

**II Semester M.C.A. (CBCS) Examination, November 2021**  
**COMPUTER SCIENCE**  
**MCA 204T : Operating System**  
**(Equivalent to Y2K5/Y2K12 Operating System and Unix)**

Time : 3 Hours

Max. Marks : 70

**Instructions :** i) Answer **any five** questions from Section – A.  
 ii) Answer **any four** full questions from Section – B.

## SECTION – A

Answer **any five** questions. **Each** carries **6** marks. **(5×6=30)**

1. What is an Operating System ? Explain different services of an operating system.
2. Explain methods of handling Deadlocks.
3. Discuss a method to handle producer consumer problem.
4. Distinguish between segmentation and paging.
5. What is File allocation method ? Explain in detail.
6. What is protection ? Explain the goals of protection.
7. What is real time operating system ? Explain in detail.
8. What is a system call ? Explain system call parameters.

## SECTION – B

Answer **any four** questions. **Each** carries **10** marks. **(4×10=40)**

9. Consider the following set of processes with length of CPU burst time in milliseconds arrived with different arrival time as indicated below.

| Process | Arrival Time | CPU Burst-Time |
|---------|--------------|----------------|
| P1      | 0            | 6              |
| P2      | 5            | 10             |
| P3      | 7            | 13             |
| P4      | 11           | 2              |
| P5      | 13           | 6              |

P.T.O.



- a) Draw Gantt's chart illustrating the execution of these processes using FCFS and SJF algorithm. 6  
4
- b) Calculate turn-around time and waiting time.
- 10. Consider the following page reference string 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6. How many page faults would occur for the following replacement algorithm ? (5+5)
  - a) FIFO
  - b) LRU.(6+4)
- 11. Consider the following system :

| Allocation     |   |   |   |   |
|----------------|---|---|---|---|
|                | A | B | C | D |
| P <sub>0</sub> | 0 | 0 | 1 | 2 |
| P <sub>1</sub> | 1 | 0 | 0 | 0 |
| P <sub>2</sub> | 1 | 3 | 5 | 4 |
| P <sub>3</sub> | 0 | 6 | 3 | 2 |
| P <sub>4</sub> | 0 | 0 | 1 | 4 |

| Max |   |   |   |   |
|-----|---|---|---|---|
|     | A | B | C | D |
|     | 0 | 0 | 1 | 2 |
|     | 1 | 7 | 5 | 0 |
|     | 2 | 3 | 5 | 6 |
|     | 0 | 6 | 5 | 2 |
|     | 0 | 6 | 5 | 6 |

| Available |   |   |   |   |
|-----------|---|---|---|---|
|           | A | B | C | D |
|           | 1 | 5 | 2 | 0 |

- a) Using Banker's algorithm answer the following :
  - i) What is the content of matrix need ?
  - ii) Is the system in a safe state ? Justify it.
- b) Write a short note on Resource Allocation Graph.
- 12. a) Discuss the Dining-Philosophers problem for synchronization in detail. 6
- b) What are the necessary conditions of deadlock ? Explain. 4
- 13. Explain the attributes and operations of file in detail.
- 14. Explain the directory structure in detail with a suitable example.

| Process         | Arrival Time | CPU Burst-Time |
|-----------------|--------------|----------------|
| P <sub>1</sub>  | 0            | 10             |
| P <sub>2</sub>  | 0            | 5              |
| P <sub>3</sub>  | 0            | 15             |
| P <sub>4</sub>  | 0            | 10             |
| P <sub>5</sub>  | 0            | 10             |
| P <sub>6</sub>  | 0            | 10             |
| P <sub>7</sub>  | 0            | 10             |
| P <sub>8</sub>  | 0            | 10             |
| P <sub>9</sub>  | 0            | 10             |
| P <sub>10</sub> | 0            | 10             |