

# CBCS SCHEME

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17CS72

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 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. What are Performance factors? How system attributes affects on Performance factors? Explain. (08 Marks)  
b. Explain the Architecture of the Vector Super Computer, with diagram. (07 Marks)  
c. Explain the Flynn's classification briefly. (05 Marks)

**OR**

- 2 a. What is Data Dependence? Explain types of Data dependence with dependency graph. (08 Marks)  
b. Explain Static Interconnection Networks with examples. (07 Marks)  
c. What are the metrics affecting the scalability of Computer Architecture? Explain. (05 Marks)

### Module-2

- 3 a. With diagram, explain the basic architecture of the scalar computers. (08 Marks)  
b. Distinguish Architectures between CISC and RISC computers, with neat diagram. (05 Marks)  
c. What is Super Scalar Architecture? Explain the superscalar RISC processor architecture. (07 Marks)

**OR**

- 4 a. With diagram, explain the hierarchy of the Memory Technology. (05 Marks)  
b. Explain the Inclusion property and locality of reference along with its type in Memory hierarchy. (07 Marks)  
c. Explain TLB, Paging and Segmentation. (08 Marks)

### Module-3

- 5 a. What is Bus Arbitration? Explain distributed Bus Arbitration. (07 Marks)  
b. Explain Cache Memory modes with neat diagram. (08 Marks)  
c. Explain Sequential Consistency Memory Model. (05 Marks)

**OR**

- 6 a. Explain Speedup, Efficiency and through put of Linear Pipeline Processors. (05 Marks)  
b. Consider the reservation table given below and determine the  
i) For bidden latencies ii) MAL iii) Initial collision vector and  
iv) Stat diagram for the non linear pipeline. (07 Marks)

	1	2	3	4	5	6
S1	X					X
S2		X			X	
S3			X			
S4				X		
S5		X				X

1 of 2

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.

- c. What are Instruction Pipeline Processors? Explain Pipeline design multiplication 8 – bit arithmetic, with diagram. (08 Marks)

**Module-4**

- 7 a. What are the Dynamic Interconnect Networks? Explain Routing in Dynamic OMEGA  $8 \times 8$  Interconnect Network using  $2 \times 2$  switch modules. (08 Marks)
- b. What is Vector Processing? Explain Vector schemes and memory with diagram. (07 Marks)
- c. Write a note on Cross Bar Networks design V/s Multiport Memory. (05 Marks)

**OR**

- 8 a. Explain Hierarchical Bus System with diagram. (05 Marks)
- b. Explain four Context – Switching Policies in Multiprocessing Modes. (08 Marks)
- c. Explain Connection Machine CM – 2 Architecture, with diagram. (07 Marks)

**Module-5**

- 9 a. Define Parallel Programming Model. Explain shared and distributed parallel models. (08 Marks)
- b. Explain Concurrent OOP and Actor model in Object Oriented Parallel Programming Model. (05 Marks)
- c. Explain principles of Synchronization in Parallel Programming in Multiprocessing. (07 Marks)

**OR**

- 10 a. With the help of neat diagram, explain Computation phases in code generation in parallel computation. (07 Marks)
- b. Explain different language features of Parallel programming. (08 Marks)
- c. Write a note on Dependency Testing. Briefly. (05 Marks)

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17CS73

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 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. Describe the following problems with respect to tasks, performance and experience
- i) A checkers learning problem
  - ii) A handwriting recognition learning problem
  - iii) A robot driving learning problem. (06 Marks)
- b. List out any four applications of machine learning. (04 Marks)
- c. Find the maximally general hypothesis and maximally specific hypothesis taking the enjoy sport concept and training instances given in Table 1(c) and discuss the advantages of the algorithm. (10 Marks)

Table 1(c)

Examples	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	Cool	Change	Yes

OR

- 2 a. Explain the steps in designing learning system in details. (10 Marks)
- b. Describe the find-s algorithm. Find the most specific hypothesis by taking data set given in Table 2(b) and discuss the issues with the algorithm. (10 Marks)

Table 2(b)

Example	Eyes	Nose	Head	Fcolor	Hair	Smile
1	Round	Triangle	Round	Purple	Yes	Yes
2	Square	Square	Square	Green	Yes	No
3	Square	Triangle	Round	Yellow	Yes	Yes
4	Round	Triangle	Round	Green	No	No
5	Square	Square	Round	Yellow	Yes	Yes

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**Module-2**

- 3 a. Explain the concept of entropy and information gain. (04 Marks)  
 b. Apply ID3 algorithm for constructing decision tree for the training example shown in Table 3(b). Here the target attribute is classification. Draw the complete decision tree. (12 Marks)

Table 3(b)

Day	A1	A2	A3	Classification
1	True	Hot	High	No
2	True	Hot	High	No
3	False	Hot	High	Yes
4	False	Cool	Normal	Yes
5	False	Cool	Normal	Yes
6	True	Cool	High	No
7	True	Hot	High	No
8	True	Hot	Normal	Yes
9	False	Cool	Normal	Yes
10	False	Cool	High	No

- c. Explain Inductive bias in decision tree. (04 Marks)

**OR**

- 4 a. Discuss the following issues in detail:  
 i) Alternative measures for selecting attributes  
 ii) Incorporating continuous valued attributes  
 iii) Handling training examples with missing attribute values. (06 Marks)  
 b. Discuss the two approaches to prevent over fitting the data. (06 Marks)  
 c. Construct decision trees to represent the Boolean functions:  
 i)  $A \&\& \neg B$   
 ii)  $A \vee [B\&\&C]$   
 iii)  $A \text{ XOR } B$   
 iv)  $[A\&\&B] \vee [C\&\&D]$  (08 Marks)

**Module-3**

- 5 a. What is Artificial Neural Network? Explain appropriate problem for neural network learning with its characteristics. (08 Marks)  
 b. Define perception. Explain the concept of single perception with neat diagram and represent the Boolean function of AND, OR using perceptron. (12 Marks)

**OR**

- 6 a. Write a note on: i) Perceptron training rule ii) Gradient descent and Delta rule. (08 Marks)  
 b. Describe the multilayer neural network. Derive the back propagation rule considering the output layer and training rule for output unit weights. (12 Marks)

**Module-4**

- 7 a. Define Bayesian theorem and explain Maximum A Posteriori (MAP) and Maximum Likelihood (ML) hypothesis. (10 Marks)
- b. Estimate conditional probabilities of each attributes {colour, type, origin} for the stolen classes: {yes, no} using the data given in the Table 7(b) using these probabilities estimate the probability values for the new instance - (color = red, type = SUV, origin = domestic). (10 Marks)

Table 7(b)

Colour	Type	Origin	Stolen
Red	Sports	Domestic	Yes
Red	Sports	Domestic	No
Red	Sports	Domestic	Yes
Yellow	Sports	Domestic	No
Yellow	Sports	Imported	Yes
Yellow	SUV	Imported	No
Yellow	SUV	Imported	Yes
Yellow	SUV	Domestic	No
Red	SUV	Imported	No
Red	Sports	Imported	Yes

**OR**

- 8 a. Explain the Naïve Bayes classifier algorithm and Bayesian belief networks with example. (14 Marks)
- b. Explain EM algorithm. (06 Marks)

**Module-5**

- 9 a. Define the following terms:  
 i) Sample error    ii) True error    iii) Expected value. (06 Marks)
- b. Explain the K-nearest neighbor algorithm for approximating a discrete valued function  $f: \mathbb{R}^n \rightarrow V$  with pseudo code. (08 Marks)
- c. Explain case based reasoning with example. (06 Marks)

**OR**

- 10 a. What is reinforcement learning and explain the reinforcement learning problem with neat diagram. (07 Marks)
- b. Explain locally weighted linear regression. (07 Marks)
- c. Define  $\phi$  - learning and write down  $\phi$  - learning algorithm. (06 Marks)

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17CS741

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Natural Language Processing

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Explain the issues and processing complexities in NLP. (05 Marks)
- b. Explain the components of transformational grammar with an example. (10 Marks)
- c. With a diagram, explain the components of Governing and Binding. (05 Marks)

OR

- 2 a. Explain the various levels of processing and the types of knowledge it involves. (10 Marks)
- b. Illustrate the bi-gram model by considering the Training Set :  
"The Arabian Knights  
These are the fairy tales of the east  
The stories of the Arabian knights are translated in many languages.  
Test Sentence (s) : The Arabian Knights are the fairy tales of the east. (10 Marks)

### Module-2

- 3 a. Write minimum edit distance algorithm and compute minimum edit distance for tutor and tumour. (07 Marks)
- b. Explain Earley parsing algorithm. (07 Marks)
- c. Explain Rule based Tagger. (06 Marks)

OR

- 4 a. Explain top-down parser and bottom-up parser with a suitable example. (08 Marks)
- b. Interpret Regular expressions and Finite State Automata with an example for each. (08 Marks)
- c. Explain Cocke-Younger-Kasami (CYK) algorithm. (04 Marks)

### Module-3

- 5 a. Explain the shortest path Hypothesis and learning with dependency path in detail. (10 Marks)
- b. Explain with neat diagram the learning frame Architecture. (10 Marks)

OR

- 6 a. Explain the following Indexing services  
i) Document processing  
ii) Clause processing  
iii) Linguistic processing (10 Marks)
- b. Explain Frame semantics and semantics Role labeling in detail. (10 Marks)

### Module-4

- 7 a. Explain the functioning of Word Matching Feedback Systems. (08 Marks)
- b. Discuss iSTART system and their modules. (08 Marks)
- c. Illustrate Topic Models (TM) Feedback system. (04 Marks)

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OR

- 8 a. Define:
- i) Cohesion
  - ii) Coh- Metrix
  - iii) Latent Semantic Analysis. (10 Marks)
- b. Write a note on various approaches to analyzing texts. (10 Marks)

**Module-5**

- 9 a. Explain design features of information retrieval systems, with a neat diagram. (10 Marks)
- b. Define term weighting. Consider a document represented by the 3 terms {tornado, swirl wind} with the raw tf 4, 1 and 1 respectively. In a collection of 100 documents 15 documents contains the term tornado, 20 contains swirl and 10 contains wind. Find the idf and term weight of the 3 terms. (06 Marks)
- c. Explain the benefits of eliminating stop words. Give examples in which stop word elimination may be harmful. (04 Marks)

OR

- 10 a. List different IR models. Explain classical Information Retrieval models. (10 Marks)
- b. Explain Wordnet and list the applications of Wordnet. (10 Marks)

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