# WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 3rd Semester Examination, 2022-23

## CMSACOR06T-COMPUTER SCIENCE (CC6)

### OPERATING SYSTEM

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.*
*Candidates should answer in their own words and adhere to the word limit as practicable.*
*All symbols are of usual significance.*

**Answer Question No 1 and any *four* from the rest**

1. Answer any *four* questions from the following:                                    2×4 = 8

    (a) Define PCB.

    (b) Differentiate between internal and external fragmentation.

    (c) Describe the process creation using fork() system call.

    (d) What is critical section?

    (e) What is demand paging?

    (f) What is thrashing?

    (g) Differentiate long-term scheduler and short-term scheduler.

2. (a) What is operating system? What are the functions of operating system?     4

    (b) Distinguish among (i) Multiprogramming Systems (ii) Multitasking Systems and (iii) Multiprocessor Systems.     4

3. Consider the following set of processes, with the length of the CPU burst given in milliseconds:     4+4

| Process | Burst Time | Priority |
|---------|------------|----------|
| P1 | 2 | 2 |
| P2 | 1 | 1 |
| P3 | 8 | 4 |
| P4 | 4 | 2 |
| P5 | 5 | 3 |

The processes are assumed to have in the order P1, P2, P3, P4, P5, all at time 0.

   (i) Draw the Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a larger priority number implies a higher priority), and RR (quantum = 2).

   (ii) What is the waiting time of each process for each of the scheduling algorithms?

4.   What is semaphore? What are the different types of semaphore? A counting semaphore S is initialized to 10. Then, 6 P operations and 4 V operations are performed on S. What is the final value of S?   2+2+4

5.   Explain Dining-Philosophers problem. What is Critical Section?   5+3

6   Consider the following reference string; find out the number of page fault for FIFO, LRU and optimal page replacement algorithm assuming four-page frames.   3+3+2

7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1

7.   Write short notes on any *two* of the following:   4×2 = 8
   (a) Semaphore
   (b) Real Time Operating System
   (c) Indexed File Allocation.
   (d) Virtual Memory.

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