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II Semester M.C.A. Degree Examination, December - 2022

COMPUTER SCIENCE

Artificial Intelligence

(CBCS 2020-21 Scheme Y2K20)

Paper: 2 MCA 6

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Answer All Parts.

PART - A

Answer any **FIVE**. Each carries **SIX** marks.

(5×6=30)

1. Briefly explain the characteristics of Artificial Intelligence.
2. What is the minimax strategy for game playing? Explain.
3. Explain different types of knowledge.
4. Convert the following sentence into predicate logic.
 - a) John likes all kind of food.
 - b) Apple and vegetable are food.
 - c) Anything anyone eats and not killed is food.
 - d) Anil eats peanuts and still alive.
 - e) Harry eats everything that Anil eats.
 - f) Prove by resolution that: John likes peanuts.
5. Differentiate between Forward and Backward chaining.
6. Give an example for non-monotonic reasoning.
7. Why synthetic processing is required in Natural Language processing? Explain with an example.
8. With a neat diagram explain Neural Network architecture.



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PART - B**Answer any FOUR.** Each carries **TEN** marks:**(4×10=40)**

9. Write a short note on:
a) A*Algorithm (5)
b) Alpha - Beta Pruning. (5)
10. What is an Expert system? Discuss the components and architecture of an expert system. (10)
11. a) Discuss different forms of Learning. (6)
b) Define Fuzzy logic. (4)
12. a) With a neat diagram describe the Biological Neuron. (5)
b) Write the Mathematical representation of a single Neuron with the help of a diagram. (5)
13. Define natural language processing. Discuss the steps in processing a natural language sentence with an example. (10)
14. Trace the execution of ATN for the sentence "The long file has printed". (10)



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P I 8 I W 2 L S 0005

II Semester M.C.A. Degree Examination, December - 2022

COMPUTER SCIENCE

Computer Networks

(CBCS Scheme Y2K20 2020-21)

Paper : 2 MCA 3

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Answer all the Parts.

PART - A

Answer any FIVE questions. Each question carries 6 marks. (5×6=30)

1. Explain the causes for transmission impairment in a communication channel.
2. How many bits can fit on a link with 2ms delay, if the bandwidth of the link is:
 - a) 1Mbps
 - b) 10 Mbps
 - c) 100 Mbps
3. Explain connection-oriented approach of packet switching.
4. Explain IPv4 Datagram packet.
5. Explain the Go-Back-N.
6. Explain datagram network with suitable diagram.
7. List and explain four types of delays in Packet-Switched networks.
8. Write short note on congestion Control and Flow Control in TCP.



PART - B

Answer any FOUR questions. Each question carries 10 marks. (4×10=40)

9. Differentiate between pure Aloha and slotted Aloha.
10. Explain the layers of the TCP/IP Protocol suite and identify the protocols in each layer.
11. Discuss the Address Resolution Protocol operation and the ARP Packet format with suitable diagram.
12. Explain the salient features of:
 - a) Stop - and - Wait Protocol;
 - b) Stop - and - Wait ARQ Protocol.
13. Explain the operation of CSMA/CD. What happens when a station detects collision?
14. What is the purpose of DNS? Explain the six steps for mapping host name to IP address.



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II Semester M.C.A. Degree Examination, December - 2022**COMPUTER SCIENCE****Data Base Management Systems****(CBCS Y2K20 Scheme)****Paper : 2 MCA 2****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

1. Answer ALL Sections.
2. Answer any FIVE questions from Section-A, each carries SIX marks.
3. Any FOUR questions from Section-B, each carries TEN marks.

SECTION - A

L. Answer any FIVE of the following questions. Each carries 6 marks. $(5 \times 6 = 30)$

1. Explain the role and responsibilities of DBA.
2. Describe the three schema architecture of DBMS with a neat diagram.
3. Define relationship. Explain the different types of relationships with example.
4. Write a short notes on indexes on multiple keys.
5. Explain key constraints with examples.
6. Explain Third Normal Form with an example.
7. What are the advantages and disadvantages of VIEWS?
8. Explain the ACID properties of transaction.

**SECTION - B**

II. Answer any FOUR full questions. $(4 \times 10 = 40)$

9. a) Construct an ER diagram for student database. (5)
b) What is data independence? Write the difference between logical and physical data independence. (5)
10. Consider the following Schema and answer the queries. Student (Stdid, Stdname, DOB, Sub1, Sub2, Sub3, Mark1, Mark2, Mark3, Total, GPA, Course)
a) Create a table, Insert, update and delete records in the table.
b) Find the Students who have Secured same GPA.
c) List the Students who born on particular Month.
d) List the Number of Students who have scored maximum GPA from the particular course. (10)

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11. a) Write a note on DML and DDL commands with syntax and example. (5)
b) With an example explain SELECTION and PROJECTION operations. (5)
12. a) What is database anomalies? Explain different types of anomalies with example. (5)
b) Define Normalization. Write a note on BCNF. (5)
13. a) Explain ORDER BY, GROUP BY and HAVING CLAUSE with syntax and example. (5)
b) Write short notes on Embedded and Dynamic SQL. (5)
14. a) Describe Two phase locking with an example. (5)
b) Briefly explain the database failure and recovery. (5)





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II Semester M.C.A. Degree Examination, December - 2022**COMPUTER SCIENCE****Operating Systems****(CBCS Scheme Y2K20)****Paper: 2 MCA 1****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:***Answer ALL Parts.***PART - A**Answer any **FIVE** questions.

(5×6=30)

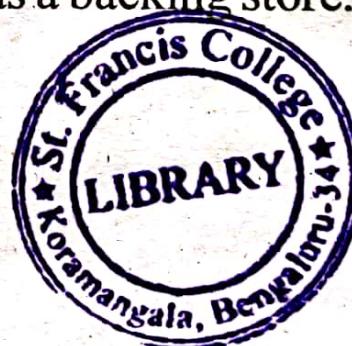
1. What is Operating System? Explain multiprogramming and time sharing systems.
2. What are system calls? Briefly Point out its types.
3. Define semaphores. Explain Reader-Write problem with semaphore in detail.
4. Describe Mutual Exclusion implementation with TestAndSet().
5. What are monitors? Explain dining Philosopher's solution using monitor.
6. Describe both internal and external fragmentation problems encountered in a contiguous memory allocation scheme.
7. Explain swap in and swap out in two process using disk as a backing store.
8. Briefly describe the implementation of Access Matrix.

PART - BAnswer any **FOUR** questions.

(4×10=40)

9. Consider the following snapshot of a system:

Processes	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	1	1	2	4	3	3	2	1	0
P1	2	1	2	3	2	2			
P2	4	0	1	9	0	2			
P3	0	2	0	7	5	3			
P4	1	1	2	1	1	2			



- a) Calculate the content of the need matrix.
- b) Is the system in a safe state?
- c) Determine the total amount of resources of each type.

(10)

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10. a) Consider the following page reference stream: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. How many page faults would occur for LRU and FIFO replacement algorithms assuming 3 frames? Which one of the above is most efficient? (6)
 b) Explain demand paging system. (4)

11. Consider the following set of processes:

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9

Draw Gantt Chart and Compute average turnaround time and the average waiting time using FCFS, Pre-emptive SJF and RR (Quantum=4). (10)

12. a) Explain Dual Mode Operation with a neat diagram. (4)
 b) With a neat diagram explain Queueing diagram of Process Scheduling. (6)
13. a) List and Explain the goals and principles of security. (6)
 b) Write a short note on Virtual Machines. (4)
14. a) What is System Boot and Context Switch? (4)
 b) Discuss the features of Linux Operating System. (6)



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II Semester M.C.A. Degree Examination, December - 2022
COMPUTER SCIENCE
Software Engineering
(CBCS 2020-21 Y2K20 Scheme)
Paper : 2 MCA 4

Time : 3 Hours

Maximum Marks : 70

Instruction to Candidates:

Answer ALL the Parts.

PART - A

- Answer any FIVE questions. $(5 \times 6 = 30)$
1. Define Agile software development. Explain Agile manifesto.
 2. Differentiate between Agile software development and Waterfall model.
 3. Explain basic practices of Agile software development.
 4. Explain with the help of suitable example that how Agile helps to build quality product.
 5. What is meant by user stories? How are they used in Agile? Discuss with the help of suitable example.
 6. What is Test-Driven Development? Explain with the help of a suitable project.
 7. Define refactoring. Explain how refactoring helps in Agile development.
 8. Describe state chart diagram with example.

PART - B

Answer any FOUR questions. $(4 \times 10 = 40)$ 

9. Explain how to measure reflect in project risk analysis. (10)
10. a) Construct an interaction diagram by considering company software. (5)
b) Briefly discuss about modularity and functional independence. (5)
11. Explain how planning session reflect in role of Agile software teams. (10)
12. Detail the code of ethics and professional practice in Agile teams. (10)
13. a) Explain the framework for the end of release retrospective. (5)
b) Explain application of Agile practices in retrospective. (5)
14. a) Describe software development management. (5)
b) Describe coaching framework. (5)



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II Semester M.C.A. Degree Examination, December - 2022

COMPUTER SCIENCE

The Design And Analysis of Algorithm

(CBCS Scheme Y2K20)

Paper : 2 MCA5

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Answer any Five questions from Section-A and any Four questions from Section-B

SECTION-A

I. Answer any FIVE questions. Each question carries SIX marks.

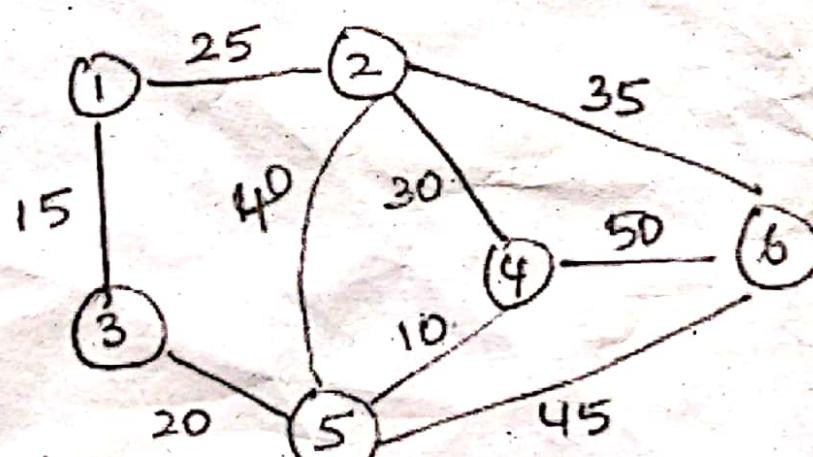
(5×6=30)

1. Obtain the time complexity of the code below:
for $i=0$ to $n-2$
for $j=i+1$ to $n-1$
If ($a[i]=a[j]$)
2. Discuss about Mathematical analysis of Non-recursive algorithm with an example.
3. Explain Best case, Worst case and Average case of linear search.
4. Multiply the following two matrices using strassen's matrix multiplication.

$$A = \begin{bmatrix} 1 & 2 \\ 5 & 6 \end{bmatrix} \quad B = \begin{bmatrix} 8 & 7 \\ 1 & 2 \end{bmatrix}$$



5. Write Hoya's algorithm and analyze its time complexity.
6. Find the minimum spanning tree using prim's algorithm.



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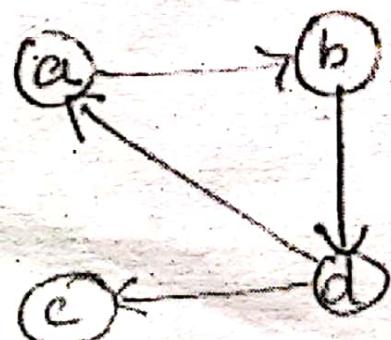
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7. Apply backtracking to solve the following instance of the subset-sum problem.
 $S=\{1,3,4,5\}$ and $d=11$.
8. State travelling sales person problem. Mention its applications.

SECTION - B

II. Answer any **FOUR** of the following questions. $(4 \times 10 = 40)$

9. a) Define and explain various asymptotic notations. (6)
b) Discuss Algorithm visualization. (4)
10. a) Explain Brute force string matching with an example. (6)
b) Write a note on Branch and Bound method. (4)
11. Write the steps of
a) Horspool's algorithm (5)
b) Boyer-Moore algorithm (5)
12. Compute 6_c , using dynamic programming and find its time complexity. (10)
13. Apply warshall's algorithm to compute transitive closure for the graph shown below: (10)



14. Write short notes on:
a) Decision trees (5)
b) Hamiltonian circuit problem (5)