

School of University Polytechnic**Diploma in Computer Science and Engineering
Semester End Examination - Jul 2024****Duration : 180 Minutes
Max Marks : 100****Sem III - N1DF302B - Operating System**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) State the purpose of a multiprocessing operating system. K1(2)
- 2) Explain different access methods, and elaborate on the structure of directory systems. K2(4)
- 3) Describe the concept of swapping in memory management and its purpose. K2(6)
- 4) Illustrate different file allocation methods in detail. K3(9)
- 5) Apply the Shortest Seek Time First (SSTF) disk scheduling algorithm to a set of disk requests and demonstrate how it minimizes disk arm movement. K3(9)
- 6) Considering a system with five processes P0 through P4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t0 following snapshot of the system has been taken: (i) What will be the content of the Need matrix? (ii) Is the system in a safe state? If Yes, then what is the safe sequence? K5(10)
- 7) Analyze the solution for Dining-Philosophers Problem K4(12)
- 8) Consider the following data with burst time given in milliseconds: i> SJF ii> Priority scheduling process Burst time Priority p1 10 3 p2 1 1 p3 2 3 p4 1 4 p5 5 2 The process has arrived in the order p1, p2, p3, p4, p5 all at time 0. Draw Gantt charts for the execution of these processes using FCFS, SJF, a nonpreemptive priority and RR (quantum=1) scheduling. What is the turnaround time and waiting time of each process for each of the scheduling algorithm. K5(15)
- 9) Evaluate the difference between internal fragmentation and external fragmentation in the context of memory management. Provide examples to illustrate each type of fragmentation. K5(15)
- 10) Propose a simple explanation for how a time-sharing operating system efficiently manages the tasks of multiple users on a single computer K6(18)