N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** ou of remaining **six** questions.

(3) Assume **suitable** data wherever **necessary**.

1. (a) Explain reach and stroke of a robot.   5
   (b) Discuss Total Work Envelope (TWE) and Dexterous Work Envelope (DWE).   5
   (c) Compare area and line descriptors.   5
   (d) Differentiate between hard and soft automation.   5

2. (a) Explain D-H algorithm. Develop D. K. analysis of 4 axis SCARA robot.   15
   (b) Explain composite rotation matrix (CRM) algorithm.   5

3. (a) Discuss work envelope of a 4 axis SCARA robot.   10
   (b) Develop IK analysis of 2-axis planar articulated Robot.   10

4. (a) Explain how straight line motion can be obtained using an articulated robot.   10
   (b) Explain linear interpolation with parabolic blends. Discuss its advantages over   10
       piecewise linear interpolation.

5. (a)   10

| 0	0	1	1	0	0
1	1	1	1	1	1
0	0	1	1	0	0

   For the above image, calculate area, centroid, first order moments, second order
   moments, central moments and principal angle.

   (b) Discuss edge detection technique. Explain the significance of edge threshold.   10

6. (a) Compare the joint variable vector $q = [q_1, q_2, q_3, q_4]^T$ for the following TCV of   10
       SCARA. $w(q) = [203 \cdot 4, 662 \cdot 7, 557, 0, 0, -1 \cdot 649]^T$.
   (b) Explain the effect of Moment of Inertia on the dynamic performance of a robot.   10

7. Short notes on :–   20
   (a) Shrink and Swell operators
   (b) Gross motion planning
   (c) Robot classification.
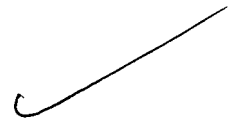
Con. 5622-10.   **GT-8484**

(3 Hours)   **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
     (2) Attempt any **four** from the remaining **six** questions.
     (3) Assume **suitable** data wherever **required**.

1. (a) Draw and explain the workstation based architecture for multimedia systems. **10**
     Also specify hardware and software expected at each layer (if any) considering
     an example.
  (b) Explain lossy and losless compression techniques. **10**

2. (a) Explain RTP, RTCP, RSVP, RTSP and IP multicast. **10**
  (b) Explain Level 0 through Level 05 of RAID functionality. **10**

3. (a) Describe the algorithm for CCITT group 3 standard. How does CCITT group 4 **10**
     differ from CCITT group 3 ?
  (b) Explain different scheduling and policing mechanism in multimedia networking. **10**

4. (a) What are different types of workflow ? Suggest application of Mail enabled
     workflow. **10**
  (b) Explain JPEG DIB file format for still and motion images. **10**

5. (a) Explain virtual reality design considerations. **10**
  (b) Explain MPEG compression in detail. **10**

6. (a) You are appointed as a Consultant to develop an implementation strategy for **10**
     an automated tourist system that helps its customers to plan this tours. The
     system has agencies that provides services like air, railway, luxury, economic
     planning of tour, hotels, services etc. For such a system design the multimedia
     authorising system and also specify the multimedia data base scheme for the same.
  (b) Explain hypermedia messaging with suitable example. **10**

7. Write short notes on any **two** of the following :— **20**
     (a) Video conferencing : Design Issues
     (b) Architectural and telecommunications considerations
     (c) Distributed multimedia system.

Con. 5616-10.

BE/COM/Sem VIII
Distributed computing.

GT-8466

(3 Hours)

[Total Marks : 100]

N.B.(1) Question No.1 is compulsory.

(2) Attempt any Four questions out of remaining six questions.

(3) Assume suitable data wherever required.

1. (a) What are the different goals of distributed system? Explain how these goals are implemented in distributed system. 10

   (b) Compare Multi computer systems with Multi processor systems . 10

2. (a) Compare NOS with DOS middleware. 10

   (b) Explain any algorithm designed to provide mutual exclusion
   in distributed environment. 10

3. (a) Explain the difference between Data Centric consistency and
   Client Centric consistency models .Explain one scheme of each. 10

   (b) What is transparency? Discuss transparency with respect to distributed system. 10

4. (a) What are the Totally Ordered multicasting? How Lamport Clock is implemented? 10

   (b) Explain the Code Migration and the role of mobile agents. 10

5. (a) Explain various forms of message oriented communication with suitable
   application of each. 10

   (b) Explain with example Threads and Processes, Discuss differences and similarities
   between thread and process . . 10

6. (a) What is Name Resolution? Explain various ways of name resolution. 10

   (b) What is CORBA? Explain the working of CORBA as middleware. 10

7. Write details note on any four 20

   (a) CODA File system.

   (b) Mobile Agents.

   (c) Message Broker.

   (d) Crash and Recovery.

   (e) Peer to Peer model as compare to Client-Server model.

BE / Com / Sem VIII

System Security

1-12-10

Con No-136

Con. 6100-10.

GT-8472

(3 Hours)

[Total Marks : 100]

N.B. : (1) Q. No. 1 is **compulsory**.
(2) Solve any **four** of the **remaining**.

1. A. Compares the working of DES and triple-DES on the grounds of speed, security, **20** complexity, etc

   B. Differentiate between fault and failure.

   C. What is key management and why is it important?

   D. List major security issues dealt with at each level of the OSI protocol stack

2. A. The following questions are based on a scenario in which encrypted data is passed **15** between Alice and Bob using the RSA algorithm. Alice's public key is {17, 321} and Bob's public key is {5, 321}. Assume that no one knows the private keys but the original owners.

   a. Encrypt the message M = 7 using Bob's public key.

   b. What would Alice have to do to decrypt the encrypted message from part a?

   c. What would Bob have to do to decrypt the encrypted message from part a?

   d. What is Alice's private key?

   B. List nonmalicious program errors. And explain any one of them in detail. Also **05** suggest the controls for the same.

3. A. Design a policy to exchange the session key "Ksession" using public key **10** cryptography. It should support :

   a. confidentiality

   b. integrity

   c. authentication of the sender

   d. non-repudiation on senders and receivers side

   e. no possibility of replay attack

   (Make necessary assumptions wherever necessary)

   B. Why the user authentication is required? What techniques are used for **10** authentication? What are the flaws in the user authentication process? Suggest controls over the same.

4. A. Every covert timing channel can be transformed into an equivalent covert storage **10** channel. Explain how this transformation can be done?

   B. What are the security requirements of the database management systems? Explain **10** in detail.

5. A. What is a Denial of service attack? What are the ways in which an attacker can **10** mount a DOS attack on the system?

   B. Why does a stealth mode IDS need a separate network to communicate alarms and **10** to accept management commands?

6. A. List and explain the factors that should be considered when developing a security 10
plan?

B. Jay is a computer programmer at a well-known operating system company. His 10
portion of his project is to work on the security for the system. He receives a
detailed specification of not only how it is to work, but also about the construct of
the security. While working on this project, he does not notice that the design
leaves an opportunity for a backdoor into the system. He goes ahead and follows
the specifications exactly, leaving the breach of the defenses in place. The
operating system is soon done with development and is shipped to all the
customers. Several months later, one of the clients is hacked into and there were
several hundred billion dollars worth of damage done. Who is responsible for the
damages: customer, programmer or the company? Justify your answer with codes
of ethics.

7   Write a short note on : ³ᴶqᵛ   20
    A. Viruses : Types and controls over them
    B. Secure email system.
    C. File protection mechanisms
    D. Salami attack.