

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MCA - SEMESTER-III • EXAMINATION – SUMMER • 2015**

**Subject Code: 2630004****Date: 14-05-2015****Subject Name: Operating Systems (OS)****Time: 02:30 pm to 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 (a)** Answer the followings: (One mark for each) **07**
1. Define the term “Multi Threading”.
  2. What is Context Switching?
  3. What is the role of Thread Library in User-Level Thread?
  4. What is jacketing? What problem can be solved using this technique?
  5. What is the difference between Hard and Soft real-time systems?
  6. Differentiate between External Fragmentation v/s Internal Fragmentation.
  7. What is Dispatcher?
- (b)** What is Virtual Paging? Explain the Address Translation in Virtual Paging Mechanism. **07**
- Q.2 (a)** 1. Calculate the total number of Page Faults to be generated according the Clock Replacement Policy based on the following data: **04**  
 Total No of pages for the process are 5 and total number of frames allocated to this process are 3 (using Fixed frame allocation)  
 The page address stream formed by executing the program is as follows:  
 (2 1 4 2 3 1 5 2 3 5 4 1 3 4)
2. Calculate the Turn Around Time for Process “E” USING Round Robin Algorithm based on the following data: **03**  
 (Assume that the quantum time  $t = 1 \text{ sec.}$ )
- | Processes | Arrival Time<br>In Seconds | Service Time<br>In Seconds |
|-----------|----------------------------|----------------------------|
| A         | 0                          | 3                          |
| B         | 2                          | 5                          |
| C         | 4                          | 5                          |
| D         | 6                          | 6                          |
| E         | 8                          | 7                          |
- (b)** 1. Which Real-Time Scheduling is best for Periodic Task? Explain it with proper example. **03**
2. What is PCB? Explain the elements of PCB. **04**
- OR**
- (b)** 1. Explain the diagram which shows the Address Translation in a Segmentation/Paging System. **03**
2. Define the User Oriented and Performance Related Scheduling Criteria for Uni-processor scheduling algorithms. **04**
- Q.3 (a)** 1. Base on the given execution profile for two periodic tasks, check which **05**

period of which particular task is missed from the execution:  
using Fixed-Priority Algorithm (In which process A has Highest Priority)

Execution Profile For Two Periodic Tasks			
Process	Arrival time	Execution Time	Ending Deadline
A(1)	0	10	20
A(2)	20	10	40
A(3)	40	10	60
A(4)	60	10	80
A(5)	80	10	100
B(1)	0	25	50
B(2)	50	25	100

2. Explain the importance of the fields of Page Table in Virtual Paging. **02**
- (b) Explain the Dining Philosopher Problem. Give a proper solution for that problem using semaphore. **07**
- OR**
- Q.3** (a) 1. What is Disk Scheduling? Define the different timings consider for calculating the total transfer time in disk scheduling. How much time is required (In Millisecond) to transfer the file of 2.25 mb, if the number of blocks required to store this file are allocated Non-contiguously. **07**
- Sector wise Non-contiguous allocation is there.
  - Rotation speed is 7500 RPM.
  - Average seek time and rotation time is 4 ms and 5 ms respectively.
  - 786.432 bytes per block and 10 blocks per sectors and 50 sectors per track.
- (b) Explain the Readers/Writers problem. Give a solution using semaphore if readers heaving a priority. **07**
- Q.4** (a) 1. What is Interrupt? Explain the different classes of Interrupt. **04**
2. Find the Hit Ratio (H) using following data. **03**
- Out of 100 mb data 80 mb data are found in cache memory and remaining data found in secondary storage.
- Time require to transfer 1 mb data from cache memory to processor is 0.1  $\mu$ s. Time required to transfer 1 mb data from secondary storage to cache memory is 1  $\mu$ s.
- (b) 1. What is Dead-Lock? Explain the different conditions for dead-lock. **04**
2. List out the different IO communication Techniques. Explain any one in detail. **03**
- OR**
- Q.4** (a) 1. Explain the different classis for Client-Server Application. **04**
2. What is IO buffering? Give a comparative study between all the IO buffering techniques. **03**
- (b) 1. What is Semaphore and what is Monitor? Explain the difference between both the terms. **04**
2. Explain the different stages for Basic Instruction Execution Cycle. Also explain the format for 16 bits instruction. **03**
- Q.5** (a) Write a short note on Record Blocking. **07**
- (b) Explain the different methods for Secondary Storage Management. **07**
- OR**
- Q.5** (a) What is RPC? Explain the required design configuration for RPC. **07**
- (b) What is cluster? Explain the advantages and different configurations of cluster. **07**

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