5E1753

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5E1753

B. Tech. V - Sem. (Main) Exam., February - 2023

Artificial Intelligence and Data Science

5AID4-03 Operating System

CS, IT, AID, CAI

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Define operating system. List the objectives of operating system.

Q.2 Why is Disk Scheduling important?

Q.3 What is Demand Paging?

Q.4 What are the disadvantages of Semaphore?

Q.5 Differentiate between Process and Thread.

Q.6 Define Thrashing. What are the reasons for thrashing?

Q.7 Why are the page sizes always in powers of two?

Q.8 What are the various file accessing methods?

Q.9 Define the term seek time and rotational latency.

Q.10 What is the role of dispatcher?

PART – B

(Analytical/Problem solving questions) [5×4=20]

Attempt any five questions

Q.1 Explain different operations performed by the operating system.

Q.2 Define process. How many different states a process has? Explain when a process changes the state using proper diagram.

Q.3 Explain Reader-writer problem and discuss the solution with proper diagram.

Q.4 Write the differences among short term, medium term and long term scheduling.

Q.5 What is deadlock? What are the necessary conditions for a deadlock to occur? Explain each condition briefly?

Q.6 Explain why the "Principle of Locality" is crucial to the use of virtual memory. What is accomplished by page buffering?

Q.7 Explain the architecture of Linux operating system with proper diagram.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [3×10=30]

Attempt any three questions

Q.1 Consider the following set of process to be executed, with the arrival time and CPU burst time given in milliseconds. Calculate average waiting time and turn-around time using given scheduling algorithm. Draw Gantt chart for each type.

Process	Arrival time	CPU Burst time
P1	0	5
P2	1	3
P3	2	3
P4	3	1

(i) FCFS

(ii) SJF

(iii) Round Robin (Quantum = 2)

Q.2 Write short notes for the following –

(i) Internal Vs External Fragmentation

(ii) Paging and segmentation

(iii) Process control block

(iv) Absolute and Relative path name of a file

Q.3 On a disk with 1000 cylinders numbers 0 to 999. Compute the number of tracks and disk arms must move to satisfy all the requests in the disk queue. Assume, the latest request received was at track 345 and the head is moving towards track 0. The queue in FIFO order contains requests for the following tracks - 123,874,692,475,105,376. Perform the computation for FIFO, SSTF and SCAN scheduling algorithms.

Q.4 Consider the following page reference string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 with four frames. How many page faults would occur for the FIFO, Optimal Page Replacement Algorithm. (Assume all Frames are initially empty)

Q.5 Write in short for the following –

(i) Virtual machine

(ii) Device Drivers

(iii) Time OS

(iv) Mutual exclusion
