Code No: 862AB **R19**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I Semester Examinations, March - 2023
OPERATING SYSTEMS

Time: 3 Hours **Max.Marks:75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) What are the major services provided by an operating system related to process management? [5]
b) Illustrate a situation where Round-robin scheduling is advisable and is not advisable to use. [5]
c) Discuss the usefulness of resource allocation graph in analyzing deadlock situation. [5]
d) What steps does an operating system take when a page fault occurs? [5]
e) Give a short note on directory structure implementation. [5]

PART – B

(50 Marks)

2.a) Explain in detail about multi programmed systems.
b) What is the need of a virtual machine? Explain in detail about virtual machine role. [5+5]

OR

3.a) Explain the functions and role of an operating system from system's perspective.
b) What are the advantages and disadvantages of Real-Time systems? [6+4]

4.a) Describe the need for zombie state in Unix.
b) How does a kernel level thread distinguish from a user level thread?
c) Illustrate the need of wait() system call with sample code. [3+2+5]

OR

5. Consider the following processes that are to be executed on a single processor.

Process No.	Arrival time	Priority	Burst time (ms)
P1	0	2	10
P2	2	1 (highest)	04
P3	3	3 (lowest)	03
P4	5	2	06

Draw the Gantt chart illustrating the execution of these processes for FCFS, SJF, preemptive and non-preemptive priority and RR(with time slice=3ms) scheduling algorithms. Compute the average turnaround time and average waiting time for each algorithm. [10]

6.a) Define the terms: Safe state, Unsafe state and Deadlock state.

b) How to determine whether the system is in safe state or deadlock state using Banker's algorithm? Demonstrate with an example. [4+6]

OR

7.a) State the advantages and disadvantages of using FIFOs for IPC.

b) Give solution to the critical section problem for two concurrent processes using semaphore. [4+6]

8.a) What is meant by internal fragmentation and external fragmentation?

b) With relevant diagram explain in detail about paging memory management technique. [3+7]

OR

9. Given a page frame allocation of 3 and assuming the primary memory is initially unloaded, how many page faults will the given reference stream incur under FIFO, LRU and OPTIMAL page replacement strategies.
Reference Stream: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 [10]

10. Explain various file access methods and list out the merits and demerits of each method. [10]

OR

11.a) Explain the use of lseek( ) and ioctl( ) system calls with illustrative examples.

b) Discuss the file system structure in detail. [6+4]

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