b. Define user interface Design with example. Explain the importance and benefits of Good user Interface Design. (10 Marks)

OR

- 2 a. Discuss the general principles of UID. (10 Marks)  
b. Mention the advantages and disadvantages of GUI in details. (10 Marks)

### Module-2

- 3 a. What is requirement analysis? What are the methods involved in it? What is the impact of it on UI design? (10 Marks)  
b. Define obstacles and pitfalls mention the general observation of design and common pitfalls and also explain five commandments used in Designing. (10 Marks)

OR

- 4 a. Explain the importance of human consideration in UI design with suitable example. (10 Marks)  
b. Explain briefly about human interaction speed. (10 Marks)

### Module-3

- 5 a. Explain in brief the structure of Menu's. (10 Marks)  
b. Describe the components of a web navigation system with illustration. (10 Marks)

OR

- 6 a. Write a note on Graphical menus for the following  
i) Pull down menu  
ii) Pop up menu (10 Marks)  
b. Describe at least four guidelines to be followed in phasing of menu, during the development of system menus. (10 Marks)

### Module-4

- 7 a. Discuss briefly about the types of windows with example. (Any five) (10 Marks)  
b. Write a note on the following  
i) Track ball  
ii) Joystick (10 Marks)

OR

- 8 a. Explain briefly about window management. (10 Marks)  
b. Write a note on components of a windows. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-5**

- 9 a. Explain briefly the following selection control
- i) Radio buttons (10 Marks)
  - ii) Checkboxes (10 Marks)
- b. Explain the purpose of prototypes. Discuss any two kinds of prototypes with their importance to the system developers. (10 Marks)

**OR**

- 10 a. Explain the following with respect to kinds of Tests.
- i) Think – Aloud Evaluation (10 Marks)
  - ii) Usability Test (10 Marks)
- b. Explain the types of presentation control. (10 Marks)

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18CS744

## Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 Cryptography

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Define following terms :
- Cryptography
  - Ciphertext
  - Encryption
  - Decryption
  - Kerchoff's principles. (10 Marks)
- b. Perform simple cipher substitution for below message "meet me after the toga party" and explain the mathematical equations with key = 3. (10 Marks)

OR

- 2 a. With a neat diagram, explain the fiestel structure of DES method. (10 Marks)
- b. Encrypt the message "Meet me at the usual place at ten rather than eight O'clock". Using the hill cipher with key  $\begin{pmatrix} 9 & 4 \\ 5 & 7 \end{pmatrix}$ . Show your calculation and result. (10 Marks)

### Module-2

- 3 a. Perform encryption using RSA algorithm following  $P = 3$ ,  $Q = 11$ ,  $e = 3$  and  $M = 9$ . (10 Marks)
- b. Evaluate a Diffie – Hellman key exchange concept for prime number  $q = 71$  and primitive root  $\alpha = 7$ .
- If user A has private key  $X_A = 5$ , what is A's public key  $Y_A = ?$
  - If user B has private key  $X_B = 12$ , what is B's public key  $Y_B = ?$
  - What is shared key? (10 Marks)

OR

- 4 a. Compare how Diffie – Hellman key exchange algorithm useful in evaluating man – in – middle attack concept. (10 Marks)
- b. Consider an Elgamal scheme with common prime  $q = 71$ , and primitive root  $\alpha = 7$ .
- If B has private key  $Y_B = 3$ , and A choose the random integer  $k = 2$ , what is the ciphertext of  $M = 30$ ?
  - If A now choose a different value of  $k$  so that the encoding of  $M = 30$ , is  $c = (59, C_2)$  what is integer  $C_2$ ? (10 Marks)

### Module-3

- 5 a. Discuss elliptic curve cryptography for analog of Diffie – Hellman key exchange and explain with neat steps. (10 Marks)
- b. Explain pseudorandom number generation based on asymmetric cipher. (10 Marks)



OR

- 6 a. Apply the distribution of public key with respect to directory, authority and certificate. (10 Marks)  
b. Explain secret key distribution with confidentiality and authentication. (10 Marks)

**Module-4**

- 7 a. What are X.509 standards? Explain the structure of X.509 certificate with neat diagram. (10 Marks)  
b. Explain Kerberos version 5 message exchange with neat diagram. (10 Marks)

OR

- 8 a. Write a note on:  
i) S/MIME functionality  
ii) Types of S/MIME message. (10 Marks)  
b. Explain internet mail architecture with its key components. (10 Marks)

**Module-5**

- 9 a. Explain the applications of IPsec with example. (10 Marks)  
b. Summarize the below :  
i) IPsec documents  
ii) IPsec services. (10 Marks)

OR

- 10 a. Explain transport and tunnel modes of operations in ESP. (10 Marks)  
b. Explain ESP packet format with Top level format and substructure of payload data. (10 Marks)

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18CS752

## Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 Python Application Programming

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Distinguish between :
  - i) Interpreter and compiler
  - ii) Syntax, logic and Semantic errors. (08 Marks)
- b. Define variable and keyword. List the keywords and rules followed to use variable names with an example. (06 Marks)
- c. Write a note on :
  - i) Accepting input from keyboard
  - ii) Choosing mnemonic variable names. (06 Marks)

OR

- 2 a. Demonstrate the conditional, alternative, chained and nested execution statements with syntax, flowchart and example. (12 Marks)
- b. Develop a student grading program that takes score with value between 0.0 to, 1.0 as its parameter and returns a grade as string. If score is out of range/string, then print appropriate error message using try and except concept.

Score	Grade
$\geq 0.9$	A
$\geq 0.8$	B
$\geq 0.7$	C
$\geq 0.6$	D
$< 0.6$	F

(08 Marks)

### Module-2

- 3 a. Explain definite and indefinite loops with suitable examples. (05 Marks)
- b. Develop a program which repeatedly reads numbers until the user enters "done". Once "done" is entered, print total, count, average, maximum and minimum of numbers. Use try and except to print appropriate error message and skip to next number input. (10 Marks)
- c. List out the string handling methods with syntax and examples. (05 Marks)

OR

- 4 a. Describe the concept of parsing Strings and Format operators with suitable examples. (04 Marks)
- b. Demonstrate the open, read, write, search and close file methods with syntax and examples. (12 Marks)
- c. Develop a program to create a string made of first, middle and last character of a user specified string. (Ex : Input, : James, Output : Jms). (04 Marks)

**Module-3**

- 5 a. Illustrate 8 list handling methods in python. (08 Marks)  
 b. Bring out the relationship between list and functions with suitable examples. (06 Marks)  
 c. Development a program to turn every item of a list 1 into its square and place it into list 2. Print both lists. (06 Marks)

OR

- 6 a. Develop a program to read through a word file, find out the frequency of words in a file by ignoring the punctuation and alphabet case using dictionary. Print error if file does not exist. (08 Marks)  
 b. Describe tuple assignment with examples. (06 Marks)  
 c. Illustrate searching and extracting operational methods using regular expression. (06 Marks)

**Module-4**

- 7 a. Define instantiation. Explain the shallow and deep copy concept with examples. (08 Marks)  
 b. Demonstrate the concept of sameness between instances and use of instances as arguments and return values. (12 Marks)

OR

- 8 a. Illustrate the concept of pure functions and modifiers. (05 Marks)  
 b. Develop a program with initialization method and optional arguments. (10 Marks)  
 c. Demonstrate operator overloading and polymorphism feature with sample code. (05 Marks)

**Module-5**

- 9 a. Develop a program that represent World's simplest web browser. Also draw a conceptual diagram. (07 Marks)  
 b. Develop a program that can read any size file without using up all the memory in computer. (06 Marks)  
 c. Demonstrate the XML and JSON formats for data exchange across the web. (07 Marks)

OR

- 10 a. Write a note on Google geo-coding API web service. (08 Marks)  
 b. Demonstrate the use of CREATE, INSERT, SELECT, UPDATE and DELETE SQL commands in python. (12 Marks)

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