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Department of Computer Science and Engineering
SAMPLE MIDTERM EXAMINATION QUESTION

CSE321: OPERATING SYSTEM

Total Marks: 60 **Time Allowed: 1 Hour 10 Mins**

Section A [Answer any 5 (Marks 30)]

1. What OS's Do? A modern computer system has a number of device controllers to do specific task; what is that task? **[6]**
2. Interrupt-driven I/O is fine for moving small amounts of data but can produce high overhead when used for bulk data movement. Which mechanism is used to overcome that overhead and how? What is mode bit?**[6]**
3. Discuss the advantages and disadvantages of having a large degree of multiprogramming. What is the purpose of system calls? **[6]**
4. What relevant data about a process should the PCB contain**?** Which technique is used to maintain PCB? **[6]**
5. 'Process executing concurrently in OS may be either independent processes or cooperating processes'. If statement is true- explain how? And which mechanism that will allow the processes to communicate each other for exchanging data and information?**[6]**
6. What is the relationship between threads and processes? How are they similar/different? **[6]**
7. Context switching between two processes of execution within the operating system is usually performed by a small task. In general terms, what does this small task do internally?**[6]**
8. Describe the differences between symmetric and asymmetric multiprocessing. What are three advantages and one disadvantage of multiprocessor systems? **[6]**

B [Answer any 3 (Marks 30)]

Section B [Answer any 3]

1. Describe the following scheduling algorithms:
   • Non Pre-Emptive: First Come, First Serve; Shortest Job First
   Given the following processes and burst times

Process	Burst Time
P1	10
P2	6
P3	23
P4	9
P5	31
P6	3
P7	19

   Calculate the average waiting time and turnaround time when each of the above scheduling algorithms is used?
2. The Round Robin (RR) CPU scheduling policy preempts an executing process via a system parameter called *time quantum*. Using the RR policy with a time quantum of 20 time units, construct a Gantt chart and compute the wait for the 5 processes tabulated below: **[10]**

Process	Burst Time	Arrival Time
P1	135	0
P2	102	150
P3	56	200
P4	148	300
P5	125	380

3. List and explain the advantages and limitations of SJF scheduling. The SJF CPU scheduling policy preempts an executing process. Using the SJF policy, construct a Gantt chart and compute the wait for the 4 processes tabulated below:

Process	Burst Time	Arrival Time
P1	7	0.0
P2	4	3.0
P3	2	5.0
P4	2	8.0

4. Shared Variables

Var flag: array [0…1];

```
Turn=0…1;
Process(Pi):  flag[i]=true;
Turn=j;
While (flag[j] and turn ==j) do skip;
```

Critical Section

```
Flag[j]=true;
```

Note: Initially: flag[0]=false; flag[1]=false; Turn=0; (If i=0 than j=1 OR i=1 than j=0);

Above the code will satisfy the Mutual Exclusion, Progress and Bounded Waiting or not for 2 processes. If satisfy, explain how (give an example)? It works for 3 processes or not. Justify your answer.

THE END