



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Information Science and Engineering

Semester End Examination; February / March - 2022

Operating System

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Outline the operating system concepts and its functionalities.

CO2: Implementation of various CPU scheduling algorithms and process synchronization using programming languages.

CO3: Identify deadlock Occurrence, deadlock recovery in various OS and outline memory management concepts.

CO4: Compare page replacement algorithms in OS and understand fundamental file concepts.

CO5: Discuss file system structure and implement disk scheduling algorithms.

Note: I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks	BLs	COs	POs															
I : PART - A		10																		
I a.	What are the advantages of Multiprogramming?	2	L1	CO1	PO1															
b.	What is the difference between Semaphore and Monitor?	2	L1	CO2	PO1															
c.	What is the difference between Logical address and Physical address?	2	L1	CO3	PO1															
d.	What is meant by Thrashing?	2	L1	CO4	PO1															
e.	Define superbblock.	2	L1	CO5	PO1															
II : PART - B		90																		
UNIT - I		18																		
1 a.	List out operating system responsibilities in connection with process and memory management.	9	L1	CO1	PO1															
b.	“One set of operating system services provides functions that are helpful to the user”. Justify with proper services.	9	L2	CO1	PO1															
c.	List and explain the categories of system programs.	9	L2	CO1	PO1															
UNIT - II		18																		
2 a.	Given the snap shot of the system;																			
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Process</th> <th>Arrival time</th> <th>Burst time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">14</td> </tr> <tr> <td>P2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">9</td> </tr> <tr> <td>P3</td> <td style="text-align: center;">5</td> <td style="text-align: center;">7</td> </tr> <tr> <td>P4</td> <td style="text-align: center;">7</td> <td style="text-align: center;">5</td> </tr> </tbody> </table>	Process	Arrival time	Burst time	P1	0	14	P2	3	9	P3	5	7	P4	7	5				
Process	Arrival time	Burst time																		
P1	0	14																		
P2	3	9																		
P3	5	7																		
P4	7	5																		
	With the help of Gantt chart. Find;																			
	I) i) Average waiting time																			
	ii) Average turnaround time using SJF and RR algorithm																			
	II) Find the total number of context switches occurred during RR scheduling when the time slice = 2 ms	9	L3	CO2	PO2															

- b. Explain mutual exclusion with respect to swap() instruction and TestAndset() instruction. 9 L2 CO2 PO1
- c. Distinguish between various thread models. 9 L2 CO2 PO1

UNIT - III

18

- 3 a. Define Deadlock. Explain characteristics of Deadlock. 9 L2 CO3 PO1
- b. Solve the following using bankers algorithm with the given snapshot of a system:

Process	Allocated				Process	Maximum				Process	Available			
	A	B	C	D		A	B	C	D		A	B	C	D
P0	0	0	1	2	P0	0	0	1	2	P0	1	5	2	0
P1	1	0	0	0	P1	1	7	5	0	P1				
P2	1	3	5	4	P2	2	3	5	6	P2				
P3	0	6	3	2	P3	0	6	5	2	P3				
P4	0	0	1	4	P4	0	6	5	6	P4				

9 L3 CO3 PO2

- i) Compute the content of need matrix
- ii) Is the system in a safe state?

- c. i) Justify the statement “resource allocation graph with cycle is not the sufficient condition for deadlock” with an example. 4
- ii) Discuss the basic method of segmentation with segmentation hardware and neat block diagram. L4 CO3 PO2

UNIT - IV

18

- 4 a. Write the total no of page faults for the following reference string with 3 page frame 1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 5, 4, 5, 4,2 using, 9 L3 CO4 PO2
 - i) FIFO
 - ii) Optimal
 - iii) LRU algorithm
- b. Write the procedure to handling the page fault in demand paging with a diagram. 9 L2 CO4 PO1
- c. List and explain the basic operations of files. 9 L2 CO4 PO1

UNIT - V

18

- 5 a. Suppose that a disk drive has 100 cylinders numbered 0-100 the drive is currently serving a request at cylinder 50, the following is the queue of pending requests in FIFO order 44, 20, 95, 4, 50, 52, 47, 61, 87, 25. Starting from the current head position, what is the total distance that the disk arm moves to satisfy the pending requests for each of the following disk scheduling algorithm? 9 L3 CO5 PO2
 - i) SSTF
 - ii) C-LOOK
- b. Define swapping. Explain swap-space management with example. 9 L2 CO5 PO1
- c. Explain different methods used for implementation of directories. 9 L2 CO5 PO1