Code No.: CS303PC	R20	H.T.No.			8	R						

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–I–Semester End Examinations (Supply) – June - 2025
OPERATING SYSTEMS
(Common to CSE, IT, CSC, CSD & CSM)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1. a)	Differentiate between Multi-programming and Multiprocessing.	[2M]
b)	What are the services of an Operating System?	[2M]
c)	What is a dispatcher process?	[2M]
d)	Describe the differences between Preemptive Scheduling and Non-Preemptive Scheduling.	[2M]
e)	How can the hold and wait condition be prevented?	[2M]
f)	What are the necessary conditions to occur Deadlock?	[2M]
g)	What is Internal Fragmentation?	[2M]
h)	What do you mean by Thrashing?	[2M]
i)	Enumerate different I/O ctl System Calls.	[2M]
j)	What delay elements are involved in disk read or write?	[2M]

PART-B **(50 Marks)**

2.a)	Explain about the functions of Operating System.	[5M]
b)	What are the different types of system calls?	[5M]

OR

3.	What are different types of Operating Systems? Explain them in detail.	[10M]
4.	Following is the snapshot of a CPU	[10M]

Process	CPU Burst	Arrival Time
P1	75	0
P2	40	10
P3	25	10
P4	20	80
P5	45	85

Draw the Gantt chart and calculate the turnaround time and waiting time of the jobs for FCFS (First Come First Served), SJF (Shortest Job First), SRTF (Shortest Remaining Time First) and RR (Round Robin with time quantum 15) scheduling algorithms.

OR

5.a)	Explain the concept of Semaphores. Illustrate with example.	[5M]
b)	Explain Peterson solution for Critical Section problem.	[5M]

6. Consider the following snapshot of a system: [10M]

Processes	Allocation	Max	Available
	A B C D	A B C D	A B C D
P0	0 0 1 2	0 0 1 2	2 1 0 0
P1	2 0 0 0	2 7 5 0	
P2	0 0 3 4	6 6 5 6	
P3	2 3 4 5	4 3 5 6	
P4	0 3 3 2	0 6 5 2	

Answer the following questions using the banker's algorithm:

i) What is the content of the matrix Need?

ii) Is the system in a safe state? Why?

iii) Is the system currently deadlocked? Why or why not?

iv) Which process, if any, or may become deadlocked if this whole request is granted immediately?

OR

7.a) Explain Deadlock Avoidance using Resource Allocation graph. [5M]

b) Write short notes on Access Matrix. [5M]

8. Illustrate the page-replacement algorithms i) FIFO ii) Optimal Page Replacement use the reference string 7, 0,1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2,1, 2, 0, 1, 7, 0,1 for a Memory with three frames. [10M]

OR

9.a) What is Virtual Memory? Discuss the benefits of Virtual Memory Technique. [5M]

b) Explain briefly about LRU Page Replacement Algorithm. [5M]

10.a) Explain various File Access methods with suitable examples. [5M]

b) Explain File System architecture. [5M]

OR

11.a) Explain various File Allocation Methods. [5M]

b) What is Directory? Write short notes on Directory Implementation. [5M]

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