Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–III • EXAMINATION – WINTER • 2014

Subject Code: 630004 **Date: 02-01-2015**

Subject Name: Operating System

Time: 10:30 am - 01:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Answer following. **07**

1. Program counter register contains_____.
2. In Unix, _____system call creates the new process.
3. State true/false: kernel is made of various modules which cannot be loaded in running operating system.
4. What is arm-stickiness?
5. _____ is the concept in which a process is copied into main memory from the secondary memory according to the requirement.
6. The jacketing technique is used to_____
7. _____algorithm chooses the page that has not been used for the longest period of time whenever the page required to be replaced?

(b) 1. List and briefly define the four main elements of a computer and define two main categories of processor register. **04**

2. What is an interrupt? How are multiple interrupts dealt with? **03**

Q.2 **(a)** Draw the standard seven state transition diagrams. Briefly define each state. Does the UNIX operating system also have the same number of process states? **07**

(b) 1. List the requirements for mutual exclusion. **02**

2. What conditions are associated with readers/writers problem? **02**

3. How can the hold and wait condition is prevented? **03**

OR

(b) Differentiate semaphore and monitor and solve the producer consumer problem using monitor. **07**

Q.3 **(a)** State various memory partitioning techniques and compare them in terms of their strengths and weakness. **07**

(b) Discuss Dining Philosopher problem using semaphore and state deadlock free solution for it. **07**

OR

Q.3 **(a)** Consider the following snapshot of a system: Resource Vector{ 10, 5, 7} Available Vector= { 3, 3, 2} **07**

Process	**Allocation**			**Request**			**Need**		
	R1	**R2**	**R3**	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**
P0	0	1	0	7	5	3			
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Answer the following questions using banker's algorithm.

a. What is the content of matrix Need?

b. Determine the order of process. Is system currently in a safe state? Why?

c. If request of p4 arrives for (3, 3, 0) can that be safely granted immediately? Why?

(b) What is page fault? Explain any one page replacement algorithm. Discuss its advantages and disadvantages. **07**

Q.4 **(a)** 1. Why would we expect improved performance using a double buffer rather than a single buffer for I/O? **03**

2. Briefly define the disk scheduling policies. **04**

(b) What are the basic criteria for scheduling of processes in a uniprocessor environment? Given the following data, calculate Turnaround time for each process and average turnaround time for all process using FCFS, SPN, SRT, RR(quantum=2). (Draw Gantt Chart) **07**

Process	A	B	C	D
Arrival Time	0	1	2	3
Service Time	8	4	9	5

OR

Q.4 **(a)** Briefly define the seven RAID levels. **07**

(b) Discuss three different types of schedulers. **07**

Q.5 **(a)** 1. List and briefly define means of Authentication. **04**

2. What is digital immune system? **03**

(b) Explain Remote Procedure Call and discuss benefits and disadvantages of synchronous and asynchronous RPC. **07**

OR

Q.5 **(a)** What is cluster? Explain cluster configuration and briefly define four clustering methods. **07**

(b) Define computer security. What are the fundamental requirements addressed by computer security? What is the difference between passive and active security threats? **07**

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