



**WEST BENGAL STATE UNIVERSITY**  
B.Sc. Honours 3rd Semester Examination, 2021-22

**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.*

**GROUP-A**

1. Answer any **four** questions from the following: 2×4 = 8
- (a) What is meant by light in light weight process?
  - (b) What do you mean by PCB?
  - (c) State the main difference between Logical address and Physical address.
  - (d) What is Thrashing? How it occurs?
  - (e) What are the differences between User Level Thread and Kernel Level Thread?
  - (f) Differentiate between waiting time and response time.
  - (g) State the difference between Absolute paths and Relative paths.

**GROUP-B**

**Answer any four questions from the following**

**8×4 = 32**

2. (a) Draw the process state diagram and explain its various states. 5
- (b) Explain types of scheduler in operating system. 3
3. (a) Compare Network Operating System with Distributed Operating System. 3
- (b) What is Segmentation? 3
- (c) Define Virtual Memory. 2
4. (a) Why Paging is needed? 2
- (b) If page size is 4 kB and logical address is 22 bit then find the number of entries in the page table. 2
- (c) What are the necessary conditions for deadlock? 4
5. (a) What is Race Condition? 2
- (b) At a particular time of computation the value of a counting semaphore is 7. Then 20 P operations and 15 V operations were completed on this semaphore. Find resulting value of the semaphore. 2
- (c) Considering a system with five processes P<sub>0</sub> through P<sub>4</sub> and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. 4

Suppose at time  $t_0$  following snapshot of the system has been taken:

Process	Allocation	Max	Available
	A B C	A B C	A B C
P <sub>0</sub>	0 1 0	7 5 3	3 3 2
P <sub>1</sub>	2 0 0	3 2 2	
P <sub>2</sub>	3 0 2	9 0 2	
P <sub>3</sub>	2 1 1	2 2 2	
P <sub>4</sub>	0 0 2	4 3 3	

What will be the content of the Need matrix? Is the system in a safe state? If yes, then what is the safe sequence?

6. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds: 4×2 = 8

Process	Burst Time	Priority
P <sub>1</sub>	8	2
P <sub>2</sub>	6	1
P <sub>3</sub>	3	4
P <sub>4</sub>	4	5
P <sub>5</sub>	7	3

Calculate the average turnaround time and average waiting time of each process for each of the following scheduling algorithms:

- (a) FCFS  
(b) SJF.

7. (a) What do you mean by the CPU-burst and I/O-burst times? What could be the estimation for the next predicted CPU-burst time for SJF scheduling? How can you say the SJF scheduling as a special kind of Priority Scheduling? 1+2+1

- (b) What are the four necessary conditions of deadlock? 4

8. Write short notes on any *two* of the following: 4×2 = 8

- (a) Real Time Operating System  
(b) System Call  
(c) Starvation.

**N.B. :** Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.

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