POKHARA UNIVERSITY

Level: Bachelor Semester: Fall Year : 2019
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 time sharing, parallel and real-time operating systems? How they are different from one another? Explain. 8

   b) Differentiate between process and thread. What are the benefits of threads? Explain different process states and possible transitions using a diagram. 7

2. a) Consider following set of processes along with their burst time, arrival time and priorities. Calculate average waiting time and average turnaround time using following scheduling algorithms. 8

   i. FCFS
   ii. SJF
   iii. Priority (Preemptive)
   iv. HRRN

Process	Arrival Time	Burst Time	Priority
A	0	3	5
B	2	6	4
C	4	4	1
D	6	5	3
E	8	2	2
F	3	4	1

   b) What is mutual exclusion? Show how mutual exclusion can be achieved using Peterson's Solution. 7

3. a) Define critical section problem. What is busy waiting? Explain semaphore and its use in critical-section problem with example. 7

b) Suppose we have two resources, A, and B. A has 6 instances and B has 3 instances. Can the system execute the following processes without deadlock occurring? 8

Processes	Allocated A	Allocated B	Maximum Need A	Maximum Need B
P0	1	1	2	2
P1	1	0	4	2
P2	1	0	3	2
P3	0	1	1	1
P4	2	1	6	3

4. a) Define swapping. Explain contiguous and non-contiguous memory allocation scheme with their advantages and disadvantages. 8

b) Define page fault. How many page faults occur for the following reference strings for 3 page frames: 3, 4, 5, 6, 5, 3, 6, 4, 7, 4, 3, 4, 5, 6, Using Second Chance, LRU, and FIFO replacement algorithm. 7

5. a) What are different ways to input/output? Explain Interrupt-Driven input/output with diagram. 7

b) Given the following request queue (in order): 85, 170, 24, 109, 11, 123, 60, 62 with the head initially at track 50 and the trail track being at 184. 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 each of the following disk-scheduling algorithms? 8

i. FCFS
ii. SSTF
iii. SCAN(initially moving inward)
iv. C-SCAN(initially moving outward)

6. a) List out some operation on file. Explain different file access method with their advantages and disadvantages. 7

b) What is file? Explain different free space management strategy in file systems. 8

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

a) OS services and system calls
b) Demand paging and Thrashing
c) Bad Sectors handling in OS.