

CMR TECHNICAL CAMPUS
UGC AUTONOMOUS

B. Tech. IV Semester Supply End Examinations, July/August-2023

Operating Systems
Common to CSE & IT

Time: 3 Hours

Max. Marks: 70

Note

- i. This Question paper contains Part- A and Part- B.
- ii. All the Questions in Part A are to be answered compulsorily.
- iii. All Questions from Part B are to be answered with internal choice among them.

PART-A

10 X 02 = 20 Marks

		Marks	CO	BL
1.	a	2 M	CO1	L1
	b	2 M	CO1	L4
	c	2 M	CO2	L2
	d	2 M	CO2	L4
	e	2 M	CO3	L2
	f	2 M	CO3	L3
	g	2 M	CO4	L2
	h	2 M	CO4	L2
	i	2 M	CO5	L2
	j	2 M	CO5	L2

PART- B

5 X 10 = 50 Marks

		Marks	CO	BL
2.	Explain different operating system structures with neat sketch.	10 M	CO1	L2
OR				
3	List and explain the various services provided by operating systems.	10 M	CO1	L2
4	Consider the following set of processes, with the length of the CPU burst given in milliseconds: Process Burst Time Priority	10 M	CO2	L3

P1	27	5
P2	12	1
P3	37	2
P4	19	4
P5	10	3

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0. Draw the Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF and Priority. Also determine the average waiting time and average turnaround time for each of the algorithms.

OR

- 5 Explain about the system calls fork, exit, wait, waitpid and exec. 10 M CO2 L2

UNIT-III

- 6 What is Deadlock? List the condition that leads to deadlock. How deadlock can be prevented. 10 M CO3 L3

OR

- 7 What is Semaphore? Give the implementation of Bounded Buffer Producer Consumer problem using semaphore. 10 M CO3 L2

UNIT-IV

- 8 Compare the main memory organization schemes of contiguous memory allocation, pure segmentation and pure paging with respect to the following issues:
a. External fragmentation.
b. Internal fragmentation.
c. Ability to share code across processes. 10 M CO4 L4

OR

- 9 What is the need of Page replacement? Consider the following reference string
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1.
Find the number of Page Faults with FIFO, Optimal Page replacement and LRU with four free frames which are empty initially. Evaluate which algorithm gives the minimum number of page faults? 10 M CO4 L4

UNIT-V

- 10 List and explain the various methods for protection and access control. 10 M CO5 L2

OR

- 11 Describe about the different types of File allocation methods. 10 M CO5 L2

CO : Course Outcomes

BL : Bloom's Taxonomy Levels

L 1 : Remembering	L 2 : Understanding
L 3 : Applying	L 4 : Analysing
L 5 : Evaluating	L 6 : Creating

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PART-A

10 X 02 = 20 Marks

		Marks	CO	BL
1.	a Define Multitasking.	2	CO1	L1
	b List the objectives of an operating system.	2	CO1	L4
	c What are the functions of a dispatcher?	2	CO2	L1
	d Distinguish between pre-emptive and non-pre-emptive scheduling.	2	CO2	L4
	e Define semaphore with example.	2	CO3	L1
	f Explain the resource allocation graph.	2	CO3	L2
	g What is demand paging?	2	CO4	L1
	h Define lazy swapper.	2	CO4	L1
	i Identify the attributes of a file.	2	CO5	L3
	j Summarise the file accessing methods.	2	CO5	L2

PART- B

5 X 10 = 50 Marks

		Marks	CO	BL
2.	a Explain the operating system services.	7	CO1	L2
	b List the commonly used operating systems in real world.	3	CO1	L4
	OR			
3	a Explain the operating systems structures with neat diagrams.	7	CO1	L5
	b What are the components of computer system?	3	CO1	L1
4	a Identify turnaround time and waiting time for the given processes using FCFS, SJF and Priority processor scheduling algorithms.	7	CO2	L3

Process-ID	Burst-Time	Priority	Arrival Time
P1	7	3	0
P2	4	1	2
P3	1	2	3
P4	4	4	1

- b Distinguish between independent process and cooperating process. 3 CO2 L4

OR

- 5 a Explain the file management and process management system calls. 7 CO2 L4
b What are the various scheduling criteria for CPU scheduling? 3 CO2 L1

- 6 a Explain deadlock avoidance with bankers algorithm for the following example. (7) 7 CO3 L5

	Max			Allocation			Available		
	A	B	C	A	B	C	A	B	C
P ₀	7	5	3	0	1	0	3	3	2
P ₁	3	2	2	2	0	0			
P ₃	2	2	2	2	1	1			
P ₄	4	3	3	0	0	2			

- b Identify the deadlock recovery methods. 3 CO3 L3

OR

- 7 a Classify the classical problems of synchronization. 7 CO3 L4
b Explain Monitors. 3 CO3 L2

- 8 a Discuss the paging memory management technique. 7 CO4 L6
b How do you convert logical address to physical address? 3 CO4 L1

OR

- 9 a Identify the total number of page faults for the given page reference string using
i. FIFO & ii. Optimal page replacement algorithms.
Which gives best results? Frame size = 3 and 4.
Page Reference String: 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5 7 CO4 L3
b List the advantages and disadvantages of virtual memory. 3 CO4 L1

- 10 a Explain the various directory structures. 7 CO5 L5
b How do you provide protection to a file? 3 CO5 L1

OR

- 11 a Discuss the File allocation methods. 7 CO5 L6
b Explain the following system calls: lseek, stat, and ioctl 3 CO5 L2

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L 3 : Applying

L 5 : Evaluating

L 2 : Understanding

L 4 : Analysing

L 6 : Creating
