1T01234 - S.E.(Information Technology Engineering)(SEM-IV)(Choice Based) (R-20-21) (C Scheme) / 41023 - Operating System   QP CODE : 10028409   DATE: 15/05/2023

Time: 3 hours   **Max. Marks: 80**

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N.B.: 1) Question No.**1** is **compulsory**.

2) Attempt any **THREE** questions out of the remaining **FIVE** questions.

3) **Figures** to the **right** indicate **full** marks.

4) Assume suitable data if **necessary**.

Q1	**Attempt any FOUR of the following**	**20**
a	What is the content of page table? Explain.	
b	Compare process scheduling and process switching.	
c	What is Semaphore? What is its significance?	
d	Explain UNIX OS kernel.	
e	Explain Direct Memory Access (DMA) in detail.	

Q.2

a Consider the following snapshot of the processes: **10**

Process	Burst time	Arrival time	Priority
P1	8	0	1
P2	20	1	3
P3	3	2	2
P4	6	3	5
P5	12	4	4

i. Draw the Gantt chart for the execution of the processes, showing their start time and end time using FCFS, SJF (without considering the priority), priority scheduling (pre-emptive), RR (with time quantum=5),

ii. Calculate turnaround time, and average waiting time and average turnaround time for the system.

b Explain with suitable example, how virtual address is converted to physical address?   **10**

Q.3

a Consider the following state of a system with four processes, P1, P2, P3, and P4, and five types of resources, RS1, RS2, RS3, RS4, and RS5:   **10**

$$C = \begin{bmatrix} 0 & 1 & 1 & 1 & 2 \\ 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 2 & 1 & 0 & 0 & 0 \end{bmatrix} \qquad R = \begin{bmatrix} 1 & 1 & 0 & 2 & 1 \\ 0 & 1 & 0 & 2 & 1 \\ 0 & 2 & 0 & 3 & 1 \\ 0 & 2 & 1 & 1 & 0 \end{bmatrix}$$

E = (24144)

A = (01021)

Using the deadlock detection algorithm check deadlock is there or not? If deadlock is there, then identify the processes that are deadlocked.

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b What is virtual memory technique? Discuss segmentation with example. **10**

Q.4

a Consider the following reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, **10** 2, 3, 6. Find the number of page faults with FIFO, Optimal Page Replacement and LRU with frame size=4,

b State features of Cloud OS. Enlist its advantages and disadvantages. **10**

Q.5

a What is demand paging? Discuss the hardware support required to support **10** demand paging.

b What is Threading and Multithreading? Explain importance of Multithreading. **10**

Q.6 **Write short notes on any FOUR** **20**
a Necessary conditions for deadlock
b RAID levels
c Disk Scheduling
d Real Time Operating System
e Deadlock avoidance
f Process Control Block

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