Registration No : | | | | | | | | | | |

Total Number of Pages : 03 **Course: B. Tech**

Sub_Code: RCS5C003

5th Semester Regular/Back Examination: 2022-23

SUBJECT : Operating Systems

BRANCH(S): CSE, CSEAIME, CSIT, CST, ELECTRICAL & C.E, ELECTRONICS & C.E, IT

Time : 3 Hour

Max Marks : 100

Q.Code : L315

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What is a time-sharing operating system?

b) List out any four information management system calls?

c) What does PCB contain?

d) Define race condition.

e) What is the basic method of Segmentation?

f) What is Demand Paging?

g) Define deadlock?

h) Differences between Logical address space and physical address space.

i) What is the purpose of system programs?

j) When does thrashing occur?

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) List five services provided by an operating system and explain how each creates convenience for users. In which cases would it be impossible for user-level programs to provide these services? Explain your answer.

b) Explain the purpose of system calls and discuss the calls related to device management and communications in brief.

c) Define a Thread? Give the benefits of multithreading. What resources are used when a thread is created? How do they differ from those used when a process is created?

d) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Burst Time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	2
P5	5	3

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

a) What is the average turnaround time for these processes with the SJF scheduling algorithm?

b) What is the average turnaround time for these processes with the PRIORITY scheduling algorithm?

e) Define Deadlock. State and explain conditions that are necessary for deadlocks to occur deadlock. How can it be prevented. Discuss with example?

f) Describe dining-philosopher problem? Device an algorithm to solve the problem, using semaphores.

g) Discuss the Peterson's solution for the race condition with algorithm.

h) Consider page reference string 1, 3, 0, 3, 5, 6 with 3-page frames. Find number of page faults in FIFO, LRU and Optimal Page Replacement Techniques.

i) What is Internal and External fragmentation? In which memory management technique internal fragmentation occurs, Explain the solution for it.

j) Explain swap space management in detail.

k) Explain different Disk scheduling algorithms SCAN, CSCAN, CLOOK.

l) Write short notes on DNS and VM ware and LINUX system.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Explain the FCFS, preemptive and non-preemptive versions of Shortest-Job First and Round Robin (time slice = 2) scheduling algorithms with Gantt charts for the four processes given. Compare their average turnaround and waiting time. **(16)**

PROCESS	ARRIVAL TIME	BURST TIME
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Q4 Explain in detail about Banker's algorithm with example in deadlock. **(16)**

Consider a system that contains five processes P1, P2, P3, P4, P5 and the three resource types A, B and C. Following are the resource types: A has 10, B has 5 and the resource type C has 7 instances.

Process	Allocation A B C	Max A B C	Available A B C
P1	0 1 0	7 5 3	3 3 2
P2	2 0 0	3 2 2	
P3	3 0 2	9 0 2	
P4	2 1 1	2 2 2	
P5	0 0 2	4 3 3	

Answer the following questions using the banker's algorithm:

a) What is the reference of the need matrix?

b) Determine if the system is safe or not.

c) What will happen if the resource request (1, 0, 0) for process P1 can the system accept this request immediately?

Q5 Explain the concept of demand paging in detail with neat diagram. **(16)**

Consider the following page-Reference string:

1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults occur for the LRU, FIFO and optimal page replacement algorithms, assuming 3 frames and initially all frames are empty?

Q6 Discuss the objectives for file management systems. Suppose the head of a moving- head disk with 200 tracks, numbered 0 to 199, is Currently serving a request at track 143 and has just finished a request at track 125. If the queue of requests is kept in FIFO order: 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the total head movement to satisfy these requests for the following Disk scheduling algorithms. **(16)**

(a)FCFS (b) Random (d) SCAN (e) SSTF (f) C- SCAN