Code No: 154BR **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, September/October - 2023
OPERATING SYSTEMS
(Common to CSE, IT, CSBS, CSIT, ITE, CE(SE), CSE(CS), CSE(DS), CSE(IOT), CSE(N), AI&ML, CSD)

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 is the difference between multiprogramming and multiprocessing?	[2]
b)	Under what circumstances would a user be better off using a time-sharing system, rather than a PC or a single-user workstation?	[3]
c)	Differentiate between preemptive and non-preemptive scheduling.	[2]
d)	What are the differences between user-level threads and kernel-level threads?	[3]
e)	Suppose that a system is in a safe state. Show that it is possible for the processes to complete their execution without entering in a deadlock state.	[2]
f)	Explain race conditions with one example.	[3]
g)	List the two differences between logical and physical addresses.	[2]
h)	Compare and contrast paging and segmentation.	[3]
i)	Explain the following file allocation methods: i) Contiguous allocation and ii) indexed allocation.	[2]
j)	Which functions are used to read and write to a text file?	[3]

PART – B

(50 Marks)

2.a)	What is spooling, and what is the use of it in batch operating systems?	
b)	Write down the major difference between the following types of operating systems: i) Batch system, ii) Real-time system and iii) Time-sharing system.	[5+5]

OR

3.a)	What is the purpose of system calls? List out various types of system calls.	
b)	In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems. i) What are two such problems? ii) Can we ensure the same degree of security in a time-shared machine as we have in a dedicated machine? Explain your answer.	[5+5]
4.a)	Explain the different states of a process with the help of a state transition diagram.	
b)	Explain different system call interfaces for process management.	[5+5]

OR

5.a) Consider the following snapshot of the system. Here, the smallest integer is equal to the highest priority.

Process	Arrival Time	Priority	CPU Burst Time (in ms)
P_1	0	5	19
P_2	2	3	13
P_3	3	2	17
P_4	4	7	07

Calculate the average waiting time and turnaround time (up to two decimal places) when the operating system deploys the following scheduling algorithms: i) FCFS, ii) SJF (non-preemptive), iii) shortest remaining time first, iv) priority (preemptive) and round robin (time quantum = 5ms).

b) Define starvation. Which of the scheduling algorithm result in starvation? Explain.[5+5]

6.a) What is deadlock? Explain the necessary and sufficient conditions to occur deadlock. What is the difference between deadlock avoidance and prevention?

b) List two examples of deadlocks which are not related to a computer system environment. Explain. [5+5]

OR

7.a) What is semaphore? Explain the solution to the producer-consumer problem using semaphore.

b) State the Dining philosopher's problem and give a solution using semaphore. [5+5]

8.a) What is demand paging? Why is it called lazy swapper? Explain in detail.

b) How many pages will be required to convert a logical address of 18 bits into a physical address during mapping if the size of each page is 1K? Explain. [5+5]

OR

9.a) Given memory partitions of 100K, 500K, 200K, 300K and 600K (in order). How would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212K, 417K, 112K and 426K (in order)? Which algorithm makes the most efficient use of memory?

b) Discuss various page replacement techniques with examples. [5+5]

10.a) Explain the security and protection provisions implemented in an operating system.

b) Explain the method used for implementing directories. [5+5]

OR

11.a) Mention the different file attributes and file types.

b) Explain file system mounting and protecting in detail. [5+5]

---ooOoo---