



P.E.S. College of Engineering, Mandya - 571 401
 (An Autonomous Institution affiliated to VTU, Belagavi)
Fifth Semester, B.E. - Computer Science and Engineering
Semester End Examination; Feb. - 2021
Operating System

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Explain operating system structure, services, types, design and implementation of OS.

CO2: Apply the various algorithms of process scheduling.

CO3: Develop solutions to process synchronization and deadlock problems.

CO4: Analyze various memory management techniques.

CO5: Explain file system implementation and allocation methods.

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	PO																	
I : PART - A		10																				
I a.	What are virtual machines?	2	L2	CO1	PO1																	
b.	Write the difference between multilevel queue scheduling and multilevel feedback queue scheduling.	2	L2	CO2	PO1																	
c.	Define critical section problem.	2	L2	CO3	PO1																	
d.	What is memory fragmentation?	2	L2	CO4	PO1																	
e.	Describe directory structure.	2	L2	CO5	PO1																	
II : PART - B		90																				
UNIT - I		18																				
1 a.	List operating system operation and its importance of transition.	9	L2	CO1	PO1																	
b.	Define system call and system program. Write the importance of system program.	9	L2	CO1	PO1																	
c.	Explain process management and memory management.	9	L2	CO1	PO1																	
UNIT - II		18																				
2 a.	Explain the following with neat diagrams:	9	L2	CO2	PO1																	
	i) User level threads ii) Kernel level threads																					
b.	Discuss on Multi-threading models.	9	L2	CO2	PO1																	
c.	Consider the following set of process with arrival time																					
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Process</th> <th>Burst time</th> <th>Arrival time</th> </tr> </thead> <tbody> <tr><td>P₁</td><td>10</td><td>0</td></tr> <tr><td>P₂</td><td>1</td><td>0</td></tr> <tr><td>P₃</td><td>2</td><td>1</td></tr> <tr><td>P₄</td><td>4</td><td>2</td></tr> <tr><td>P₅</td><td>3</td><td>2</td></tr> </tbody> </table>	Process	Burst time	Arrival time	P ₁	10	0	P ₂	1	0	P ₃	2	1	P ₄	4	2	P ₅	3	2			
Process	Burst time	Arrival time																				
P ₁	10	0																				
P ₂	1	0																				
P ₃	2	1																				
P ₄	4	2																				
P ₅	3	2																				
	i) Draw the Gantt chart using FCFS, SJF preemptive and non-preemptive scheduling																					
	ii) Calculate the waiting and average waiting for each of scheduling algorithm.																					
		9	L3	CO2	PO2																	

UNIT - III

18

- 3 a. Explain Dining Philosopher’s problem using monitors. Define deadlock. 9 L3 CO3 PO1
- b. Explain different methods to recover from deadlock. 9 L2 CO3 PO1
- c. The operating system contains 3 resources; the number of instances of each type is 7, 7, 10. The current resource allocation state is as shown below.

Process	Allocated resources			Max. requirements		
	R ₁	R ₂	R ₃	R ₁	R ₂	R ₃
P ₁	2	2	3	3	6	8
P ₂	2	0	3	4	3	3
P ₃	1	2	4	3	4	4

9 L3 CO3 PO1

Find the safe sequence using Banker’s algorithm.

UNIT - IV

18

- 4 a. What are the functions performed by the virtual memory manger? Explain. 9 L2 CO4 PO1
- b. What is swapping? Does this increase the operating system overhead? Justify your answer. 9 L2 CO4 PO1
- c. For the following page reference string, calculate the number of page faults with FIFO and LRU page replacement policies when;
 - i) No. of page frames are 3 9 L3 CO4 PO1
 - ii) No. of page frames are 4
 Page reference string: 5 4 3 2 1 4 3 5 4 3 2 1 5

UNIT - V

18

- 5 a. With an example, explain different file allocation methods and bring out the advantages and disadvantages of each. 9 L2 CO5 PO1
- b. Suppose the position of cylinder is at 53. Sketch the graphical representation for the queue of pending requests in the order 98, 183, 37, 122, 14, 124, 65, 67 for FCFS and SSTF and LOOK scheduling scheme. 9 L3 CO5 PO1
- c. Describe how access matrix can be implemented effectively. 9 L2 CO5 PO1

* * *