**United College of Engineering and Research, Allahabad**
**Department of Computer Science & Information Technology**

**I$^{ST}$ Sessional Examination, 2018-19**
**B.Tech. -IV$^{TH}$ Sem(CS & IT)**

# OPERATING SYSTEMS

**Subject Code: RCS-401**
**Time: 2.00 hours** **Max. Marks: 30**

**Note:** There are three sections in this paper. All sections are compulsory.

## Section-A

**Note:** All questions are **compulsory**. Each question has equal marks. **10*1=10**

1. Justify the statement 'the degree of multiprogramming is controlled by the Long term scheduler, whereas the Mid term scheduler reduces the degree of multiprogramming'.
2. Define the term 'Spooling'.
3. Define the System Call. Given three system calls used in Process Management.
4. Draw a neat diagram to show the process states transitions.
5. What is process control block (PCB)?
6. Describe the steps involved in Booting.
7. What is convoy effect? In which scheduling algorithm it occurred?
8. Discuss the drawback of priority scheduling algorithm.
9. Why the processes are suspended?
10. What are the dual modes of Operating System? Write the name of three operating systems.

## Section-B

**Note:** Attempt any **six** questions. Each question has equal marks. **6*2=12**

1. Five processes A, B, C, D, E require CPU burst of 4, 1, 2, 1,and 5 units respectively. Their arrival times in system are 0, 1, 3, 5, 7 respectively. Draw Gantt chart and compute the average turnaround time, average waiting time of these processes for the First Come First Serve (FCFS) and Shortest Remaining Time First (SRTF) scheduling algorithms.
2. What is the Real Time operating system? what is the difference between Hard real time and Soft Real time operating system?
3. Four processes A, B, C and D require CPU burst time of 4, 3, 3 and 5 units with priority 3, 4, 6 and 5 respectively. The largest priority number has higher priority. Their arrival times in system are 0, 1, 2 and 3 respectively. Draw Gantt chart and compute the average turnaround time and average waiting time of these processes for the priority scheduling algorithms: (i) Preemptive and (ii) Non-Preemptive.

4. Short notes on any **one**:
    (a) Necessary conditions for Deadlock.
    (b) Performance criteria for Scheduling.
5. What are the role of different types of Scheduler?
6. 'A cycle occurred in a Resource Allocation Graph, is a necessary and sufficient condition to detect deadlock'. This statement is true or false. justify with suitable example?
7. Explain Multilevel Feedback Queue Scheduling with a suitable example.
8. Short notes on any **one**:
    (a) Asynchronous and Deferred Cancellation of thread.
    (b) fork() and exec() thread creation system calls.

## Section-C

**Note:** Attempt any **two** questions. Each question has equal marks. **2*4=8**

1. Five processes A,B,C,D,E require CPU burst time of 4, 7, 3, 3,and 5 units respectively. Their arrival times in system are 0, 2, 3, 3. 5, 4 respectively. Draw Gantt chart and compute the average turnaround time and average waiting time of these processes for the scheduling algorithms: (i) Round Robin (Quantum = 1), (ii) Round Robin (Quantum = 2), (iii)Shortest Job First (SJF). Comment on your result, which one is better and why? Also compute the response time of each process.
2. What is operating system? Discuss the main services of operating system.
3. Short notes on any **two**:
    (a) Monolithic kernel and Micro kernel
    (b) Multiprogramming and Time sharing OS
    (c) Deadlock Prevention
4. Consider the following snapshot of a system

| Process ID | Allocated | | | Maximum | | | Available | | |
|---|---|---|---|---|---|---|---|---|---|
| | R1 | R2 | R3 | R1 | R2 | R3 | R1 | R2 | R3 |
| P1 | 1 | 1 | 2 | 4 | 3 | 3 | 3 | 1 | 0 |
| P2 | 2 | 1 | 2 | 3 | 2 | 2 | | | |
| P3 | 4 | 0 | 1 | 9 | 0 | 2 | | | |
| P4 | 0 | 2 | 0 | 7 | 5 | 3 | | | |
| P5 | 1 | 1 | 2 | 11 | 2 | 3 | | | |

    (a) Determine the total amount of each resource type.
    (b) Compute the need matrix.
    (c) Determine if the system is safe or not using Banker's Algorithm.
    (d) Would the following request be granted in current state? P1(1,1,1)