Course Code: MCT540

First Semester MCA Summer 2021 Endsem Examination

INTRODUCTION TO OPERATING SYSTEMS

Time: 2 Hours] [Max. Marks: 40

Instructions to Candidates:

1. All questions are compulsory.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data and illustrate answers with neat sketches wherever necessary.

Question		Description of Question	Marks	CO
1	(a)	Consider a disk with 200 tracks and the queue has random requests from different processes in the order: 55, 58, 39, 18, 90, 160, 150, 38, 184 Initially disk head is at 100. Find the Average Seek length using FIFO, SSTF, SCAN and C-SCAN algorithm.	04	CO1
	(b)	What is internal and external fragmentation. OR	02	CO1
	(c)	List any four schemes for defining the logical structure of a directory.	02	CO1
2	(a)	The following four processes with their time of arrival(in ms) and CPU Burst Time are given below: Process Arrival time Burst Time P1 0 9 P2 1 7 P3 2 8 P4 3 6 With the help of a GANTT Chart, calculate average waiting time, average turnaround time for FCFS, preemptive SJF and Round Robin algorithm. Take quantum q=5 ms.	04	CO2
	(b)	Suggest the methods of deadlock recovery	03	CO2
	(c)	Calculate Effective Access Time (EAT)if: Hit ratio is 85%, TLB search time is 25 nanoseconds and memory access time is 100 nanoseconds What will be the effect on EAT if hit ratio increases upto 95%.	03	CO2
	(d)	Draw three comparisons between various multithreading models?	03	CO2
	(e)	Consider the following segment table:	05	CO2

Segment	Base	Length
0	219	600
1	2300	14
2		
90	100	
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?

a. 0,430
b. 1,10
c. 2,500
d. 3,400
e. 4,112

OR

(e) Describe the LRU, FIFO page replacement algorithm, assuming there are 5 frames and the page reference string is 05 CO2

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

Find the number of page faults. Which is optimal?

(f) Give the difference between swapping and demand paging. 03 CO2

(g) Consider a paging system with the page table stored in memory. 04 CO2

a. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?
b. If we add TLBs and 75 percent of all page table references are found in the TLBs, what is the effective memory reference time? (Assume that finding a page table entry in the TLBs takes zero time, if the entry is there).

(h) Analyze the readers writers problem and its possible semaphore based solution. 03 CO2

OR

(h) Analyze the test and set instruction solution to the mutual exclusion problem 03 CO2

3 (a) Write a short note on any two: 04 CO3

i) Morris internet worm
ii) Boot Sector Virus
iii) Categories of security violations.

(b) Discuss the strengths and weaknesses of implementing an access matrix using capabilities that are associated with domains. 02 CO3