End-TermExamination
(CBCS)(SUBJECTIVE TYPE)(Off Line)
Course Name: B. Tech, Semester: 4
(May, 2024)

Subject Code: BIT-202	Subject: Operating System
Time :3 Hours	Maximum Marks :60

Note:Q. 1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1 (4*5=20)

(a) Explain different types of Operating Systems along with examples and diagrams

(b) Logical Address Space=128KB, Physical Address Space = 512KB and Page Size= 16KB.

Calculate:

1. Numbers of bits for Logical Address
2. Number of bits for Physical Address
3. Number of Pages in Logical Address Space or Process
4. Number of Frames in main memory
5. Page Table Size

(c) Differentiate between Dedicated, Shared and Virtual devices.

(d) What are the differences between Physical and Logical File Systems? Briefly illustrate with the help of examples.

UNIT-I

Q2 (a) Consider a set of six processes. Draw the Gantt Chart and Calculate the average waiting time, average turnaround time and average response time using Round Robin algorithm (5)

Process	Arrival Time (msec)	Burst time (msecs)
P_1	0	7
P_2	1	4
P_3	2	15
P4	3	11
P5	4	20
P6	4	9

Assume T.Q=5

Calculate Avg. Turn-around time and Avg. Waiting time

(b) Consider a set of six processes. Draw the Gantt Chart and Calculate the average waiting time, average turnaround time using Pre-emptive Shortest job first scheduling algorithm (5)

Process	Arrival Time (msec)	Burst time (msecs)
P_1	0	7
P_2	1	5
P_3	2	3
P4	3	1
P5	4	2
P6	5	1

Calculate Avg. Turn-around time and Avg. Waiting time

Q3 Given below are the burst times and priorities of five processes P_1, P_2, P_3, P_4 and P_5. **(10)**

The processes are assumed to have arrived in order P_1, P_2, P_3, P_4, P_5 all at time 0.

Process	Priority	Burst time (msec)
P_1	3	10
P_2	1	1
P_3	3	2
P_4	4	1
P_5	2	5

(a) Draw four Gantt Charts illustrating the execution of these processes using FCFS, SJF, non pre-emptive priority (a smaller priority number implies a higher priority) and RR (Quantum=1) scheduling.

(b) What is the turn-around time of each process for each of the scheduling algorithms?

UNIT-II

Q4 Consider the following system with five processes and available four Resources A,B,C & D **(10)**

Processes	Allocation A B C D	Max. need A B C D	Available A B C D
P_0	0 0 1 2	0 0 1 2	1 5 2 0
P_1	1 0 0 0	1 7 5 0	
P_2	1 3 5 4	2 3 5 6	
P_3	0 6 3 2	0 6 5 2	
P_4	0 0 1 4	0 6 5 6	

Answer the following using Banker's Algorithm.

(i) What is the Content of matrix need? Justify

(ii) Is the system in a safe state? Conclude and Explain

(iii) If a request from process is arrives for (0, 4, 2, 0), can the request be granted immediately? Explain

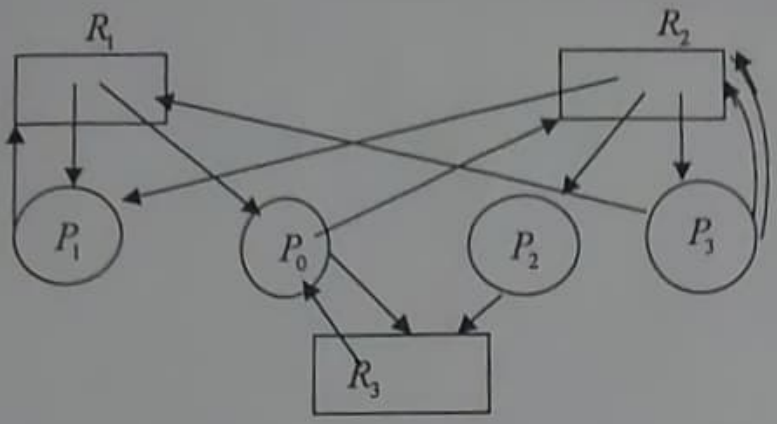
Q5 (i) A single processor system has three resource types x, y and z which are shared by three process. There are 5 units of each resource type. Consider the following scenario, where the columns allocation denotes the number of units so each resource type allocated to each process, and column request denotes the number of units of each resource type requested by a process in order to complete execution. Which of these processes will finish Last?

	Allocation X Y Z	Request X Y Z
P_0	1 2 1	1 0 3
P_1	2 0 1	0 1 2
P_2	2 2 1	1 2 0

OR **(5)**

(I) What do you understand by Process Synchronization? Explain any two classical problem of Process Synchronization

(ii) Consider the following Resource Allocation Graph, Having two instances of R1, three instances of R2 and two instances of R3. Check weather Deadlock will occur or not, If not, find safe sequence. Justify the Process **(5)**



	UNIT-III	
Q6	Describe:- (i) Features of Device management and Three categories of the fundamentals of I/O devices. (ii) Rotational latency, seek time and Disk structure with diagram.	(5) (5)
Q7	Suppose the order of request is: (82, 170, 43, 140, 24, 16, 190) and the current position of Read/ write head is : 50 Calculate total overhead movements using: (a) SSTF 332 (b) SCAN 332 (c) Look 314 (d) CSCAN 391 (e) C LOOK 341	(10)
	UNIT-IV	
Q8	(i) Discuss free space management in operating system using suitable diagram. (ii) What is Swap-Space Management?	(5) (5)
Q9	Describe Directory Implementation in operating system & Directory Implementation using singly linked List (10 marks)	(10)