

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-IV EXAMINATION – WINTER 2015**

**Subject Code: 140702****Date:01/01/2016****Subject Name: Operating System****Time: 02:30pm to 05:00pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Answer the following. **07**  
 (i) What is Operating System? Give functions of Operating System.  
 (ii) Explain “5 State” Process State Transition Diagram with illustration.
- (b) Write short notes on: Real Time Operating System, Timesharing Operating System. **07**
- Q.2** (a) Answer the following. **07**  
 (i) Define: Race Condition, Mutual Exclusion, Throughput , Turnaround Time.  
 (ii) Give the functions of following unix commands.  
       cat, cp, grep.
- (b) Define Process and Thread. What is Process Control Block? Explain its various entries with their usefulness. **07**
- OR**
- (b) Five jobs A through E arrive at a computer center with following details **07**  
**Job Arrival\_Time CPU\_Time**
- |   |   |   |
|---|---|---|
| A | 0 | 9 |
| B | 1 | 5 |
| C | 2 | 2 |
| D | 3 | 6 |
| E | 4 | 8 |
- Calculate the Turnaround Time and Waiting Time for all processes applying (i) First Come First Serve (ii) Shortest Job First and (iii) Round Robin (with Time Quanta=3) algorithms.
- Q.3** (a) What is Semaphore? Give the implementation of Producers-Consumers Problem using Semaphore. **07**  
 (b) Explain various Disk Scheduling algorithms with illustration. **07**
- OR**
- Q.3** (a) Give the implementation of Readers-Writers Problem using Semaphore. **07**  
 (b) Explain the use of Banker’s Algorithm for multiple resources for Deadlock Avoidance with illustration. **07**
- Q.4** (a) Explain Files and Directory Management in UNIX Operating System. **07**  
 (b) Why Page Replacement is necessary? Compare Optimal, LRU and FIFO page replacement algorithms with illustration. **07**
- OR**
- Q.4** (a) Explain Virtual Memory Management with Paging in detail. Explain how Virtual Address is translated into Physical Address. Give the advantages of Paging over Segmentation. **07**

- (b) Explain the following in brief. **07**  
    (i) Contiguous and Linked List Allocation for implementing File System.  
    (ii) File Attributes and File Operations.
- Q.5** (a) Write short notes on following: **07**  
    (i) Security Threats of Operating System.  
    (ii) Access metrics mechanism.
- (b) Write following Shell scripts in Unix/Linux : **07**  
    (i) To find Factorial of a given number.  
    (ii) For generating students' mark sheet. Calculate "CLASS" also.
- OR**
- Q.5** (a) What are the use of device driver & controller in OS? Explain. **07**  
(b) Explain UMA and NUMA multiprocessors. **07**

\*\*\*\*\*