

Q. P. Code : 23699

(3 Hours)

[Total Marks : 80

N.B.:- (1) Question No. 1 is **Compulsory**.

(2) Solve any **three** questions from the remaining **five** questions.

(3) **Figures to the right** indicate **full** marks.

(4) Make **suitable** assumptions wherever **necessary** and state them **clearly**.

1. (a) Define Embedded System. Discuss various components of embedded system. **5**
(b) What is Semaphore? Explain Mutex in RTOS. **5**
(c) Compare AJMP, SJMP, LJMP instructions of 8051. **5**
(d) Explain the brief Real Time operating Systems **5**
 2. (a) Explain in detail ARM 7 pipelining **10**
(b) Explain the Timer/ Counter of IC 8051. **10**
 3. (a) Write an assembly language program for 8051 microcontroller to multiply two 8 bit numbers stored external memory locations 4000H and 4001 H. Send the result on PORT 1 and PORT 3. **10**
(b) Explain CPSR register of ARM 7 processor. **10**
 4. (a) Explain the addressing modes of ARM 7 processor. **10**
(b) Explain the hardware and software interrupts of 8051 microcontroller **10**
 5. (a) Explain Internal memory organization of 8051. **10**
(b) Explain the addressing modes of 8051 microcontroller. **10**
 6. Write note on (**any two**): **20**
(a) Automated meter reading system.
(b) Digital Camera.
(c) Serial communication of 8051.
(d) Assembler directives.
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(3 Hours)

Total Marks: 80

N.B. 1) Question no.1 is compulsory

2) Solve any **Three** questions from remaining five.

3) Assume suitable data wherever required.

Q 1) Answer any four

(20)

- a) Describe various types of system calls for performing different tasks.
- b) What are the four necessary conditions of deadlock prevention?
- c) Differentiate between multiprogramming and multiprocessing.
- d) Explain pre-emptive and non-pre-emptive scheduling.
- e) What is a semaphore? Explain busy waiting semaphores.

Q 2) a) Consider the following page reference string:

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six, or seven frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each.

• LRU , FIFO and Optimal replacement. (10)

b) What do you mean by a critical section? Using semaphores , write a solution to readers and writers problem that gives priority to readers. (10)

Q 3) a) Consider the following system snapshot using data structures in the Banker's algorithm, with resources A, B, C, and D, and process P0 to P4.

	MAX				Allocate				NEED				Available				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
P0	6	0	1	2	4	0	0	1									
P1	1	7	5	0	1	1	0	0									
P2	2	3	5	6	1	2	5	4									
P3	1	6	5	3	0	6	3	3									
P4	1	6	5	6	0	2	1	2									
													3	2	1	1	

Using Banker's algorithm, answer the following questions.

- (i) How many resources of type A, B, C, and D are there?
- (ii) What are the contents of the Need matrix?
- (iii) Is the system in a safe state? Why

(iv) If a request from process P4 arrives for additional resources of (1,2,0,0), can the Banker's algorithm grant the request immediately? Show the new system state and other criteria. (10)

b) Explain the process states by using processes state transition diagram. (10)

Q 4) a) Explain any 3 allocation schemes that exist for allocating secondary storage to files. (10)

b) What is directory? What are the different ways to implement a directory? (10)

Q 5) a) What are the methods for selecting a disk scheduling algorithm? Explain the disk scheduling algorithms? (10)

b) Suppose the head of moving-head disk with 200 tracks, numbered 0 to 199 is currently serving a request at track 143 and has just finished a request at track 125. if the queue of requests is kept in the FIFO order 86, 147, 91, 177, 94, 150, 100, 175, 130 What is total head movement to satisfy these request for the following disk scheduling algorithms?

i) FCFS ii) SSTF iii) C-SCAN (10)

Q 6) a) Compare the following main memory organization schemes : contiguous memory allocation, pure segmentation, and pure paging with respect to the following issues:

i) External fragmentation ii) Internal fragmentation iii) Ability to share code across processes. (10)

b) Write an algorithm to implement a semaphore using:-

i) The Swap instruction ii) The Test and set instruction. (10)

- N.B. (1) Question number 1 is compulsory.
(2) Solve any 3 from remaining.
(3) Assume suitable data where ever necessary.

Q.1. Attempt the following:

20

- a. Explain any two widely used open sources licenses.
- b. What are redirects used for? Explain with suitable examples.
- c. What are explicit and implicit Intent? What do you mean by Intent resolution?
- d. Explain different Layouts in Android Programming

Q.2.

(a) Explain different file access permissions in Linux. Explain chmod, chown, chgrp

10

(b) Write note on sed. Show how it can be used for

10

(i) As replacement for head command

(ii) As find and replace utility, for all two or more digit numbers by string 'N'

Q3.

(a) Discuss significance of passwd, shadow, group and gshadow files in /etc directory

10

(b) Explain use of wget and curl commands to get website contents.

10

Q4.

(a) Write a note on process management in Linux. Explain relevant commands.

10

(b) Explain telnet, netstat, nslookup, traceroute, ping commands with example usage.

10

Q5.

(a) Explain use of httpd.conf Explain any five configuration directives used in httpd.conf file.

10

(b) Explain how to work with data and Files in Android application.

10

Q6.

(a) Explain File System Hierarchy in Linux

10

(b) Write note on Disk partitioning. Explain role of Logical Volume Manager as device mapper.

10

- NB : 1) **Question 1** is **compulsory**.
 2) Attempt any **three** questions from the **remaining** questions.
 3) **Assume** suitable **data** wherever applicable.
 4) **Draw figures** wherever applicable.

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|---|-----|--|----|
| 1 | (a) | Explain different applications of computer graphics. | 5 |
| | (b) | Explain different types of virtual reality systems. | 5 |
| | (c) | Prove that two successive rotation are additive. | 5 |
| | (d) | Explain fractals | 5 |
| 2 | (a) | Explain Virtual reality architecture. | 10 |
| | (b) | Explain Bresenham's line drawing algorithm. How it is different from DDA | 10 |
| 3 | (a) | Find the Bézier curve given 4 control points (25,25), (45,40), (60,45) and (90,10) using the step size as 0.1. | 10 |
| | (b) | List various polygon filling algorithms and explain boundary fill in detail. | 10 |
| 4 | (a) | Explain geometric and kinematic modeling in detail | 10 |
| | (b) | Explain Sutherland Hodgeman polygon clipping algorithm. | 10 |
| 5 | (a) | Explain 2D transformations with suitable example for each. | 10 |
| | (b) | Explain Cohen Sutherland line clipping algorithm with example. | 10 |
| 6 | | Write short note on (any four) | 20 |
| | (a) | Antialiasing techniques | |
| | (b) | Application of Virtual Reality | |
| | (c) | Text Clipping | |
| | (d) | VR toolkit | |
| | (e) | Morphing techniques | |

(Time: 3 Hrs)

Marks: 80

N.B. : 1. Question no. 1 is **Compulsory**.2. Solve any **Three** questions out of remaining **Five** questions.

- Qu-1 a) Explain concept of a View in SQL. **5**
- b) What is the role of Metadata in data warehouse? **5**
- c) Use **Figure-1** and write SQL query to retrieve the name of each employee who has a dependent with the same first name and is the same sex as the employee **5**
- d) What is Write-Ahead Logging and when it is used? **5**
- Qu-2 a) Explain the ARIES Recovery Algorithm with suitable example. **10**
- b) Explain Star Schema. Draw Star Schema for Supermarket. **10**
- Qu-3 a) Explain Multilevel Indexes with suitable example. **10**
- b) Explain Data Warehouse architecture in detail. **10**
- Qu-4 a) Explain OLAP Operations in Multidimensional Data Model with suitable example. **10**
- b) Explain Query Processing and Optimization in Distributed Databases. **10**
- Qu-5 a) Explain the concept, Immediate Data Extraction and Deferred Data Extraction in data warehouse with suitable example. **10**
- b) List and Explain Data Fragmentation in distributed databases. **10**
- Qu-6 Attempt the following.
- a) There are two levels for assigning privileges to use the database system: i) The account level and ii) The relation/table level. Give example of each considering the database shown in **Figure-1**. **5**
- b) Write short note on “SQL Injection”. **5**
- c) What is multiple granularity locking? Under what circumstances is it used? **5**
- d) Suppose we want to check whenever an employee’s salary is greater than the salary of his or her direct supervisor in the COMPANY database shown in **Figure-1**. Several events can trigger this rule: inserting a new employee record, changing an employee’s salary, or changing an employee’s supervisor. Create a SALARY_VIOLATION trigger which will notify the supervisor about the salary violations. **5**

EMPLOYEE

Fname	Minit	Lname	<u>Ssn</u>	Bdate	Address	Sex	Salary	Super_ssn	Dno
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DEPARTMENT

Dname	<u>Dnumber</u>	Mgr_ssn	Mgr_start_date
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DEPT_LOCATIONS

<u>Dnumber</u>	<u>Dlocation</u>
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PROJECT

Pname	<u>Pnumber</u>	Plocation	Dnum
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WORKS_ON

<u>Essn</u>	<u>Pno</u>	Hours
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DEPENDENT

<u>Essn</u>	<u>Dependent_name</u>	Sex	Bdate	Relationship
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Figure-1. Schema diagram for the COMPANY relational database schema.

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