Exam. Code : 206702
Subject Code : 5235

M.Sc. Computer Science 2nd Semester

IMAGE PROCESSING

Paper–MCS-202

Time Allowed—3 Hours] [Maximum Marks—100

Note :— Attempt any **FIVE** questions. Each question carries equal marks.

1. Explain the term Image Digitization. Discuss different technologies involved in Image Digitization. Also write the properties of a digital image. 20

2. Define the following terms :

   (a) Image Enhancement

   (b) Image Data Compression

   (c) Image Restoration

   (d) Statistical Pattern Recognition. 4×5

3. Discuss Digital Image Restoration System. Write different Digital Image Restoration models. Explain the concept of image formation system, a detector and a recorder. 20

4. What do you understand by a Computer Vision System? Explain Computer Vision application areas. Explain at least one in detail. 20

5. Discuss the term Data Redundancy in Image Processing ? Explain its three types in detail with the help of an example. 20

6. Write short notes on the following :

   (a) Statistical Pattern Recognition 10

   (b) Color System Transformations. 10

7. Discuss the role of Image processing in the field of medical image analysis. 20

8. Discuss :

   (a) Convolution 10

   (b) Correlation in Fourier Transform. 10

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M.Sc. Computer Science 2nd Semester
DESIGN & ANALYSIS OF ALGORITHMS
Paper—MCS-203

Time Allowed—3 Hours] [Maximum Marks—100

Note :— Attempt any ***five*** questions. All questions carry equal marks.

1. Define algorithm. What are the parameters to judge the efficiency of an algorithm ? Explain various notations for representation of time complexity of an algorithm with suitable examples. 20
2. How is binary search different from linear search ? Write the binary search algorithm and compute its time complexity. 20
3. Explain the Quick sort algorithm for sorting the elements and show that the Quick-sort's best case running time is $\Omega(n \lg n)$. 20
4. What is meant by minimum spanning tree ? What are its applications ? Prove that Kruskal's algorithm generates a minimum-cost spanning tree for every connected undirected graph G. Analyze the time complexity of Kruskal's algorithm. 20
5. What is 0/1 Knapsack problem ? Describe, by giving an algorithm, how 0/1 Knapsack problem can be solved by using dynamic programming technique of designing an algorithm. 20

6. What do you mean by forward and backward approach of problem solving in Dynamic Programming ? What are the differences between Greedy and dynamic programming method of problem solving techniques ? Explain in detail how the technique of backtracking can be applied to solve the 8-queens problem. Present an algorithm for this and explain. 20

7. Define multistage graphs problem. Name the algorithms, which solve the problem. Write one of the algorithms and explain its working with an example. 20

8. Write short notes on :

   (a) Traversal techniques for graphs

   (b) Travelling salesman problem. 10,10

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M.Sc. Computer Science 2nd Semester

CLOUD COMPUTING

Paper — MCS-204

Time Allowed—3 Hours] [Maximum Marks—100

Note :— There are **eight** questions, attempt any **five**. **All** questions carry equal marks.

1. Which are different types of Cloud computing services ? Which are various desired features of a cloud ?
2. What is virtualization ? Discuss the role and importance of virtualization and virtual appliance in cloud computing ?
3. Explain cloud computing architecture. What is SLA and QoS in cloud computing ?
4. Explain various security issues and their solutions in cloud computing.
5. What is Big-Data Analytics ? What is Federated Cloud Computing ?
6. Which are various service models ? Explain security as a service on cloud.
7. Explain the concept of energy efficiency in cloud. What is market oriented cloud computing.
8. What do you mean by programming models in Cloud? What is Thread programming and Map-Reduce programming ?

Exam. Code : 206702
Subject Code : 5238

M.Sc. Computer Science 2nd Semester

DISTRIBUTED DATABASE SYSTEMS

Paper–MCS-205

Time Allowed—3 Hours] [Maximum Marks—100

Note :— Attempt any **FIVE** questions. All questions carry equal marks.

1. Define distributed database system. What are the problems in distributed database system ? Tabulate the differences in distributed database and centralized database. 20

2. (a) What is fragmentation. What are various methods of fragmentation ? Discuss in detail. 10

   (b) What are different types of schemes ? Explain with suitable examples. 10

3. What is a query ? How a database operation can be represented in form of a query ? What are various operations which can be performed in a query ? Discuss with suitable examples. 20

4. Elaborate the process of query optimization. 20

5. Define transaction. What are the termination conditions for a transaction ? What are various goals of transaction management ? Discuss in detail with suitable examples. 20

6. (a) Two-phase locking increases concurrency in transaction execution relative to static locking. However what problems are associated with the two phase locking ? 10

(b) What are various integrity constraints ? Discuss briefly. 10

7. What do you mean by deadlock ? Discuss in detail various control organizations for distributed deadlock detection. 20

8. Discuss the following in detail :

(a) Distributed database administration 10

(b) Authorization and protection in distributed database. 10