



**MARWADI UNIVERSITY**

**Faculty of Technology**

**Information Technology/Computer Engineering**

**B.TECH**

**SEM: 4<sup>th</sup>**

**Enroll. No. \_\_\_\_\_**

**SUMMER: 2019**

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**Subject: - Operating System (01CE0401)**

**Date:-9/04/2019**

**Total Marks:-100**

**Time: - 03:00 hours**

**Instructions:**

- 1. All Questions are Compulsory.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

**Question: 1.**

(a) Objective MCQ [10]

- (1) Page fault occurs when
  - a) When a requested page is in memory
  - b) When a requested page is not in memory
  - c) When a page is corrupted
  - d) When an exception is thrown
- (2) A solution to the problem of external fragmentation is:
  - a) compaction
  - b) larger memory space
  - c) smaller memory space
  - d) none of the mentioned
- (3) Which one of the following is the deadlock avoidance algorithm?
  - a) banker's algorithm
  - b) round-robin algorithm
  - c) elevator algorithm
  - d) karn's algorithm
- (4) Scheduling is done so as to :
  - a) increase the waiting time
  - b) keep the waiting time the same
  - c) decrease the waiting time
  - d) None of the above
- (5) Which one of the following is the address generated by CPU?
  - a) physical address
  - b) absolute address
  - c) logical address
  - d) none of the mentioned

- (6) If the wait for graph contains a cycle :
- then a deadlock does not exist
  - then a deadlock exists
  - then the system is in a safe state
  - either deadlock exists or system is in a safe state
- (7) If the quantum time of round robin algorithm is very large, then it is equivalent to:
- First in first out
  - Shortest Job Next
  - Lottery scheduling
  - None of the above
- (8) Semaphore is a/an \_\_\_\_\_ to solve the critical section problem.
- hardware for a system
  - special program for a system
  - integer variable
  - none of the mentioned
- (9) A thread is also called :
- Light Weight Process(LWP)
  - Heavy Weight Process(HWP)
  - Process
  - None of the mentioned
- (10) What is a short-term scheduler?
- It selects which process has to be brought into the ready queue
  - It selects which process has to be executed next and allocates CPU
  - It selects which process to remove from memory by
  - None of the mentioned
- (b) Define the following terms: [10]
- Turn Around Time ( TAT)
  - Interrupts
  - Logical Address
  - Dispatcher
  - Frame
  - Disk
  - Thread
  - Context Switching
  - Swapping
  - Convoy Effect

**Question: 2.**

- (a) What is process? Draw a process state transition diagram using five states and explain interpretation of each transition. [08]
- (b) What is Race Condition? Explain producer consumer problem with code. [08]
- OR**
- (b) Define operating system. What are different types of operating systems? Explain any three. [08]

**Question: 3.**

- (a) Consider the following set of processes with the length of CPU burst time given in the milliseconds.

Process	Arrival Time	Burst Time/Service Time
A	0	3
B	0	6
C	0	4
D	0	5
E	0	2

Draw Gantt charts and Calculate average turnaround time and average waiting Time for First-come first served scheduling and Shortest job first scheduling. [08]

- (b) Explain Peterson's solution with code. [04]
- (c) What is page and what is frame. How are the two related? [04]

**OR**

- (a) Consider the following set of processes with the length of CPU burst time given in the milliseconds.

Process	Arrival Time	Burst Time/Service Time	Priority
P1	0	21	2
P2	0	3	1
P3	0	6	4
P4	0	2	3
P5	0	11	5

Draw Gantt charts illustrating the execution of these processes using FCFS, Priority non preemptive scheduling (a higher priority number implies a higher priority) and Calculate average turnaround time and average waiting time. [08]

- (b) Explain different deadlock recovery methods. [04]
- (c) Explain PCB. Discuss its major fields. [04]

**Question: 4.**

- (a) Define File and explain different file access methods. [08]
- (b) Explain paging with the help of diagram. [04]
- (c) Explain the IPC Problem known as Reader- Writer problem with code. [04]

**OR**

- (a) Explain DMA with suitable diagram. [08]
- (b) What is deadlock? Explain the terms circular wait & hold and wait. [04]

- (c) Explain the IPC Problem known as Sleeping barber Problem with code. [04]

**Question: 5.**

- (a) Consider an imaginary disk with 51 cylinders. A request comes in to read a block on cylinder 10. While the seek to cylinder 10 is in progress, new requests come in for cylinders 1, 36, 16, 34, 9, 48 and 12 in that order. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of following Disk Scheduling algorithms? 1) FCFS 2) SSTF [08]
- (b) Discuss the term scheduler along its types. [04]
- (c) Explain the following allocation algorithms: 1) Worst-fit 2) Best-fit [04]

**OR**

- (a) Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is Currently serving a request at cylinder 90, The queue of pending requests 55, 58, 39, 18, 99, 160, 150, 38, 184 Starting from the current head position, what is the total distance ((in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling  
1) C - Scan (increasing order)  
2) Elevator (increasing order) [08]
- (b) State the role of page table in paging. [04]
- (c) Compare any two file structures with example. [04]

**Question: 6.**

- (a) For the Page Reference String: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6 Calculate the Page Faults applying (i) FIFO and (ii) LRU Page Replacement Algorithms for a Memory with three frames. Remember all frames are initially empty, so your first unique pages will all cost one fault each [08]
- (b) What is the purpose of a TLB? Explain the TLB lookup with the help of a block Diagram. [04]
- (c) Explain the term Belady's anomaly. [04]

**OR**

- (a) For the Page Reference String: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 Calculate the Page Faults applying (i) OPTIMAL and (ii) LRU Page Replacement Algorithms for a Memory with four frames. Remember all frames are initially empty, so your first unique pages will all cost one fault each. [08]
- (b) Explain the concept of virtual memory. [04]
- (c) Explain access matrices. [04]

**---Best of Luck---**

### Que. Paper weight-age as per Bloom's Taxonomy

No.	Que. Level	% of weight-age	
		% of weight –age	Que. No.
1	Remember/Knowledge	23.25	Q1(a),Q1(b),Q2(B-OR),Q3(b),Q6(c),Q6(b-OR),
2	Understand	32.55	Q2(a),Q2(b),Q3(c),Q3(c-OR),Q4(a),Q4(a-OR),Q4(b-OR),Q5(b),Q5(c),Q6(c-OR)
3	Apply	23.25	Q3(a),Q3(a-OR),Q4(b),Q5(a),Q5(a-OR),Q6(b)
4	Analyze	11.62	Q3(b-OR),Q4(c),Q4(c-OR),Q5(b-OR),Q5(c-OR)
5	Evaluate	9.30	Q6(a),Q6(a-OR)
6	Higher order Thinking		

### GRAPH:

