POKHARA UNIVERSITY

Level: Bachelor | Semester: Spring | Year : 2018
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) What are the main functions of operating system? Discuss on the different structures of operating system in brief. 8

   b) What is a process control block? How are the states and transitions associated with process? Illustrate using three state models. 7

2. a) What is a race condition and mutual exclusion? Show how mutual exclusion can be achieved using TSL (Test and set Lock). 7

   b) What is deadlock? Consider a system with four processes P0 through P3 and three resources types A,B,C. Resource type A has 8 instances, B has 6 instances and type C has 4 instances. Suppose at time t_0 following snapshot of the system has been taken. 8

Allocation Matrix			
Process	A	B	C
P0	2	1	1
P1	2	1	1
P2	1	2	1
P3	1	1	1

Required Matrix			
Process	A	B	C
P0	4	3	2
P1	5	4	2
P2	6	3	2
P3	3	2	1

Use resource allocation graph to model the given system.

3. a) What is critical region? Write and explain Dekker's algorithm. 8

   b) Consider the following set of information. Determine the average waiting time and average turn-around time using FCFS, SJF (Preemptive), RR (Quantum=2) and HRRN. 7

Process	Arrival Time	Service Time (Burst Time)
P1	0	7
P2	2	6
P3	4	2

4. a) Differentiate between internal and external fragmentation. How external fragmentation can be combat, illustrate with example. 7

   b) Why does page fault occur? Consider the following page reference strings: a, b, c, d, b, a, e, f, b ,a, b, c, g, f, c, b, a, b, c, f. How many page faults would occur for each of the following page replacement algorithms assuming 3 pages a frame? In each case calculate fault ratio. 8

      i. Second Chance page replacement
      ii. LRU page replacement
      iii. FIFO page replacement

5. a) What are the problems of programmed and interrupt driven I/O techniques? How does DMA solve these problems? Explain in detail. 8

   b) What is Access control list (ACL) ? Describe different file system implementation methods in brief. 7

6. a) What are different network architecture in Distributed System? Explain clock synchronization technique in distributed system. 7

   b) Describe in brief about the file system of windows and Linux. 8

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

   a) Deadlock Detection and Recovery
   b) Context Switching in Kernel
   c) Segmentation with Paging