22516

3 Hours / 70 Marks   Seat No.

15 minutes extra for each hour

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1.   Attempt any FIVE of the following: **10**

a) State and describe any two advantages of multiprocessor system.

b) State any four types of system calls.

c) Draw a neat labelled diagram for process state.

d) State difference between preemptive scheduling and non-preemptive scheduling.

e) Define the term fragmentation in terms of memory.

f) Give commands to perform following tasks:

i)   To add delay in script

ii) To terminate a process

g) List any four operations performed on a file.

Marks

2. Attempt any THREE of the following: **12**

a) Describe working of time sharing system with neat diagram.

b) List and describe any four services of operating system.

c) Differentiate between shared memory system and message passing system of interprocess communication.

d) State and describe any two scheduling criteria.

3. Attempt any THREE of the following: **12**

a) Describe use of ps and wait commands with suitable example.

b) Describe prevention of deadlock occurrence with respect to hold and wait necessary condition.

c) With suitable diagram, describe the concept of variable partitioning of memory.

d) Describe linked file allocation method with suitable example. Also list its one advantage.

4. Attempt any THREE of the following: **12**

a) Differentiate between command line based operating system and GUI based operating system (Any four points)

b) Describe various activities performed by following operating system components.

   i)   Main memory management

   ii) File management

c) With suitable diagram, describe use of scheduling queues in process scheduling.

d) Write steps required for Banker's algorithm to avoid deadlock.

e) With suitable example, describe any one free space management technique.

5. **Attempt any <u>TWO</u> of the following:** **12**

a) Calculate average waiting time for following data using First Come First Served (FCFS) and Shortest Job First (SJF) algorithms.

Process	Burst time	Arrival time
P0	08	0
P1	04	1
P2	05	2
P3	03	3

b) Describe with example, use of following tools:

   i) Device Management

   ii) Performance monitor

   iii) Task scheduler

c) Describe the concept of virtual memory with respect to paging. Also draw paging hardware diagram and describe its working with example.

6. **Attempt any <u>TWO</u> of the following:** **12**

a) Describe one-to-one multithreading model with suitable diagram. Also write any two advantages of one-to-one model over many-to-one model.

b) Consider the following page reference string arrival with three page frames:-
   5, 6, 7, 8, 9, 7, 8, 5, 9, 7, 8, 7, 9, 6, 5, 6
   Calculate number of page faults with optimal and FIFO (First In First Out) page replacement algorithms.

c) Describe following directory structures in short with neat sketches:

   i) Single level

   ii) Two level

   iii) Tree structured

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