USN | | | | | | | | | | **18CB35**

Third Semester B.Tech. Degree Examination, Feb./Mar. 2022
Operating Systems

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Explain computer system organization in detail.   **(06 Marks)**
   b. With a neat diagram, explain working of virtual machine with benefits of it.   **(08 Marks)**
   c. Explain dual mode operation in OS.   **(06 Marks)**

OR

2 a. What is a system call? Explain different types of system calls.   **(06 Marks)**
   b. Analyze the layered Kernel and modular Kernel approach used in the design of OS structure.
                                                                                          (08 Marks)
   c. Explain multiprogramming and time sharing systems.   **(06 Marks)**

Module-2

3 a. What is process? Explain process state and PCB with neat diagram.   **(08 Marks)**
   b. Consider the following set of processes with the length of the CPU-burst time given in milliseconds.

Process	Burst – Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0. Draw the Gantt chart and find the average turnaround time and average waiting time for
i) FCFS   ii) SJF   iii) Priority scheduling.   **(12 Marks)**

OR

4 a. Explain Multilevel feedback – queue scheduling with an example. Also mention the parameters to be considered in the design of such scheduler.   **(08 Marks)**
   b. Consider the following set of processes, with the length of the CPU-burst time given in ms.

Process	Burst – Time	Priority
P_1	20	2
P_2	12	1
P_3	2	4
P_4	1	5
P_5	3	3

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0. Draw the Gantt charts and find the average turnaround time and average waiting time for
i) FCFS   ii) SJF   iii) Priority scheduling.   **(12 Marks)**

Module-3

5 a. Explain the critical section problem with the help of a general structure of a typical process.
(07 Marks)
b. Illustrate how Readers-writers problem can be solved using semaphores. (07 Marks)
c. What is a deadlock? List and explain the necessary conditions for deadlock to occur?
(06 Marks)

OR

6 a. Explain a Resource Allocation Graph (RAG). (04 Marks)
b. Explain the various methods for recovery from the deadlocks. (06 Marks)
c. Consider the following snapshots of a system.

	Allocating			Max			Available		
	A	B	C	A	B	C	A	B	C
P_1	0	1	0	7	5	3	3	3	2
P_2	2	0	0	3	2	2			
P_3	3	0	2	9	0	2			
P_4	2	1	1	2	2	2			
P_5	0	0	2	4	3	3			

    i) What is the content of the matrix need?
    ii) Is the system in a safe state? Write safe sequence. (10 Marks)

Module-4

7 a. Define paging? Explain paging hardware with a neat diagram. (10 Marks)
b. What is TLB? Explain paging hardware with TLB along with a neat diagram. (10 Marks)

OR

8 a. Describe different types of directory structures. (10 Marks)
b. Given the following sequences 95, 180, 34, 119, 11, 124, 64, 68 with the head initial position at track 56 and moving towards track 199. What is the total disk travelled by the disk arm to satisfy the request using FCFS, SSTF, Look and C-Look algorithm. (10 Marks)

Module-5

9 a. Explain implementation of Access matrix. (10 Marks)
b. Describe revoke access nights to objects shared by different users. (10 Marks)

OR

10 a. What is thrashing? Explain the cause of thrashing with a diagram. (10 Marks)
b. Discuss different program threads. (10 Marks)

* * * * *