

**M.Sc. Part-I Semester—I (CBCS Scheme) Examination**  
**COMPUTER SCIENCE**  
**1MCS 3 : Operating System**

Time : Three Hours]

[Maximum Marks : 80

**N.B. :—** (1) All questions are compulsory.

(2) Assume suitable data wherever necessary.

(3) Illustrate your answer with the help of neat sketches.

1. (A) What is an operating system ? State and explain its types. 6  
(B) What are system calls ? Explain. 7

**OR**

2. (A) Explain :  
(i) GUI  
(ii) Multi User O.S.  
(iii) Modules. 6  
(B) State and explain different functions of an operating system. 7
3. (A) Draw process state transition diagram and explain each state in brief. 8  
(B) Draw Gantt chart and calculate the average waiting time for processes using FCFS and SJF

| Process        | Burst Time |   |
|----------------|------------|---|
| P <sub>1</sub> | 10         |   |
| P <sub>2</sub> | 5          |   |
| P <sub>3</sub> | 7          |   |
| P <sub>4</sub> | 3          | 7 |

**OR**

4. (A) What are the factors needs to considered while scheduling a process ? Explain. 7  
(B) Draw Gantt and calculate average waiting time for process using Round Robin where time Quantum = 4.

| Process        | Burst Time |   |
|----------------|------------|---|
| P <sub>1</sub> | 05         |   |
| P <sub>2</sub> | 03         |   |
| P <sub>3</sub> | 04         |   |
| P <sub>4</sub> | 09         |   |
| P <sub>5</sub> | 10         | 8 |

5. (A) What is Dead Lock ? State and explain its characteristics. 7  
(B) What is Critical Section ? Explain. 6
- OR**
6. (A) What is Semaphore ? Explain its working. 7  
(B) State and explain Dining Philosophers Problem. 6
7. (A) What is the need of memory management ? Explain. 5  
(B) Calculate the page faults occurred in a page reference string given below using FIFO, for a memory with three frames :  
7, 5, 4, 3, 1, 2, 4, 6, 5, 4, 5, 7, 2, 1, 3, 4, 7, 5, 3, 1. 8
- OR**
8. (A) Explain :  
(i) Page fault  
(ii) Swapping  
(ii) Segmentation. 6  
(B) Calculate the page fault occurred in a page reference string given below using LRU, for a memory with four frames :  
1, 3, 4, 2, 5, 6, 3, 2, 5, 6, 7, 3, 2, 5, 6, 7, 3, 4, 5, 3. 7
9. (A) Explain :  
(i) File Attribute  
(ii) Hash File. 6  
(B) Calculate the total head movement using SSTF Disk Scheduling algorithm, where head starts at 53.  
Queue = 98, 183, 37, 122, 14, 124, 65, 62, 90. 7
- OR**
10. (A) How free space management is done using linked list ? Explain. 6  
(B) Calculate the total head movement using FCFS Disk Scheduling algorithm where head starts from 0 (ZERO).  
Queue = 53, 67, 39, 45, 123, 41, 56, 230. 7
11. (A) What is an embedded system ? Explain. 7  
(B) State and explain the advantages and disadvantages of Distributed File System. 6
- OR**
12. (A) Explain :  
(i) Data Migration  
(ii) Remote Login. 8  
(B) What are stateful and stateless services ? Explain. 5