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Reg. No.

Question Paper Code

12074

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Fourth Semester

Computer Science and Business Systems

20CBPC403 - OPERATING SYSTEMS

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- |  | <i>Marks,</i><br><i>K-Level, CO</i> |
|--|-------------------------------------|
| 1. What is time sharing operating system?                            | 2,K1,CO1                            |
| 2. List out any four process control system calls.                   | 2,K1,CO1                            |
| 3. Name some classical problem of synchronization.                   | 2,K1,CO2                            |
| 4. Define Context switching.   | 2,K1,CO2                            |
| 5. What is Deadlock prevention?                                      | 2,K1,CO3                            |
| 6. Define PCB.   | 2,K1,CO3                            |
| 7. State the difference between internal and external fragmentation. | 2,K1,CO4                            |
| 8. Define Demand Paging.   | 2,K1,CO4                            |
| 9. List the advantages of Linked Allocation.                         | 2,K1,CO5                            |
| 10. Write the different Accessing Methods of a File.                 | 2,K1,CO5                            |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

- |   |           |
|---|-----------|
| 11. a) Explain Process view and hierarchical view of an OS.                                   | 13,K2,CO1 |
| <b>OR</b>   |           |
| b) Discuss in detail about architectural concept of OS.                                       | 13,K2,CO1 |
| 12. a) Consider the following set of processes with the given CPU burst time in milliseconds: | 13,K3,CO2 |

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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Assume all the processes arrived in the order P1, P2, P3, P4, and P5 at time 0.

(i) Draw Gantt charts and illustrate the execution of these processes using the scheduling algorithms FCFS, SJF, Priority (Smallest number indicates highest priority), RR (Quantum = 1).

(ii) What is the waiting time, Turnaround time of each of the scheduling algorithms?

(iii) Identify which algorithm is the best algorithm. Justify.

**OR**

b) Explain about the various CPU scheduling algorithms in detail. 13,K2,CO2

13. a) What is deadlock? Explain deadlock Avoidance in detail. 13,K2,CO3

**OR**

b) Discuss in detail about Inter process communication. 13,K2,CO3

14. a) Explain in detail about the following page replacement algorithms  
a) FIFO, b) Optimal, c) LRU. 13,K2,CO4

**OR**

b) Explain about advantages and disadvantages of paging and the difference between paging and segmentation. 13,K2,CO4

15. a) Explain different Disk scheduling algorithms FCFS, SSTF, CSCAN, CLOOK. 13,K2,CO5

**OR**

b) (i) Describe indexed file, indexed sequential file organization. 6,K2,CO5

(ii) Explain about file attributes, file operations, and file types. 7,K2,CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) Consider the following snapshot of a system. 15,K3,CO3

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	2	0	0	1	4	2	1	2	3	3	2	1
P1	3	1	2	1	5	2	5	2				
P2	2	1	0	3	2	3	1	6				
P3	1	3	1	2	1	4	2	4				
P4	1	4	3	2	3	6	6	5				

Answer the following using Banker's algorithm.

(i) Explain the system is in safe state by demonstrating an order in which the processes may complete?

- (ii) If a request from process P1 arrives for (1, 1, 0, 0), can the request be granted immediately?
- (iii) If the request from P4 arrives for (0, 0, 2, 0), can the request be granted immediately?

**OR**

- b) Consider the following page reference string.  
1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 4, 5, 3.  
How many page fault and page hit occur for the FIFO, LRU, and optimal replacement algorithms, assume one, two, three frames?

15.K3.CO4