Paper no. - 7852

Unique paper code: 6202452303

Name of Paper: Operating Systems

Name of the Course: B.Voc. Software Development

Semester: 3

Duration: 3 Hours

Maximum Marks: 90

Instructions for Candidates:

- **Write your Roll No. on the top immediately on receipt of question paper.**
- **The paper has two sections. Section A (30 Marks) is compulsory.**
- **Attempt any four questions from Section B. Each question in section B is of 15 marks.**

Section A

1	a)	What is an Operating System? Explain *Time Sharing* and *Real Time* Operating System.	5
	b)	Consider the following page reference string 7,0, 1,2,0,3,0,4,1,2,0,3,2, 1,7,0, 1, 7, 0, 2. How many page faults would occur for FIFO page replacement algorithm, assuming three frames?	3
	c)	Describe various file access methods.	4
	d)	What is meant by Locality of Reference?	3
	e)	Explain various states of a process with the help of a suitable diagram.	5
	f)	What is a Semaphore? Describe the operations for accessing semaphores.	4

g) Fill in the Blanks : 2

i. Each process maintains a _____ to store its attributes.

ii. Shortest Job First Scheduling is a _____ version of scheduling.

h) True/False 2

i. Pages are of fixed size and segments are of variable size. (T/F)

ii. The medium-term scheduler only runs in times of high resource contention, as when physical memory is full. (T/F)

i) Choose the correct option : 2

i. Hard real time operating system has _____ jitter than a soft real time operating system.

a) equal

b) more

c) less

d) none of the mentioned

ii. In Unix, which system call creates the new process?

a) create

b) fork

c) new

d) none of the mentioned

Section B

2 a) What are the different file allocation methods. Explain the linked allocation of file implementation with it's merits and demerits. 10

b) What are the five major activities of an operating system with regard to process management? 5

3 a) Consider the following set of processes. Find the average waiting time using Gantt chart for : 10

(i) SJF algorithm

(ii) Priority scheduling algorithm

	Burst time	Priority
p1	5	5
p2	3	4
p3	8	3
p4	2	1
p5	1	2

The process has arrived in the order p2, p1, p4, p3 and p5.

b) Write short notes on each of the following: 5

i) Working set model

ii) Fragmentation

4 a) Differentiate between : 10

i)Paging and Segmentation

ii)Multiprogramming and Multitasking operating systems

b) How deadlock can be prevented? 5

5 a) Explain Banker's deadlock-avoidance algorithm with an example. 10

b) Consider a logical address space of 64 pages with 1024 words each, mapped onto a physical memory of 32 frames. 5

(i) How many bits are there in the logical address?

(ii) How many bits are there in the physical address?

6 a) What is disk scheduling? Explain different disk scheduling algorithms. 10

b) Consider the following page reference string: 5

1,2,3,4,2,1,5,6,2,1,2,3,7,6,1,2,6,5. Number of page frames are 4. Find out the number of page faults using the following page replacement algorithms:

(i) LRU

(ii) Optimal

7 a) Consider a paging hardware with a TLB. Assume that the entire page table and all the pages are in the physical memory. It takes 10 milliseconds to search the TLB and 80 milliseconds to access the physical memory. If the TLB hit ratio is 0.6, calculate the effective memory access time (in milliseconds). 10

b) Evaluating the maximum number of pages needed if a system supports 16 bit address line and 1K page size. 5