Course Code : MCT 536 **KRSJ/RS – 18 / 3705**

Second Semester Master in Computer Application (CBCS) Examination

INTRODUCTION TO OPERATING SYSTEMS

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions are compulsory.

(2) Due credit will be given to neatness and adequate dimensions.

(4) Assume suitable data and illustrate answers with neat sketches wherever necessary.

1. (a) Write a short note on any **Two** :—

(a) "Graceful degradation" and "fault tolerance" in a multiprocessor system.

(b) File system mounting.

(c) Pipes. 3(CO 1)

(b) Consider the following details and determine the performance of FCFS, SSTF, SCAN and LOOK algorithm in terms of total head movement to satisfy all the pending requests.

- work Queue : 23, 89, 132, 42, 187
- there are 200 cylinders numbered from 0–199.
- the disk head starts at number zero. 4(CO 1)

(c) State drawbacks of contiguous allocation. Also explain how these drawbacks can be minimized using compaction scheme and modified–allocation scheme. 3(CO 2)

2. (a) Consider the following five processes with given CPU Burst Time and Quantum 8.

Process	Burst Time
P1	10
P2	29
P3	3
P4	7
P5	12

Draw GANTT Chart. Calculate average waiting time, average turnaround time for FCFS, non preemptive SJF and RR algorithm. State which one is optimal. 6(CO 1)

(b) Explain the synchronizing protocol of a classical readers/writers problem. Write a symbolic program code to implement the above protocol. 4(CO 1)

OR

Write a short note on :

(i) Sockets.

(ii) Semaphore. 4(CO 1)

3. (a) A process references 5 pages A, B, C, D, E in the following order A, B, C, D, A, E, B, C, E, D.

Assuming that the replacement algorithm is LRU and FIFO find out the number of page faults during the sequence of references, starting with an empty main memory with 3 frames. 3(CO 1)

(b) Which of the following programming techniques and structures are "good" for a demand–paged environment ? Which are "not good" ?

(a) Stack.

(b) Hashed symbol table.

(c) Sequential search.

(d) Binary search. 2(CO 2)

(c) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB and 600 KB (in order), how would the first–fit, best–fit and worst–fit algorithms place processes of 212 KB, 417 KB, 112KB and 426KB (in order) ? Which algorithm makes the most efficient use of memory ? 3(CO 2)

(d) What causes thrashing ? How does the system detect thrashing ? Once it detects thrashing, what can the system do to eliminate this problem ? 2(CO 2)

4. (a) What is deadlock ? Explain the necessary conditions for its occurrence. 4(CO 2)

(b) Consider the following snapshot of a system with five processes and answer the questions using banker's algorithm :

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	1	1	0	0	2	1	0	1	5	2	0
p_1	1	2	3	1	1	6	5	2				
p_2	1	3	6	5	2	3	6	6				
p_3	0	6	3	2	0	6	5	2				
p_4	0	0	1	4	0	6	5	6				

(a) Find total number of instances available for each resource type at startup.

(b) What is the content of the matrix Need ?

(c) Is the system in a safe state ? If 'Y' state the safe sequence.

(d) If P1 requests (2, 1, 1, 0) can the request be granted immediately? 4(CO 2)

(c) Suggest the methods of deadlock recovery. 2(CO 2)

5. (a) What is access matrix ? Discuss the strengths and weaknesses of implementing an access matrix using access lists. 3(CO 3)

(b) Explain the method used by Boot Sector Virus to infect devices. 3(CO 3)

(c) Write short note on any **Two** :—

(i) Denial of service attack.

(ii) Firewall.

(iii) One time password. 4(CO 3)

6. (a) Discuss how the clone() operation supported by Linux is used to support both processes and threads. In what circumstances is the system–call–sequence fork(), exec() most appropriate. 5(CO 4)

(b) Discuss various security measures in Unix. 5(CO 4)