May 24, 2024   02:30 pm - 05:30 pm   1T01874 - S.E.(Computer Science & Engineering (Artificial Intelligence and Machine Learning)(R-2019-20)('C' Scheme) Semester - IV / 38974 - Operating System   QP CODE: 10054552

Duration: 3hrs   **[Max Marks: 80]**

N.B.:   (1) Question No 1 is Compulsory.
         (2) Attempt **any three** questions out of the remaining five.
         (3) All questions carry equal marks.
         (4) Assume suitable data, if required and state it clearly.

1   Attempt **any FOUR** (Draw neat diagrams if applicable)   **[20]**

   a   Differentiate between a Process and a Thread.

   b   Explain the CPU Scheduling Criteria

   c   What is External Fragmentation in Memory Management System? Explain with
       an example.
   d   Explain Disk Organization within the OS.

   e   Explain the Critical Section problem.

2   a   Suppose the following disk request sequence for a disk with 200 tracks is given   **[10]**
        as:
        100, 150, 20, 180, 30, 70, 190, 50, 120.
        Assume that initial head position of the R/W head is on track 80. Count the
        difference in the distance that will be traversed by the head when SSTF
        algorithm is used as compared to the SCAN algorithm, assuming that SCAN
        moves towards 200 when it starts the execution.
    b   Explain different File Organization Methods.   **[10]**

3   a   What is a process? Draw and Explain Process State Transition Diagram with six   **[10]**
        states.
    b   Calculate the Hit and Miss Ratio for the following string using LRU   **[10]**
        technique. Compare the results for frame size 3 and 4 in terms of "number of
        hits"
                Page String : 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 7, 2, 0, 7, 5, 0, 7, 5

4   a   Explain ULT and KLT. Explain the differences between the two.   **[10]**

    b   What is a Deadlock? Explain various Deadlock Prevention Techniques.   **[10]**

5   a   Explain the three types of schedulers with a proper diagram illustrating   **[10]**
        connection within them.
    b   What is Producer-consumer Problem? Provide the solution to the problem using   **[10]**
        Semaphores.

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6 a Explain the following terms in brief   **[10]**
   i.   Starvation
   ii.   Thrashing
   iii. Aging
   iv.   Convoy Effect
   v.   Context Switch

   b With the help of a diagram and an example, explain how a System Call works in   **[10]**
      an OS.

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