CBCS SCHEME

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15CS64

Sixth Semester B.E. Degree Examination, Jan./Feb. 2023
Operating Systems

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain the services provided by an operating system. **(08 Marks)**

b. Define an operating system. What is systems view point of an operating system? Explain the dual mode operation of an operating system. **(08 Marks)**

OR

2 a. What is a process? With state diagram explain different states of a process. **(05 Marks)**

b. Explain the two fundamental models of inter process communication. **(06 Marks)**

c. Explain the concept of a virtual machine with the help of a neat diagram. **(05 Marks)**

Module-2

3 a. Explain different scheduling criteria that must be kept in mind while choosing different scheduling algorithms. **(05 Marks)**

b. Consider the following snapshot of a CPU:

Process	Burst Time
P_1	6
P_2	8
P_3	7
P_4	3

Draw Gantt chart showing the execution of these processes using SJF scheduling scheme. Also find average waiting time and average turnaround time of processes. **(05 Marks)**

c. Explain three multithreading models. **(06 Marks)**

OR

4 a. What is a critical section problem? Explain Peterson's solution to critical section problem. **(08 Marks)**

b. What are the three classical problems of synchronization? Explain any one in detail. **(08 Marks)**

Module-3

5 a. Consider the following snapshot of a system:
Answer the following questions using banker's algorithm. Resource type 'A' has 10 instances, 'B' has 5 instances and 'C' has 7 instances.

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

i) What is the content of the matrix need?

ii) Is the system is in safe state? Explain.

iii) If a request from process P1 arrives for (1, 0, 2), can the request be granted immediately? Explain. **(08 Marks)**

b. What is Deadlock? Explain the four necessary conditions for deadlock to occur. **(04 Marks)**

c. For the following resource allocation graph, write the corresponding wait-for graph. Also explain the procedure of construction of graph. (Refer Fig.Q.5(c)). **(04 Marks)**

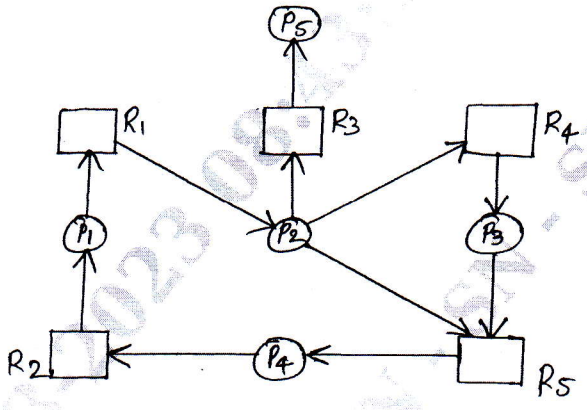

Fig.Q.5(c)

OR

6 a. What is paging? Explain how logical addresses are converted to physical addresses. **(08 Marks)**

b. Explain the most common techniques for structuring the page table. **(08 Marks)**

Module-4

7 a. Consider the following page reference string:
7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1
How many page faults will occur in the following page replacement algorithms by assuming 3 frames? Frames are empty in the beginning.
i) FIFO ii) LRU iii) Optimal. **(08 Marks)**

b. What is page fault? Explain the steps involved in handling a page fault with an example scenario. **(08 Marks)**

OR

8 a. Briefly explain typical file attributes and various file operations. **(08 Marks)**

b. Explain contiguous allocation and linked allocation of disk space. **(08 Marks)**

Module-5

9 a. Explain various disk scheduling techniques. **(08 Marks)**

b. Describe the access matrix model used for protection purpose. **(08 Marks)**

OR

10 a. Explain the components of a Linux system. **(08 Marks)**

b. Explain how interprocess communication is handled in Linux. **(08 Marks)**

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