# CBCS Scheme

USN ☐☐☐☐☐☐☐☐☐☐ **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. $P_1$, $P_2$, $P_3$, $P_4$, $P_5$ have all arrived at same time.

| Process | Burst Time | Priority |
|---------|-----------|----------|
| $P_1$   | 10        | 3        |
| $P_2$   | 1         | 1        |
| $P_3$   | 2         | 3        |
| $P_4$   | 1         | 4        |
| $P_5$   | 5         | 2        |

                                                                                         **(08 Marks)**
   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
   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)

\* \* \* \* \*