



# Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India  
(Autonomous College Affiliated to University of Mumbai)

## End Semester Examination

May 2019

Max. Marks: 60

Class:FYMCA

Course Code:MCA21

Name of the Course: Operating System

Duration: 3Hr

Semester:II

Branch:MCA

### Instruction:

- (1) All questions are compulsory
- (2) Draw neat diagrams
- (3) Assume suitable data if necessary

Q No.		Max. Marks	CO																								
Q.1	Compare Multitasking, Multiprogramming and Multiprocessing with suitable example	05	CO1																								
	OR																										
	Illustrate various services provided by OS		CO1																								
Q.2 ( a)	Assume you have the following jobs to execute with one processor, with the jobs arriving in the order listed here:	05	CO2																								
	<table border="1"><thead><tr><th>Process</th><th>Arrival Time</th><th>Burst Time</th></tr></thead><tbody><tr><td>P0</td><td>0</td><td>5</td></tr><tr><td>P1</td><td>1</td><td>3</td></tr><tr><td>P2</td><td>2</td><td>1</td></tr><tr><td>P3</td><td>3</td><td>2</td></tr><tr><td>P4</td><td>4</td><td>3</td></tr></tbody></table>	Process	Arrival Time	Burst Time	P0	0	5	P1	1	3	P2	2	1	P3	3	2	P4	4	3								
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	Use Round Robin CPU Scheduling algorithm with Time Quantum=2 to calculate Average Turnaround Time and Average Waiting Time?																										
	OR																										
	Consider the following set of processes. Draw Gantt chart, Find average waiting time, average turnaround time for Priority scheduling algorithm		CO2																								
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Q.2 ( b)	Consider the system with 3 Task T1, T2, T3. Use Rate Monotonic Scheduling and Earliest Deadline First scheduling algorithm to schedule given set of tasks. Give conclusion.	05	CO2												
	<table><tr><th>Task No</th><th>Service Time</th><th>Period/Deadline</th></tr><tr><td>T1</td><td>1</td><td>3</td></tr><tr><td>T2</td><td>2</td><td>4</td></tr><tr><td>T3</td><td>1</td><td>6</td></tr></table>	Task No	Service Time	Period/Deadline	T1	1	3	T2	2	4	T3	1	6		
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Q.3(a)	Suppose we want to synchronize two concurrent processes P and Q using binary semaphores S1 and S2. The code for the processes P and Q is shown below- <b>Process P</b> while(1) { P(S1); P(S2); Critical Section V(S1); V(S2); } <b>Process Q:</b> while(1) { P(S2); P(S1); Critical Section V(S1); V(S2); }  This ensures- (A) Mutual Exclusion (B) Deadlock (C) Both (A) and (B) (D) None of these. Justify your Answer.	05	CO2												
Q3 (b)	There is a buffer of n slots and each slot is capable of storing one unit of data. There are two processes running, namely, producer and consumer, which are operating on the buffer. A producer tries to insert data into an empty slot of the buffer. A consumer tries to remove data from a filled slot in the buffer. How does the synchronization can be achieved between these two processes. Justify your Answer.  OR  Discuss Dining Philosopher problem in detail and find the solution to it using Semaphores.	05	CO2												
Q3 (c)	Consider the following snapshot of system		CO2												



	Max				Allocation				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	6	0	1	2	4	0	0	1	3	2	1	1
P1	1	7	5	0	1	1	0	0				
P2	2	3	5	6	1	2	5	4				
P3	1	6	5	3	0	6	3	3				
P4	1	6	5	6	0	2	1	2				

Using Banker's algorithm, Answer the following questions.

1. How many resources of type A, B, C, and D are there?
2. What are the contents of the Need matrix?
3. Is the system in a safe state? if yes, give safe state sequence.

Q4 (a)	Given Five memory partitions of 100Kb, 300Kb, 150Kb, 650Kb, 450Kb (in order), There are 4 processes in system with following requests 212 Kb, 315 Kb, 127 Kb, and 470 Kb (in order). Apply Following Allocation algorithm For Fixed Size Partitioning scheme 1. First Fit 2. Best Fit 3. Worst Fit Calculate total space get wasted due to internal fragmentation and external Fragmentation for all the above three scheme.	05	CO2
Q4 (b)	Compare Paging and Segmentation(based on parameters basic, fragmentation, address, size, table)  OR  What is Page Fault? Illustrate the steps in handling a page fault with suitable diagram	06	CO3
Q4 (c)	Consider the following page reference string 4,7,6,1,7,6,1,2,7,2. Apply following page replacement algorithms 1. FIFO 2. LRU 3. Optimal How many page faults would occur assuming 3 frames? Initially all frames are empty.	04	CO3
Q4 (d)	Suppose that the disk drive has 200 cylinders, numbered 0-199. The drive is currently servicing the request at cylinder 53. The previous request was at 65. The pending requests are 50, 91, 150, 92, 130, 18, 140, 70, 60. Calculate the total head movement for the following disk scheduling algorithms? 1. FCFS 2. SSTF 3. SCAN 4. C-SCAN 5. LOOK 6. C-LOOK	06	CO3
Q5 (a)	Discuss and Compare different File Allocation Methods (based on their technique, advantages, and disadvantages)	06	CO4
Q5 (b)	State the significance of Access matrix in protection with example  OR  Compare different types of threats	04	CO4