

Total No. of questions : 7]

Roll No. BETN1CS20014...

B.Tech(CSE/ CS Cyber security/CS (DS&ML)), Third Semester (Reg. & Ex.)

End-Term Examination, December, 2021

## OPERATING SYSTEM (CSL0306)

Time : 3:00 hours

Max. Marks : 40

Note: Attempt all the questions.

1. Very short answer type questions. 1X5=5

- (i) Is deadlock possible if any one of the required conditions of deadlock meets?
- (ii) What is pure demand Segmentation?
- (iii) What happen if there is no free frame?
- (iv) Name the Page replacement algorithm suffers from Belady's anomaly?
- (v) What is Physical address?

- 2.(i) Compare multiprogramming and time sharing. Also write their advantages and disadvantages. 3
- (ii) Differentiate the monolithic kernel and micro kernel. 2

*Or*

- (i) Explain Bounded Buffer problem in detail. 3
- (ii) What is binary semaphore? Explain. 2

3. Given Memory partitions of 100K, 450K, 150K, 250K and 550K, how would each of the algorithms (First Fit, Best Fit, Worst Fit) place processes of 220K, 325K, 120K, And 234K? Compute the Internal and External Fragmentation in each case. 5

*Or*

- (i) Consider the following segment table.



Segment No.	Base	Limit
0	119	500
1	2200	24
2	80	50
3	1227	380
4	1852	76

Computer the physical addresses for the following logical addresses.

(a) 0,330 (b) 1,15 (c) 2,450 (d) 3,300 (e) 4,208

(ii) Differentiate between paging and segmentation. 2

4.1) Under what circumstances do page fault occur? Describe the action taken by the operating system when a page fault occurs. 3

(ii) Compare Least Recently used and Optimal algorithms. 2

Or

Consider the following page reference string:

5,1,2,3,4,3,12,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6

How many page faults will occur for LRU, FIFO and optimal page replacement algorithms, assuming 4 available frames (initially all empty)? 5

5.(i) What is virtual memory? Differentiate paging and demand paging. 3

(ii) What are the conditions under which a parent process may terminate one of its children processes? 2

Or

Define Seek Time and Rotational latency. Suppose that a disk drive has the 500 cylinders numbered from 0 to 499. The drive is currently serving a request at cylinder 143. The queue of pending requests in FIFO order is:

86,1470,913,1774,948,1509,1022,1750,130.

What is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following Disk Scheduling



algorithms?

(a) FCFS

(b) SSTF

(c) LOOK

6. Write short notes on (any two)

(i) Mutual exclusion

(ii) Deadlock

(iii) Directory Structure

(iv) Peterson algorithm

Or

Explain the following terms:

Race Condition, Deadlock recovery, Real Time Systems

7. Explain Process Scheduling Criteria. Assume following jobs are to be executed on one processor:

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Jobs	Execution Time (msec)	Arrival Time (msec)	Priority
P1	70	0	2
P2	25	10	4
P3	22	20	3
P4	20	30	4
P5	45	40	1

Using SJF, PRIORITY and SRTF scheduling, draw the GANTT CHART and calculate Avg. Waiting Time (AWT) and Avg. Turn around Time (ATAT).

Or

Define the necessary conditions for the occurrence of Deadlock. Consider the following snapshot of a system:

Process	Allocation				Maximum				Available			
P0	0	0	2	3	0	0	3	5	2	6	3	0
P1	2	0	0	0	2	8	6	0				
P2	2	4	6	5	3	4	6	7				
P3	0	7	4	3	0	7	6	3				
P4	0	0	2	5	0	7	6	7				



Answer the following questions using Banker's algorithm:

- (i) What are the contents of the matrix NEED?
- (ii) Is the system in SAFE state?
- (iii) If a request from P1 arrives for  $(0, 5, 3, 0)$ , can the request be granted immediately?