P P SAVANI UNIVERSITY

Fourth Semester of B. Tech. Examination

November 2022

SEIT2031 Operating System

28.11.2022, Monday **Time: 01:00 p.m. to 03:30 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

			CO	BTL
Q - 1	Short Question/Fill in the Blanks (Any Five)	**[05]**		
(i)	Define Starvation.		**2**	**1**
(ii)	What is process?		**1**	**1**
(iii)	What is Operating System?		**1**	**1**
(iv)	Which algorithm uses Time quantum value for scheduling?		**2**	**2**
(v)	Program which acts as an interface between a user and the hardware is called _____.		**1**	**1**
(vi)	Enlist different types of scheduler.		**1**	**1**
(vii)	Which module gives control of the CPU to the process selected by the short-term scheduler?		**1**	**2**
Q - 2 (a)	Find Average Waiting Time (WT) and Turn Around Time (TAT) for the following example using First Come First Serve (FCFS).	**[05]**	**3**	**5**

Process	Arrival Time	Burst Time
P1	0	2
P2	2	3
P3	4	4
P4	6	5
P5	8	6

Q - 2 (b)	Explain different services of Operating System (OS). Discuss generations of OS in brief.	**[05]**	**1**	**2**

OR

Q - 2 (a)	Find Average Waiting Time(WT) and Turn Around Time(TAT) for the following example using Round Robin Algorithm (Time Quantum-TQ=2):	**[05]**	**3**	**5**

Process	Arrival Time	CPU cycle
P1	0	13
P2	1	4
P3	2	3
P4	3	6
P5	4	5

Q - 2 (b)	Demonstrate Banker's Algorithm with suitable example.	**[05]**	**3**	**4**
Q - 3 (a)	Explain process state diagram with diagram.	**[05]**	**2**	**2**
Q - 3 (b)	Explain the concept of context switch with suitable example.	**[05]**	**2**	**3**

OR

Q - 3 (a)	Enlist different type of Operating System and explain any two of them.	[05]	1	2
Q - 3 (b)	List out types of Semaphore. Explain Wait and Signal operation of Binary semaphore.	[05]	2	2
Q - 4	Attempt any one.	[05]		
(i)	What is Readers-Writers Problem? Explain its solution using Semaphore.		4	3
(ii)	What is Producer-Consumer Problem? Explain its solution using Semaphore.		4	3

SECTION – II

Q - 1	Short Question/Fill in the Blanks (Any Five)	[05]		
(i)	Enlist different techniques of contiguous memory allocation.		1	1
(ii)	What is logical address space?		1	1
(iii)	Define device driver.		1	1
(iv)	What is virtual memory?		1	2
(v)	Give example of internal fragmentation.		4	3
(vi)	What is belady's anomaly?		2	1
(vii)	On a movable head system, the time it takes to position the head at the track is known as _____.		2	1
Q - 2 (a)	Explain concept of paging with suitable example.	[05]	2	2
Q - 2 (b)	Explain Best fit and worst fit memory allocation algorithms with example.	[05]	3	3
	OR			
Q - 2 (a)	Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for FCFS disk scheduling algorithm.	[05]	3	5
Q - 2 (b)	What is page fault? Explain the steps to service page fault with example.	[05]	2	4
Q - 3 (a)	What is directory structure in file system? Explain any two in brief.	[05]	2	2
Q - 3 (b)	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 would occur for the following LRU replacement algorithms, assuming four frames? Remember all frames are initially empty.	[05]	3	5
	OR			
Q - 3 (a)	For 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 Calculate the page faults applying the following Optimal Page Replacement Algorithms for a memory with three frames. Initially pages 7, 0 and 1 are already present in physical memory.	[05]	3	5
Q - 3 (b)	Explain steps of DMA data transfer with necessary diagram.	[05]	2	3
Q - 4	Attempt any one.	[05]		
(i)	Explain following in brief: (1) Sequential file access method (2) Indexed file access method		1	2
(ii)	Explain various file attributes in detail.		1	2

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CO : Course Outcome Number BTL : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create