ANDHRA UNIVERSSITY

SCHOOL OF DISTANCE EDUCATION

ASSIGNMENT QUESTION PAPER

MCA (Second Year)

THEORY OF COMPUTATION

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. State and describe closure properties of context free language.
2. For each of the following RE draw NFA with ε – transitions:

   i) (0+1)(01)*(011)* ii) (0 + 1)* (00+1) (0 + 1)*
3. Write about satisfiability and un-solvability in predicate logic.
4. Eliminate Null productions form the following CFG:

   $S \rightarrow ABA,\quad A \rightarrow aA \mid \varepsilon,\quad B \rightarrow bB \mid \varepsilon$
5. Consider the grammar $S \rightarrow (L) \mid a,\ L \rightarrow L, S \mid S$. Derive expression ((a, a), (a, a)) by leftmost derivation and rightmost derivation.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

THEORY OF COMPUTATION

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. State the Halting problem.
2. Write about multi-tape, multi-dimensional and Universal Turing machines.
3. Illustrate resolution theorem in propositional logic.
4. Construct GNF grammar for the following CFG:
   $S \rightarrow AA \mid b$, $A \rightarrow SS \mid a$
5. Give the NFA's, which accepting the following languages over the alphabets {0, 1}
   i) Set of all strings with three consecutive 0's.
   ii) Set of all strings such that 5th symbol from right end is 1.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

COMPUTER GRAPHICS

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. Explain about Direct View Storage tube with neat diagram.
2. Describe different filled area primitives and filled area function.
3. Explain about splines and Bezier curves and its mathematical representations.
4. Derive 3-D translation and rotation matrices with respective to co-ordinate axis.
5. Explain about hierarchical modelling with structures.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

COMPUTER GRAPHICS

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. State and explain about working mechanism of various graphic input devices.
2. Illustrate Sutherland-Hodgman polygon clipping algorithm with suitable example.
3. Write about pipeline for transforming a view of world co-ordinate scene to device co-ordinates.
4. Describe matrix representation of parallel and perspective projections.
5. Write the differences between Random Scan display and Raster scan Display.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

FILE STRUCTURES

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. Explain about Internal and External fragmentation.
2. How do you retrieve special subset of records from a data file using combination of secondary keys?
3. Explain briefly about buffer management.
4. Explain about Indexed sequential file organization.
5. Explain how extendible Hashing works. Show how it combines tries with conventional static hashing technique.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

FILE STRUCTURES

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. What are the operations required to maintain an indexed file?
2. Explain about Inverted files with examples.
3. What is Hashing? Explain the various methods of Hashing Algorithms.
4. What are the various techniques of data compressions? What are its uses?
5. Explain why the number of comparisons is not adequate for measuring performance in sorting large files.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

DESIGN AND ANALYSIS OF ALGORITHMS

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. What is pseudo code? How to analyse efficiency of algorithm with help of pseudocode notation? Explain with suitable example.
2. Sort the following list using quick sort algorithm: 50,40,20,60,80,100,45,70,105,30,90,75. Also discuss worst and best case of quick sort algorithm.
3. Find out the number of scalar multiplications needed to multiply the following chain of matrices using dynamic programming.
4. Explain Horspool's string matching algorithm with suitable example.
5. Explain about P,NP and NP - completeness problems with suitable examples.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

DESIGN AND ANALYSIS OF ALGORITHMS

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. What is meant by best-case, worst-case, and average case time complexities of an Algorithm?
2. Give the big – O notation definition and discuss with suitable example.
3. Write the pseudo code for Kruskal algorithm. Construct Minimum spanning tree for the following graph using Kruskal algorithm.
4. Illustrate Topological sort with suitable example.
5. State the assignment problem. Give the branch-and-bound solution for assignment problem.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

Operating systems

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. What is an operating system? Explain different types of operating system with their advantages and disadvantages.
2. What are the different process states? Explain with a diagram.
3. Explain implementation of producers / consumers problem using monitor.
4. State and explain the dining philosopher's problem and how allocate the several resources among several processes in a deadlock and starvation free manner.
5. With neat sketch, explain about paging and segmentation.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

Operating systems

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. Discuss the various services provided by the operating system.
2. What is PCP? What are the various elements of PCB?
3. Write about inter-process communication in client-server systems.
4. Explain the indexed and linked file allocation methods. Discuss the advantages and disadvantages in those methods.
5. What are the various types of operations that may be performed on the directory?

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

DATA COMMUNICATION AND NETWORKS

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. What is meant by a layered protocol? Why are the protocols layered? Explain.
2. What are the major differences between the go-back-n and select repeat protocols?
3. List and explain about the typical control messages defined by ICMP.
4. What is a cyclic redundancy check? Explain.
5. What is SMTP? How does it useful to send e-mails? Discuss.
6. Describe the client/server mode of computing in detail.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

DATA COMMUNICATION AND NETWORKS

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. Distinguish between frequency-division multiplexing and time-division multiplexing.
2. Why did IPv6 eliminate the checksum in the packet header? Explain.
3. Classify the errors that CRC method will always detect and will not detect.
4. Why are TCP and IP at different layers in the protocol hierarchy? Discuss.
5. Write short notes on Unicast and Multicast routing protocols.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

DATABASE MANAGEMENT SYSTEMS

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. What are integrity constraints? Explain various types of integrity constraints with suitable example.
2. Discuss about relational model constraints and relational model schemas.
3. What are the weak Entity set and Derived attribute?
4. what is concurrency? what are the three problems due to concurrency?
5. Explain system recovery procedure with check point record concept.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

DATABASE MANAGEMENT SYSTEMS

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. Explain about UML class diagram.
2. Explain three level architecture of database system.
3. Write about select, project and types of join operations with example.
4. What is normalization? Discuss different types of normalization.
5. Describe Two phase locking protocol. What are its advantages and disadvantages?

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

OPERATION RESEARCH

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. Write bout different phases of OR model.
2. Explain the steps involved in revised simplex method.
3. An artist in the Shilparamam has 8 persons for whom the artist performs painting works. Arrival rate is passion stream and the service times are exponential. Average arrival rate is 5 per hour with an average sevice time of 20 minutes. Cost of waiting is Rs 120, while the cost of sevice is Rs. 75 each.

   Calculate:

   i) The average length of the waiting time

   ii) The average waiting time of an arrival.

   iii) The average time which an arrival spends in the systems.

   iv) The minimum cost service rate.
4. Determine the values of u_1, u_2 and u3, so as to :
   Maximize $Z= u_1.u_2.u_3$, subject to constraints: $u_1 + u_2 + u_3 +10$ and
   u1, u2,u3 ≥ 0.
5. Establish the relation between a linear programming problem and a two — person zero —sum game.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

OPERATION RESEARCH

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. What is meant by weak duality and strong duality properties?
2. Solve the games by using maximin (minimax) principle whose pay off matrix in given in table 1.

	Player B			
Player A	B1	B2	B3	B4
A1	1	7	3	4
A2	5	6	4	5
A3	7	2	0	3

3. Write the steps to solution of a LP problem by graphical method. Also write the steps involved in solution of OR problem.
4. A manufacturing company uses certain part at a constant rate of 4500 units per year. Each unit costs Rs. 2/- and the company personal estimates that is costs Rs.50 to place an order. The carrying costs of inventory is estimated to be 20% per year, find the optimum site of each order and minimum yearly costs.
5. Solve the following LLP by dynamic programming

$$2x_1 + x_2 \leq 8$$
$$5x_1 + 2x_2 \leq 5$$
$$x_1 + x_2 \geq 0$$

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

ARTIFICIAL INTELLIGENCE

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. State Tic-Tac-Toe problem? Construct state space tree for this problem.
2. Differentiate breadth first search and depth first search.
3. What is matching? Describe different matching techniques with example.
4. What are the various components of script? Write a script for “Writing of examination in examination hall”.
5. Explain about Dempster’s- Safer theory.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

ARTIFICIAL INTELLIGENCE

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. State and discuss problem characteristics.
2. Solve the water jug problem by A* algorithm. Does the heuristic function return an optimal path? Consequently, can you call it an admissible heuristic?
3. Discuss about various approaches to represents the knowledge.
4. Represent the fact that “Sourav is taller than Sachin” with the help of semantic net.
5. Illustrate construction of frames with suitable example?

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

IMAGE PROCESSING

ASSIGNMENT-1

Marks 20

Answer All questions. All question carry equal marks.

1. Describe image formation in the eye with brightness adaptation and discrimination.
2. What is histogram equalization? Perform histogram equalization fo the image.
3. Describe image smoothing using ideal low pass filters and Butterworth low pass filters.
4. Explain about histogram processing of color images.
5. Explain the significance of thresholding in image segmentation.

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ASSIGNMENT QUESTION PAPER

MCA (Second Year)

IMAGE PROCESSING

ASSIGNMENT-2

Marks 20

Answer All questions. All question carry equal marks.

1. Explain the basic Elements of digital image processing.
2. Explain about HADMARD transform and give its applications.
3. Explain Sobel and Laplacian filters for edge enhancement.
4. Explain how periodic noise can be reduced using frequency domain filtering.
5. Write about compression due to change in domain and quantization.