MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
(Autonomous)
M.Tech. I Semester End Examinations
(Model Question Paper)
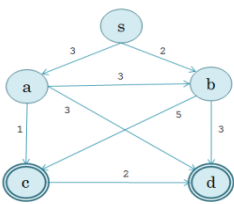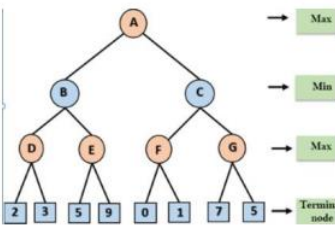
MR-22

Course Title: Artificial Intelligence & Intelligence Systems   **Course Code:** CS101PC
Time: 3 hours   Max. Marks: 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Define AI?	1	1	1	1
1. b)	State the difference between Neat and Scuffy approach.	1	2	1	1
	Unit-II				
1. c)	What are Heuristic Searches?	1	1	3	1
1. d)	Where do we apply Min-Max problem?	1	1	3	1
	Unit-III				
1. e)	Mention the role of Bayes theorem in AI.	1	1	3	1
1. f)	State the Difference between preposition logic and predicate logic.	1	2	2	1
	Unit-IV				
1. g)	What is Inductive learning?	1	1	3	1
1. h)	How Text classification is used in NLP?	1	1	3	1
	Unit-V				
1. i)	What are competitive agents.	1	1	2	1
1. j)	Define expert system.	1	1	2	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Mention the applications of AI in day-to-day life.	5	1	1	1
2. b)	Difference between symbolic and sub-symbolic AI. Knowledge based and Data-driven AI.	5	2	1	2
	OR				
2. c)	How AI has transformed the different fields of work.	5	2	1	1
2. d)	Differentiate between strong and weak AI with and example.	5	2	1	1
	Unit-II				
3. a)	How to frame Problem spaces in AI?	5	2	2	2
3. b)	Apply A* algorithm for the problem given below.	5	3	2	3
	OR				
3. c)	Apply Alpha-Beta pruning for the given problem.	5	3	2	3

		M	L	CO	PO
3. d)	What are constraint satisfaction problem. Solve the below Crypt-arithmetic problem. T W O + T W O F O U R	5	3	2	3
Unit-III					
4. a)	Show by resolution method "Which food John likes". "Anything anyone eats is called food. Mita likes all kinds of food. Burger is a food. Mango is a food. John eats pizza. John eats everything Mita eats".	10	3	2	2
OR					
4. b)	Differentiate between Totally-ordered and partially-ordered Planning.	5	2	3	1
4. d)	How Goal stack planning helps to Solve AI problems.	5	1	3	1
Unit-IV					
5. a)	Explain Naïve Bayes classifier with and example.	5	1	3	1
5. b)	Demonstrate the steps in information retrieval	5	4	3	2
OR					
5. c)	Explain Decision Trees with an example.	5	2	4	2
5. d)	Illustrate Natural language processing models and elaborate on Bag of Words.	5	3	4	2
Unit-V					
6. a)	What are agents and elaborate on layered agent architecture.	5	1	4	2
6. b)	Build an expert system for solving health problem.	5	3	4	2
OR					
6. c)	How Semantic web used in knowledge representation.	5	1	5	1
6. d)	Explain Swarm Systems and their role in AI.	5	3	5	1

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

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MR-22

Course Title: Advanced Data structures   **Course Code:** CS102PC
Time: 3 hours   Max. Marks : 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	State the properties of leftist tree.	1	1	1	1
1. b)	State the difference between min binomial heap and max binomial heap	1	1	1	1
	Unit-II				
1. c)	Write the equation of division hash function.	1	1	3	1
1. d)	State the techniques to handle collision during hashing.	1	1	3	1
	Unit-III				
1. e)	What is the difference between B-Tree and 2-3 Trees.	1	2	3	1
1. f)	State the properties of a red-black tree.	1	1	2	1
	Unit-IV				
1. g)	Define suffix trees.	1	1	3	1
1. h)	Write difference between compressed tries and standard tries.	1	1	3	1
	Unit-V				
1. i)	State the advantage of boyer-moore string searching algorithm.	1	1	2	1
1. j)	State the application of KMP algorithm.	1	1	2	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Compare and contrast height-biased and weight biased leftist trees.	5	2	1	1
2. b)	Explain the deletion procedure in a Fibonacci-Heap.	5	1	1	1
	OR				
2. c)	Illustrate the insertion procedure in a binomial heap.	5	2	1	2
2. d)	Elucidate the procedure for melding the min leftist trees.	5	1	2	2
	Unit-II				
3. a)	Demonstrate the operation of any two hash functions.	5	2	3	2
3. b)	Describe the procedure of dynamic hashing using directories	5	1	3	2
	OR				
3. c)	Summarize the operation of mid-square and folding hash functions.	5	1	2	2
3. d)	Demonstrate various collision handling techniques used in hashing.	5	2	3	1
	Unit-III				
4. a)	Construct an optimal binary search tree for keys (a1,a2,a3,a4)=(10,15,20,25) (p1,p2,p3,p4)=(3,3,1,1) and (q0,q1,q2,q3,q4)=(2,3,1,1,1).	10	4	2	2
	OR				
4. c)	Construct an AVL Tree for following keys Keys= { JAN,FEB,MAR,APR,MAY,JUNE,JULY,AUG,SEP,OCT,NOV,DEC}	5	3	3	1
4. d)	Demonstrate the insertion procedure in a B-Tree.	5	2	3	1
	Unit-IV				
5. a)	Explain the insertion procedure in a multi-way tries.	5	1	3	1
5. b)	Demonstrate the operation of suffix trees	5	2	2	
	OR				
5. c)	Elucidate various compress tries implementation techniques.	5	2	2	2
5. d)	Explain the search process in Patricia.	5	2	3	2
	Unit-V				
6. a)	Demonstrate the operation for input string "AABAACAADAABAABA" using search key "AABA"	5	3	2	2
6. b)	Demonstrate the naive string matching algorithm	5	2	2	2
	OR				
6. c)	Demonstrate the operation for input string "bacbababaabcbab" using search key "ababaca"	5	3	3	1
6. d)	Describe Rabin-karp string matching algorithm.	5	2	3	1

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MR-22

Course Title: Machine Learning **Course Code:** CS112PE

Time: 3 hours Max. Marks: 60

Note: Answer ALL Questions

Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	List the basic design issues to machine learning.	1	1	1	1
1. b)	State version space representation theorem.	1	2	1	1
	Unit-II				
1. c)	How to use entropy as evaluation function?	1	1	3	1
1. d)	List of different metrics used to construct a decision tree.	1	1	3	1
	Unit-III				
1. e)	What is the representational power of perceptron?	1	1	3	1
1. f)	What do you mean by generalization error in terms of the SVM?	1	2	2	1
	Unit-IV				
1. g)	What are the differences between lazy learning and eager learning?	1	1	3	1
1. h)	How does KNN handle the curse of dimensionality?	1	1	3	1
	Unit-V				
1. i)	Give any two examples for Bayesian belief Networks.	1	1	2	1
1. j)	State Bayes theorem.	1	1	2	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Define well posed problem. Illustrate any two examples for well posed learning problem.	5	1	1	1
2. b)	With an example, explain the candidate elimination algorithm and its limitations.	5	2	1	2
	OR				
2. c)	State inductive bias. Explain inductive bias in Candidate elimination algorithm	5	2	1	1
2. d)	Explain in detail how to evaluate machine learning models?	5	2	1	1
	Unit-II				
3. a)	Compare and Contrast Principle component Analysis and Independent Component Analysis.	5	2	2	2
3. b)	How can we express the probability of a Logistic Regression model as conditional probability?	5	3	2	3
	OR				
3. c)	Define Entropy and explain how information gain measure the expected reduction in entropy.	5	3	2	3
3. d)	Explain in detail how to update parameters in linear regression.	5	2	2	3
	Unit-III				
4. a)	Compare and contrast various activation functions in neural networks.".	5	3	2	2
4. b)	Illustrate with a neat sketch, how to implement Logical AND function using perceptron?	5	3	2	2
	OR				
4. c)	Differentiate between perceptron rule and delta rule.	5	2	3	1
4. d)	List out merits and demerits of various kernels in Support Vector Machines	5	1	3	1
	Unit-IV				
5. a)	Discuss about locally weighted linear regression and its remarks	5	1	3	1
5. b)	Explain Case based reasoning. Give suitable examples.	5	4	3	2
	OR				
5. c)	Illustrate with an example, how k means clustering works.	5	2	4	2
5. d)	Elaborate the usage of Radial basis networks in solving function approximation problems	5	3	4	2
	Unit-V				
6. a)	Illustrate with an example, how Bayes optimal classifier works?	5	1	4	2
6. b)	Demonstrate the use of genetic algorithm with an example.	5	3	4	2
	OR				
6. c)	Demonstrate Naïve Bayesian Classification of news articles. Select any five articles of your choice.	5	1	5	1
6. d)	How does genetic programming handles block-staking problem?	5	3	5	1

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Course Title: Computer Vision and Robotics   **Course Code:** CS116PE

Time: 3 hours   Max. Marks:60

Note: Answer ALL Questions

Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	State different limitations of a pinhole camera	1	3	1	2
1. b)	Explain "foreshortening" with a neat illustration	1	2	1	1
	Unit-II				
1. c)	What is aliasing?	1	1	2	1
1. d)	Define Sampling.	1	1	2	1
	Unit-III				
1. e)	What is Stereopsis? What are the two processes involved in it?	1	3	3	1
1. f)	Define Segmentation.	1	2	3	1
	Unit-IV				
1. g)	Write a short note on EM algorithm	1	2	4	1
1. h)	What are different types of curve fitting?	1	3	4	1
	Unit-V				
1. i)	What is meant by a pose?	1	2	5	1
1. j)	Explain the process of obtaining hypothesis using invariants.	1	1	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Explain the Light surfaces.	5	2	1	1
2. b)	Describe the various local shading models.	5	3	1	2
	OR				
2. c)	Construct a model for Image color	5	2	1	1
2. d)	Explain Global Shading models.	5	2	1	1
	Unit-II				
3. a)	Demonstrate Filters as templates.	5	3	2	1
3. b)	Illustrate the spatial frequency and Fourier transforms	5	3	2	2
	OR				
3. c)	How to represent a Texture with suitable example.	5	3	2	1
3. d)	Discuss any two edge detection methods	5	3	2	2
	Unit-III				
4. a)	Explain Human stereopsis with suitable example	5	1	3	1
4. b)	Write about shot boundary detection	5	2	3	1
	OR				
4. c)	List the geometry of multiple views	5	3	3	1
4. d)	Explain about Theoretic clustering.	5	2	3	1
	Unit-IV				
5. a)	How do you implement Hough transform?	5	3	4	1
5. b)	Explain abstract inference problem.	5	2	4	1
	OR				
5. c)	Explain Probabilistic inference problem	5	3	4	2
5. d)	How does the Kalman filter work?	5	2	4	1
	Unit-V				
6. a)	What is the difference between perspective and affine transformation?	5	2	5	2
6. b)	Discuss about Hypothesis by pose consistency	5	3	5	2
	OR				
6. c)	List and explain the camera models	5	4	5	2
6. d)	Explain Hypothesis by pose clustering	5	3	5	2

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