Code :9F00204

Time: 3 hours   **Max Marks: 60**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What is an Operating system ? What are its objectives ?
   (b) What is a system call ? Explain the various types of system calls. With an example, explain the sequence of operations that take place when a system call is made.

2. (a) Distinguish between a process and a thread.
   (b) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Burst Time	Arrival Time
P_1	8	0
P_2	4	1
P_3	9	2
P_4	5	3

   The processes arrive at times shown.
   a. Draw the Gantt charts that illustrate the execution of these processes using preemptive SJF, and RR (Quantum=1).
   What are the turnaround and waiting processes for each process for each of the scheduling algorithms in part a ?

3. (a) Give the schematic view of a monitor with conditional variables and explain.
   (b) What is meant by busy waiting ? Modify the semaphore operations to overcome the need for busy waiting.

4. (a) What is meant by memory protection ? Explain how memory is protected by using base register and limit register.
   (b) How many page faults occur for the following reference string, with four page frames:1,2,3,4,5,3,4,1,6,7,8,7,8,9 7,8,9,5,4,5,4,5,4,2 ?
       i. For FIFO page replacement algorithm.
       ii. For LRU page replacement algorithm.

5. (a) Explain in detail about tree-structured directories. What are its advantages and disadvantages ?
   (b) Explain in brief the following free space management techniques.
       i. Bit vector
       ii. Linked list

6. (a) Explain with an example the swap-space management.
   (b) How do system designers choose a RAID level.

7. (a) When a process is said to be in deadlock state ? Illustrate with an example.
   (b) Consider the following snapshot of a system.

	Allocation	Max	Available
	A B C D	A B C D	A BC D
P_0	0 0 1 2	0 0 1 2	1 5 2 0
P_1	1 0 0 0	1 7 5 0	
P_2	1 3 5 4	2 3 5 6	
P_3	0 6 3 2	0 6 5 2	
P_4	0 0 1 4	0 6 5 6	

   Answer the following questions using the Banker's algorithm.
   i. What is the content of the matrix need ?
   ii. Is the system in a safe state ?
   If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately.

8. (a) Make a comparison of various techniques for implementing an access matrix.
   (b) What is the need for language-based protection ? What are the advantages of enforcing protection in programming language ?

⋆ ⋆ ⋆ ⋆ ⋆