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Roll No.

333554(33)

B. E. (Fifth Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(IT Branch)

OPERATING SYSTEM

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt questions from all units. Attempt any two from (b), (c) and (d) parts of each unit. Assume suitable examples wherever necessary.

Unit-I

1. (a) Explain how operating system acts as a Resource Manager?

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- (b) The services and functions provided by an operating system can be divided into two main categories. Briefly describe the two categories, and discuss how they differ. 7
- (c) Explain Real time, time sharing, Multiprogramming OS? 7
- (d) Name and discuss the range of system calls that may be supplied by an operating system under various circumstances. List the sequence of system call required to copy content of a file to another file. 7

Unit-II

2. (a) What is the purpose of system calls? 2
- (b) What are the two models of inter-process communication? What are the strengths and weaknesses of the two approaches? 7
- (c) Give a mutual - exclusion solution for Producer-consumer problem of critical section with algorithm and example. 7

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- (d) What is CPU scheduling? If the different jobs and their arrival time and burst time is given below find the average turnaround time and average waiting time using FCFS and SJF. 7

Process time	Arrival time	Burst time
0	0	4
1	1	5
2	2	2
3	3	3
4	4	6

Unit-III

3. (a) What is deadlock? Give characteristics of deadlock. 2
- (b) What are the four necessary conditions of deadlock prevention? Explain with example/diagram. 7
- (c) Explain Banker's Algorithm and safety algorithm. 7
- (d) Write an algorithm to determine whether a given system is in a deadlock and explain. Consider the following snapshot of a system : 7

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Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_3	0	0	2	4	3	3			

Answer the following using Banker's algorithm :

- (i) What would be the need matrix?
- (ii) Is the system in a safe state?
- (iii) If a request from process P_1 arrives for (1,0, 2) can be granted immediately?
- (iv) Explain various methods for recovery from deadlock.

Unit-IV

4. (a) What is virtual memory? 2
- (b) What is the need of Page replacement? Consider the following page reference string 1,2,3,4,2,1, 5,6,2,1,2,3,7,6,3,2,1,2,3,6. Find out the no. of page

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fault by LRU, OPT replacement, FIFO algorithm.

Assume there are four page frames. 7

- (c) Explain the difference between internal and external fragmentation. 7
- (d) Why are segmentation and paging sometimes combined into one scheme? Explain the paged segmentation. 7

Unit-V

5. (a) What is Layered File System? 2
- (b) Considered SCAN disk scheduling algorithm; How is it possible to reduce the time required to finish off? Explain with an example. 7
- (c) Compare and contrast a centralized file system with a decentralized one. 7
- (d) Suppose that the head of a moving head disk with 200 tracks, 0 to 199, is currently serving a request at 143 and has just finished a request at track 125. The queue of request is kept in FIFO order 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the

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total number of head movement needed to specify these request for the following disk scheduling algorithms? 7

(i) SSTF scheduling

(ii) SCAN scheduling