DHARMSINHDESAIUNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER VI [INFORMATION TECHNOLOGY]
SUBJECT: (IT 607)APPLIED OPERATING SYSTEM

Examination	**: First Sessional**	**Seat No.**	**:**
Date	**: 10/01/2018**	**Day**	**: Wednesday**
Time	**: 12:00 to 1:15**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

(a) Why process goes from running state to ready-suspend state in seven state process models? Explain your answer. **[2]**

(b) A scheduling algorithm assigns priority proportional to the waiting time of a process. Every process starts with priority zero (the lowest priority). The scheduler re-evaluates the process priorities every T time units and decides the next process to schedule. Is given algorithm is equivalent to round robin algorithm with time quantum = T or shortest remaining time first with every job switches after T time unit? Justify your answer with proper reason. **[2]**

(c) A uni-processor computer system only has two processes, both of which alternate 10ms CPUbursts with 90ms I/O bursts. Both the processes were created at nearly the same time. The I/Oof both processes can proceed in parallel. Which of the following scheduling strategies willresult in the least CPU utilization (over a long period of time) for this system? **[2]**

(a) First Come First Serve (b) Shortest Remaining Time Next
(c) Static priority scheduling with different priorities for the two processes
(d) Round Robin Scheduling with time quantum = 5 ms

(d) Differentiate Hard Real Time System and Soft Real Time System with example. **[2]**

(e) What are the main advantages of the microkernel approach to system design? **[2]**

(f) Provide two real world applications where multithreading improves performance over single- threaded solution. Also state two examples where using multithreading do not improves performance over single threaded solution. **[2]**

Q.2 Attempt ***Any TWO*** of the following questions. **[12]**

(a) What is threading? Explain Different multithreading models possible with advantages and disadvantages. [6]

(b) 1.List five services provided by an operating system. Explain how each provides convenience to users. [4]

2. What is purpose of the command interpreter? Why it is usually separate from the kernel? [2]

(c) What resources shared by Multiprocessor as compare to Single processor System? Write down advantages of Multiprocessor System. Also write what is basic difference between asymmetric and symmetric multiprocessor system. [6]

Q.3 (a) Draw nine-state process control model of UNIX system and discuss importance of each state. **[6]**

(b) Three processes A, B and C each execute a loop of 100 iterations. In each iteration of the loop, a process performs a single computation that requires T_c CPU milliseconds and then initiates a single I/O operation that lasts for T_{io} milliseconds. It is assumed that the computer where the processes execute has sufficient number of I/O devices and the OS of the computer assigns different I/O devices to each process. Also, the scheduling overhead of the OS is negligible. The processes have the following characteristics: **[6]**

Process id	**Tc**	**Tio**
A	100 ms	2000 ms
B	350 ms	1500 ms
C	200 ms	1000 ms

The processes A, B, and C are started at times 0, 5 and 10 milliseconds respectively, in a pure time sharing system (round robin scheduling) that uses a time slice of 50 milliseconds. Find out the time in milliseconds at which process A, B and C would complete their first I/O operation.

OR

Q.3 (a) **[6]**

Process	**Arrival Time**	**Burst Time**
P1	0	5
P2	3	5
P3	5	3
P4	7	2

Draw Gantt Chart (time line) for Round Robin scheduling algorithm.
Consider Time Quantum = 1. Also find Average Waiting Time, Average Turnaround Time and Average Response Time.

(b) Consider three processes, all arriving at time zero, with total execution time of 100, 200 and 300 units, respectively. Each process spends the first 10% of execution time doing I/O, the next 70% of time doing computation, and the last 20% of time doing I/O again. The operating system uses a shortest remaining compute time first scheduling algorithm and schedules a new process either when the running process gets blocked on I/O or when the running process finishes its compute burst. Assume that all I/O operations can be overlapped as much as possible. Draw a time line for all three processes and find the percentage of time the CPU is remaining idle. **[6]**