

Bachelor Level / fourth-semester / Science Full marks: 60 **Computer Science and Information Technology(CSC259)** Pass marks: 24
(Operating Systems) Time: 3 hours Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Section-A

Attempt any two questions: (2x10=20)

1. Explain the operating system as a resource manager and extended machine. Distinguish between Batch system and Time sharing systems.

OR

What is a real time operating system? List the types. "Operating system is broker between computer System and User". Justify the statement?

2. What is the difference between Deadlock and Starvation? Consider the following four resources A, B, C and D with five processes and answer the questions:

Allocation Max Available

A B C D A B C D A B C D

P0 0 0 1 2 0 0 1 2 1 5 2 0

P1 1 0 0 0 1 7 5 0

P2 1 3 5 4 2 3 5 6

P3 0 6 3 2 0 6 5 2

P4 0 0 1 4 0 6 5 6

- a) Is the system in a safe state? Use the Banker algorithm. If yes, give the sequence.
- b) If a request from process from P1 arrives for (0, 4, 2, 0), can the request be granted immediately?

3. Five batch jobs A through E, arrive at a computer center at almost the same time. They have estimated running times of 10, 8, 4, 2, and 6. Their priorities are 3, 5, 2, 4 and 1 respectively with 5 being the highest priority. For each of the scheduling algorithms determine the average turn around time and waiting time.

- a) Round Robin (Quantum=2)
- b) Priority Scheduling
- c) SJF

Section-B

Attempt any eight questions: (8x5=20)

4. What is the critical section problem? Why must executing critical selection be mutual exclusive? Explain.

5. Suppose that a disk drive has the cylinder numbered, 0 to 199 is currently serving a request at cylinder 143. The queue it requests is kept in the FIFO order 25, 17, 119, 197, 194, 15, 182, 115, 183. What is the total head movement needed to satisfy these requests for the following disk scheduling algorithm.

a) FCFS

b) SSTF

6. What is the critical Section Problem? Describe the criteria to be satisfied for solving this problem. 7. How can the Produce-Consumer problem can be solved with sleep and wake up primitives? Explain. 8. Describe the methods for implementing files.

9. Why does a deadlock occur? How can you detect and recover from a deadlock?

10. What is swapping? Differentiate contiguous memory allocation with non contiguous memory allocation.

11. Discuss the working principles and advantages of Direct Memory Access.

12. What is the purpose of system call in an OS? Differentiate between thread and process.

