

**COE/SW-213 OPERATING SYSTEMS DESIGN**

Time: 1 Hour 30 Minutes

Max. Marks : 20

**Note :** Answer **ALL** questions.  
Assume suitable missing data, if any.

- 1 [a] Define the term operating system and also write various characteristics of operating system. 2
- [b] Explain the need of Process Control Block (PCB). 2

- 2 [a] Consider the set of the process given in table below:

Process	Arrival time	Processing time	Priority
P <sub>1</sub>	0	10	3
P <sub>2</sub>	1	1	1
P <sub>3</sub>	2	2	3
P <sub>4</sub>	3	1	4
P <sub>5</sub>	4	5	2

Calculate average waiting time, average turn around time and system throughput using following algorithms

- (i) FCFS  
(ii) Preemptive SJF  
(iii) Preemptive Priority  
(iv) Round Robin (1 time unit.)

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- 3 Consider the following snapshot of the system

Process	Current allocation			Requests			Available		
	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>
P <sub>1</sub>	0	1	0	0	0	0	0	0	0
P <sub>2</sub>	2	0	0	2	0	2			
P <sub>3</sub>	3	0	3	0	0	0			
P <sub>4</sub>	2	1	1	1	0	0			
P <sub>5</sub>	0	0	2	0	0	2			

- [a] What is the content of need matrix?
- [b] Determine if this state is safe or not?

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4 What is critical section problem? and How it is solved using Peterson's solution?

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5 Write short note on *any four* of the following:

- [a] What do you mean by deadlock?
- [b] Short term scheduler
- [c] Context switching
- [d] Semaphores
- [e] Race condition.

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