POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2022
Programme: BE | Full Marks: 100
Course: 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 processes. Explain different operating system structures. 8
   b) What is process control block? Describe the fields in a process control block (PCB) with diagram. 7

2. a) Explain Producer Consumer problem in process synchronization and give solutions to it using semaphores. 7
   b) Describe Dining Philosophers Problem and show how deadlock occurs in it. Provide the solution to deadlock in Dining Philosophers problem. 8

3. a) List out the conditions for deadlock. Explain deadlock modelling using resource allocation graphs for multiple type Resources. 8
   b) What is context switching? Explain it with an appropriate diagram. 7

4. a) Consider the following set of processes that arrive at time 0, with the length of the CPU burst given in milliseconds. Construct the Gantt chart and calculate average waiting time. 8

Process	Burst Time	Priority
P1	32	3
P2	7	6
P3	6	2
P4	21	1
P5	6	4
P6	9	5

   i. HRRN
   ii. RR (Quantum = 5)
   iii. Priority Scheduling
   iv. Shortest Job First (Preemptive)

   b) List pros and cons of distributed system over centralized system. Explain remote procedure call (RPC) 7

5. a) What is fragmentation? What are its types? How can the problems of fragmentation be solved? 7
   b) Consider the following page reference strings 7,0,1,2,0,3,0,4,2,4,0,3,2. How many page faults would occur for each of the following page replacement algorithm assuming 3 pages a frame? In each case calculate fault ratio. 8
      i. Second Chance Page replacement algorithm
      ii. NRU
      iii. Optimal Page replacement algorithm.

6. a) Suppose a disk drive has 200 tracks, numbered 0 to 199. The current position of the R/W head is at track 60 and the previous request was at track 45. The sequence of pending requests is 43,72, 150, 48, 85, 170, 190, 130. Starting from current position what is the total number of track movements (distance) for the following disk scheduling algorithms. 8
      i. SSTF ii. SCAN iii. C-LOOK
   b) List the various file operations. Explain the I-nodes method of File allocation. 7

7. Write short notes on: **(Any two)** 2×5
   a) File Systems and Disk management in LINUX
   b) Security in Windows 2000.
   c) RAID.