Tribhuvan University
Faculty of Humanities & Social Sciences
OFFICE OF THE DEAN
2024

Bachelor in Computer Applications
Course Title: Operating System
Code No: CACS 251
Semester: IV

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to answer the questions in their own words as far as possible.

Group B

Attempt any SIX questions.

[6×5 = 30]

2. Define kernel. Explain different types of kernel in operating system. [1+4]
3. What is PCB? What are different information that are included in a PCB? [1+4]
4. How paging can be used for memory management? Also differentiate it with segmentation. [3+2]
5. What are page faults and thrashing? Explain demand paging with protection bit. [1+1+3]
6. How deadlock can be prevented? Explain in detail. [5]
7. Explain different file access methods in detail. [5]
8. What is distributed system? Explain the role of clock synchronization in distributed system. [1+4]

Group C

Attempt any TWO questions.

[2×10 = 20]

9. What is critical section problem? How semaphores can be used to solve critical section problem. Also explain producer consumer problem with its solution using Mutex. [1+3+6]
10. What is belady's Anomaly in page replacement Algorithm? Explain with example. Consider the following page reference string:

   7, 2, 3, 1, 2, 5, 3, 4, 6, 7, 7, 1, 0, 5, 4, 6, 2, 3, 0, 1

   How many page faults will occur if the program has four page frames available to it and uses the following page replacement algorithm? [2+2+6]

   a) FIFO replacement   b) LRU replacement   c) Optimal replacement

11. What is use of DMA controller? Consider the following process and answer the following questions.

Process	Allocation [A, B, C, D]	Max [A, B, C, D]	Available [A, B, C, D]
P_0	0 0 1 2	0 0 1 2	1 5 2 0
P_1	1 0 0 0	1 7 5 0	
P_2	1 3 5 4	2 3 5 6	
P_3	0 6 3 2	0 6 5 2	
P_4	0 0 1 4	0 6 5 6	

   a) What is the content of need matrix?
   b) Is the system in safe state?
   c) If P_2 request (3 4 0 2), can the request be granted Immediately. [2+2+4+2]