

**MARWADI UNIVERSITY****Faculty of Technology****Information Technology/Computer Engineering****B.TECH****SEM: 4th****SUMMER: 2019****Subject: - Operating System (01CE0401)****Date:-09/04/2019****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) Semaphore is a/an _____ to solve the critical section problem.
 - a) hardware for a system
 - b) special program for a system
 - c) integer variable
 - d) none of the mentioned
- (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) A binary semaphore is a semaphore with integer values :
 - a) 1
 - b) -1
 - c) 0.8
 - d) 0.5
- (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 :
 - a) then a deadlock does not exist
 - b) then a deadlock exists
 - c) then the system is in a safe state
 - d) 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) Which of the following process scheduling algorithm may lead to starvation
- FIFO
 - Round Robin
 - Shortest Job Next
 - None of the above
- (9) A thread is also called :
- Light Weight Process(LWP)
 - Heavy Weight Process(HWP)
 - Process
 - None of the mentioned
- (10) A process is _____
- A program in main memory
 - Program in cache memory
 - program in secondary storage
 - program in execution

- (b) Short Que. (answer in one sentence)
Define following terms:

[10]

- Operating System
- Response time
- Sector
- Critical Section
- Page fault
- Context Switching
- GREP [Command]
- CAT [Command]
- Turnaround time
- Cylinder

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 multithreading? Explain threads in brief with its types. [08]

OR

- (b) What is semaphore? Explain semaphore operation for producer consumer problem with code. [08]

Question: 3.

- (a) Consider the following set of processes with the length of CPU burst time given [08]
in the milliseconds.

Process	Arrival Time	Burst Time/Service Time
A	0	3
B	2	6
C	4	4
D	6	5
E	8	2

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

- (b) Differentiate preemptive and non-preemptive scheduling in brief. [04]
(c) What is mutual exclusion? List out various methods to achieve it. [04]

OR

- (a) Consider the following set of processes with the length of CPU burst time given [08]
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

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

- (b) Explain functionality provided by OS. [04]
(c) Explain PCB. Discuss its major fields. [04]

Question: 4.

- (a) Explain different types of RAID. [08]
(b) What are the use of device driver & controller in OS? Explain it. [04]
(c) Explain the IPC Problem known as Dining Philosopher Problem with code. [04]

OR

- (a) Explain DMA with suitable diagram. [08]
(b) What is deadlock? Explain the conditions that lead to deadlock. [04]
(c) Explain IPC Problem – Readers & Writers Problem with code. [04]

Question: 5.

- (a) Consider an imaginary disk with 51(0-50) cylinders. A request comes in to read a block on cylinder 11. While the seek to cylinder 11 is in progress, new requests come in for cylinders 1, 36, 16, 34, 9 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 fragmentation in brief. [04]
- (c) Explain the following allocation algorithms: 1) First-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 100, The queue of pending requests, 55, 58, 39, 18, 90, 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) SSTF (2) SCAN(consider increasing order) [08]
- (b) Explain in detail how a system call is processed. Explain Read system call. [04]
- (c) Explain any two File Allocation Methods. [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) 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]
- (a) What is the purpose of a TLB? Explain the TLB lookup with the help of a block Diagram. [04]
- (c) List out any 5 extensions and attributes of files. [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) FIFO and (ii) Optimal 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 page and what is frame. How are the two related? [04]
- (c) Explain following file operations. [04]
1. Seek
 2. Get attributes
 3. Set attributes
 4. Append

---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	20.93	Q1-a,Q1-b,Q2(b),Q3(b-or),Q6(c)
2	Understand	34.88	Q2(a),Q2(b-or),Q3(c) ,Q3(c-or),Q4(a),Q4(a-or),Q4(b-or),Q5(b),Q5(c) ,Q6(b-or),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),Q4(c),Q4(c-or),Q5(b-or),Q5(c-or)
5	Evaluate	9.30	Q6(a),Q6(a-or)
6	Higher order Thinking	0	

GRAPH: