Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA - SEMESTER– III • EXAMINATION – SUMMER 2016

Subject Code: 630004 **Date: 26-05-2016**
Subject Name: Operating Systems (OS)
Time: 02.30p.m. To 05.00p.m. **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)** State whether the following statements are TRUE or FALSE and justify your answer. **07**

1. Process can move from blocked state to running state during process's life cycle.
2. Processor is switched from one process to another process at the time of process switching.
3. RAID is used for improvement of data transfer rate in between processor and primary memory.
4. Contention is generated due to multiple processes are trying to modify a single shared resource simultaneously.
5. Semaphore cannot prevent contention problem.
6. Preemption can not interrupt currently running process.
7. Too much of swap-in and swap-out from secondary to primary memory and vice- versa, leads to a condition known as thrashing.

(b)

1. What is thread? **02**
2. What is virtual memory? **02**
3. Define Dispatcher. **02**
4. Define Trap. **01**

Q.2 **(a)** i) What are the differences between user-level thread and kernel-level thread? Under what circumstance one type is better than other? **04**
ii) What is the difference between process and thread? **03**

(b) i) What are the difference between Long-term, Medium-term, Short-term scheduling? **04**
ii) Explain the mechanism of Remote Procedure Call (RPC). **03**

OR

(b) i) List and briefly define three techniques for performing I/O. **03**
ii) List and briefly define four techniques for thread scheduling. **04**

Q.3 **(a)** i) What are typical operations that may be performed on a directory? **03**
ii) List and briefly define four different clustering methods. **04**
(b) i) Explain fetch policy and placement policy in memory management. **07**

OR

Q.3 **(a)** Briefly define first three levels of RAID. **07**
(b) What is the need of Process Control Block (PCB) and who creates PCB? Explain different elements of PCB. **07**

Q.4 **(a)** Consider five processes to be executed by CPU. **07**

Their arrival time and service time (in milliseconds) are as follows:

Process	:	A	B	C	D	E
arrival time	:	0	2	4	6	8
Service time	:	3	6	4	5	2

Calculate Turnaround time and Finish time for each process for SPN(Shortest Process Next), SRTN(Shortest Remaining Time), HRRN (Highest Response Ration Next) scheduling. Also show Execution pattern using diagram.

(b) How can OS solve Readers/Writers Problem using semaphores where Readers have priority? Explain algorithm with appropriate comment wherever necessary. **07**

OR

Q.4 **(a)** Write down the algorithm of Infinite-Buffer producer –consumer problem using binary Semaphore technique. Write down appropriate comment wherever necessary. **07**

(b) There are three page frames in primary memory of a computer. The execution of the process requires reference to five distinct pages. Initially the memory is empty. The page address stream formed by execution of the program is as following **07**

2 3 2 1 5 2 4 5 3 2 5 2

Show the behavior of Optimal (OPT), LRU (Least recently used) and FIFO (First-in-first-out) page replacement algorithms.

Q.5 **(a)** Explain deadlock avoidance with the help of Banker's algorithm. **07**

(b) i) What is the difference between internal fragmentation and external fragmentation? **03**

ii) Explain Buddy system for memory management. **04**

OR

Q.5 **(a)** Briefly define the disk scheduling FIFO, SSTF, SCAN for following requested tracks: **07**

55, 58, 39, 18, 90, 160, 150, 38, 184. Starting track is 100.

(b) i) Write down algorithm for dining-philosophers system for avoiding deadlock. **04**

ii) What is middleware? **03**

****