

**GUJARAT TECHNOLOGICAL UNIVERSITY**

M.C.A. Sem-III - Examination –June- 2011

**Subject code: 630004****Subject Name: Operating System****Date:09/06/2011****Time: 02.30 pm – 05.00 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** State whether the following statements are TRUE or FALSE. It is **MUST** to **14**  
JUSTIFY your answer in either case.

1. The minimum information that must be saved before the processor transfers control to the interrupt handler routine is the program status word (PSW) and the location of the current instruction
2. One approach to dealing with multiple interrupts is to disable all interrupts while an interrupt is being processed.
3. Multiprogramming allows the processor to make use of idle time caused by long-wait interrupt handling.
4. Cache memory exploits the principle of locality by providing a small, fast memory between the processor and main memory.
5. An operating system controls the execution of applications and acts as an interface between applications and the computer hardware.
6. Uniprogramming typically provides better utilization of system resources than multiprogramming.
7. A monolithic kernel architecture assign only a few essential functions to the kernel, including address spaces, inter-process communication and basic scheduling.
8. In a uniprocessor machine, concurrent processes cannot be overlapped; they can only be interleaved.
9. Deadlock can be defined as the periodic blocking of a set of processes that either compete for system resources or communicate with each other.
10. A consumable resource is one that can be safely used by only one process at a time and is not depleted by that use.
11. One of the most common approaches for recovery from deadlocked processes is to abort all deadlocked processes.

12. In deadlocked process recovery, selection criteria for choosing a particular process to abort or rollback includes designating the process with the most estimated time remaining, lowest priority and least total resources allocated so far.

13. The task of subdividing memory between the O/S and processes is performed automatically by the O/S and is called relocation.

14. In a memory system employing paging, the chunks of a process (called frames) can be assigned to available chunks of memory (called pages).

**Q.2 (a)** Explain Seven-state Process Model mentioning all its transitions. **07**

**(b)** Explain the term Microkernel. Explain in brief the Memory Management, Inter-process Communication, I/O and Interrupt Management in Microkernel Design. What are the benefits of Microkernel Design? **07**

**OR**

**(b)** Define the term Deadlock. Discuss the necessary and sufficient conditions for a Deadlock to occur. State the general approaches to deal with Deadlock situation. **07**

**Q.3 (a)** Explain the following terms in brief **07**

1. Resident Monitor
2. Thrashing
3. Segmentation
4. Fail Soft Operation
5. Process Control Block
6. Medium-Grained Parallelism
7. Dispatcher

**(b)** What is race condition? What is mutual exclusion? Define Semaphore, the permissible operations with Semaphore and how they are used to achieve the mutual exclusion. **07**

**OR**

**Q.3 (a)** State various Memory Partitioning Techniques and compare them in terms of their strengths and weaknesses. **07**

**(b)** What is Translation Lookaside Buffer? Explain the Paging with the use of TLB. What role the main memory cache plays with the Virtual Memory Management using TLB? **07**

**Q.4 (a)** Consider the following set of processes **07**

Process	ArrivalTime	ProcessingTime ( Service Time)
A	0	3
B	2	6
C	4	4
D	6	5
E	8	2

Implement the FCFS, SPN and RR ( Q=1) techniques of scheduling PN and RR (Q=1) and find out the finish time and turnaround time for each process.

**(b)** Stating all File Allocation Methods, discuss any three methods of file allocation and compare them all. **07**

**OR**

- Q.4 (a)** Suppose that a disk has 200 tracks, numbered 0 to 199. The disk head is currently located at track 100. The random queue of pending requests, in FIFO order, is 55, 58, 39, 18, 90, 160, 150, 38, 184. Starting from the current head position, what is the total distance (in tracks) that the disk head moves to satisfy all the pending requests, for each of the following disk-scheduling algorithms? Also show the next track accessed with each new request serviced. **07**
- a. FIFO   b. SSTF   c. SCAN
- (b)** How do you classify the different approaches for Real-time scheduling? State various Real-time scheduling techniques available and discuss any one in detail. **07**
- Q.5 (a)** Explain the term Clusters. What benefits can be availed by using Clusters? Compare different Clustering Methods. **07**
- (b)** Explain different classes of Client Server architecture. What do you mean by three tier Client Server architecture? **07**

**OR**

- Q.5 (a)** Discuss about the main classes of intruders. Also explain the different intruder behavior illustratively. **07**
- (b)** Write a short note on Distributed Message Passing. **07**

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