QP Code : 77035

(2½ Hours) [Total Marks : 75

N. B. : (1) All questions are **compulsory.**
(2) **Figures** to the **right** indicate full marks.
(3) Illustrations, in-depth answers & diagrams will be appreciated.
(4) Mixing of sub-questions is not allowed.
(5) Assume suitable data if required & state it clearly.

1. Attempt the following (any **three**) :– 15
   (A) Write a short note on Real Time System.
   (B) Discuss the activities of operating system in regards with file management and process management.
   (C) Diagrammatically explain the states of processes.
   (D) Describe layered approach in operating system design.
   (E) Define Cooperating Processes. State its advantages.
   (F) Explain Process Control Block.

2. Attempt the following (any **three**) :– 15
   (A) Explain direct and indirect approach of IPC.
   (B) Define thread. List and explain Multithreading models.
   (C) Diagrammatically explain queuing representation of process shceduling.
   (D) Define scheduler. List and explain types of schedulers.
   (E) Consider the following set of processes with the length of CPU burst time given in milli seconds. Illustrate the execution of the processes using Round Robin algorithm. Draw Gantt chart. Also calculate average waiting time and turnaround time. Time quantum=3 ms.

Processe	Burst Time
P_1	3
P_2	3
P_3	6
P_4	2
P_5	4

   (F) What are the different CPU scheduling criterias? Explain

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3. Attempt the following (any **three**) :— 15

    (A) State Producer - Consumer Problem. Also write the algorithm for the same.

    (B) Define Deadlock. How to recover from deadlocks?

    (C) Explain in short segmentation technique.

    (D) Diagrammatically explain steps in handling page faults.

    (E) Consider the following snapshot of a system :—

Allocation

	R_1	R_2	R_3
P_1	2	0	0
P_2	1	2	0
P_3	0	1	1
P_4	0	0	1

Max

	R_1	R_2	R_3
P_1	2	0	1
P_2	2	5	
P_3	1	4	2
P_4	2	0	1

Available | 0 | 2 | 0 |

    (i) Compute the content of Need matrix.

    (ii) Find the Safe Sequence.

    (F) For the following page reference string calculate total number of page faults with FIFO and optimal page replacement algorithm with frame size = 3.

    Refrence string = 2, 3, 4, 5, 3, 2, 4, 2, 5, 3, 4, 3

4. Attempt the following (any **three**) :— 15

    (A) Explain any five file operations.

    (B) What is single-level and two-level directory? Explain.

    (C) Write a short on Direct Memory Access (DMA).

    (D) Discuss linked allocation method.

    (E) Assume there are total 200 tracks are present on each surface of the disk (0 to 199). If request queue is 30, 110, 150, 60, 185 and initial position of the head is 40. Apply SSTF and FCFS disk scheduling and calculate total head movements.

    (F) Define the term virus. Explain it's types.

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5. Attempt the following (any three) :—   15
   (A) Explain any five operating system services.
   (B) Define the following terms regarding semaphore :
       (i)   Semaphore Definition
       (ii) Counting Semaphore
       (iii) Binary Semaphore
       (iv) Wait ( )
       (v)   Signal ( )
   (C) What is the use of Resource allocation graph? Write and explain
       it's notations with the help of an example.
   (D) Write a short note on Interrupts.
   (E) Define Process. Explain under what situations process terminate.
   (F) Discuss Dinning-Philosopher's Problem.

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