Printed Pages:02 **Sub Code:RCA301**

Paper Id: 214301 **Roll No.** | | | | | | | | | | |

MCA

(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 :
(i) Best fit
(ii) First fit
(iii) Worst fit

(b) Differentiate between:
(i) Hard and soft real time system.
(ii) 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?