Answer the following questions using Banker's algorithm:

i) What is the content of Need Matrix ? 7

ii) Is the system in a safe state? Also find the safe sequence.

b) Explain different multithreading operating system designs with advantages and disadvantages.

4. a) What is mutual exclusion? Show how mutual exclusion can be achieved using Dekkers Algorithm? 7

b) How many page faults occur for following reference strings for 4 page frames? 8

5, 0, 1, 2, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 1, 2, 0, 3

Using FIFO, LRU and Optimal page replacement algorithm

5. a) Disk request come to the disk driver for cylinder 16, 18, 12, 6, 25, 38, 7 and 36 in that order. A seek take 5 micro sec per cylinder move. How much seek time is needed for 8

i. FCFS

ii. SSTF

iii. C-SCAN (upward)

iv. C-LOOK (downward)

In all case, the arm is initially at cylinder 18.

b) What is difference between Paging and Segmentation? What are different page-table structures? Explain any one in detail. 7

6. a) Describe Interrupt. How Operating system handles the interrupt? Explain with the help of a block diagram 8

b) What is file descriptor? Discuss about different file allocation methods. 7

7. Write short notes on: (**Any two**) 2×5

a) Stable storage Implementation

b) File Protection

c) RAID

POKHARA UNIVERSITY

Level: Bachelor Semester: Fall Year : 2021

Programme: BE Full Marks: 100

Course: Applied Operating System Pass Marks: 45

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Define operating system. How operating system creates abstraction? Explain with reference to operating system as extended machine. 7

b) What is process and process state? Do you think a process can exist without any state? Justify your answer with the help of a process state diagram and PCB. 8

2. a) Why semaphores are used? Give solution to reader-writer problem using semaphores. 7

b) Suppose 5 batch jobs A, B, C, D and E arrived at the service center at time 0. They have burst time 20, 22, 8, 12 and 14 respectively. Their priorities are 4, 2, 1, 3 and 5 with 5 being the highest priority. For each of the scheduling algorithm determine average waiting time (WT) and average turn-around time (TAT) using: 8

i. SJF

ii. RR (Quantum size 10)

iii. Priority (preemptive)

3. a) Consider following snapshot of a system 8

Processes	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	0	1	0	0	1	1	5	2
P1	1	0	0	1	7	5			
P2	1	3	5	2	3	5			
P3	0	6	3	0	6	5			
P4	0	0	1	0	6	5			