

(SEM-III) THEORY EXAMINATION 2018-19
OPERATING SYSTEMS

Time: 3 Hours

Total Marks: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

- a. What are batch systems?
- b. What do you mean by system calls?
- c. What is the use of job queues?
- d. What is independent process?
- e. What is dispatcher?
- f. Define throughput?
- g. Differentiate between process and thread.

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

- a. Discuss various operating system services with example.
- b. What is information in the PCB? Discuss it with diagram.
- c. Find the average waiting time (A.W.T) and average turnaround time (A.T.A.T) for executing the following process using
 - (i) Preemptive shortest-job first
 - (ii) Non-preemptive shortest-job first?

Process	Arrival time	Burst time
P1	0	5
P2	1	13
P3	2	8
P4	3	4
P5	4	10

- d. Name four page replacement algorithms. Describe any one with example.
- e. Define critical section problem. Explain Peterson's solution to solve critical section problem.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

- (a) Discuss DMA transfer and DMA controller.
- (b) What do you mean by cache memory? Discuss various mapping technique of cache memory.

4. Attempt any *one* part of the following: 7 x 1 = 7

- (a) What is deadlock? How can we avoiding deadlocks occur? Explain it.

- (b) Suppose we have five processes and three resources, A, B, and C. A has 10 instances, B has 5 instances and C has 7 instances. Can the system execute the following processes without deadlock occurring, if yes find safe sequence?

Process	Allocation			Maximum need		
	A	B	C	A	B	C
P1	0	1	0	7	5	3
P2	2	0	0	3	2	2
P3	3	0	2	9	0	2
P4	2	1	1	2	2	2
P5	0	0	2	4	3	3

5. Attempt any one part of the following:

7 x 1 = 7

- (a) Discuss the following storage placement strategies with suitable examples :
- Best fit
 - First fit
 - Worst fit
- (b) Differentiate between:
- Hard and soft real time system.
 - Paging and segmentation.

6. Attempt any one part of the following:

7 x 1 = 7

- (a) What is process synchronization? Give the solution to reader writer problem using semaphores.
- (b) Consider the following page reference string :
1, 2, 3, 4, 2, 4, 5, 6, 3, 1, 2, 3, 4, 6, 4, 5, 2, 6.
Calculate number of page faults using LRU and OPTIMAL Page replacement algorithm. Assume number of frames as three.

7. Attempt any one part of the following:

7 x 1 = 7

- (a) Which allocation scheme will minimize the amount of space required in directory structure and why?
- (b) Explain short seek time first (SSTF) disk scheduling. Why SSTF scheduling tends to favor middle cylinders over the inner most and outer most cylinders?