

# CBCS Scheme

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16MCA24

Second Semester MCA Degree Examination, June/July 2017

## Operating Systems

Time: 3 hrs.

Max. Marks: 80

*Note: Answer FIVE full questions, choosing one full question from each module.*

### Module-1

- 1 a. What is a processor register? What functions does it serve? (10 Marks)  
b. What is an interrupt? Explain with an instruction cycle diagram. (06 Marks)

OR

- 2 a. Explain various services provided by the operating system. (08 Marks)  
b. How does system call work? Explain with neat diagram. Explain the types of system call. (08 Marks)

### Module-2

- 3 a. Explain the five state process model with transition diagram, showing how to change process model for a suspend process. (10 Marks)  
b. Explain with diagram the user-level threads and kernel-level threads. (06 Marks)

OR

- 4 a. Calculate the average waiting time, turnaround time for (i) SJF and (ii) priority scheduling with following set of processes. P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub>, P<sub>5</sub> have all arrived at same time.

Process	Burst Time	Priority
P <sub>1</sub>	10	3
P <sub>2</sub>	1	1
P <sub>3</sub>	2	3
P <sub>4</sub>	1	4
P <sub>5</sub>	5	2

- b. What is reader-writers problem? Explain solution with semaphores. (08 Marks)

### Module-3

- 5 a. What is a deadlock? What are the necessary conditions for a deadlock to occur? (06 Marks)  
b. Design a solution to the dining philosophers problem using monitors/semaphores. (10 Marks)

OR

- 6 a. Mention the different page table structures. Explain in brief. (10 Marks)  
b. Consider following page reference string:  
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1  
How many page faults would occur in the case (i) LRU, (ii) FIFO? (06 Marks)

### Module-4

- 7 a. Explain various file operations. (10 Marks)  
b. Explain the virtual file system with a schematic diagram. (06 Marks)

OR

- 8 a. Explain the following with respect to free space management:
- i) Linked list (08 Marks)
  - ii) Grouping (08 Marks)
- b. List and explain different file allocation methods. (08 Marks)

**Module-5**

- 9 a. Explain various process scheduling algorithms in Linux operating system. (10 Marks)
- b. Write file system types in Linux. (06 Marks)

OR

- 10 Write short notes on:
- a. Components of Linux system
  - b. Shared memory
  - c. Inter-process communication
  - d. Journalling (16 Marks)

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