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**MCADD-401**  
**M.C.A. (Integrated), IV Semester**  
Examination, June 2020  
**Operating Systems**

*Time : Three Hours*

*Maximum Marks : 70*

- Note :** i) Attempt any five questions.  
ii) All questions carry equal marks.

1. a) Define operating system, explain its functions. 7  
b) Describe multiprogramming, time sharing and multithreading operating system. 7
2. a) Consider the following job 7

Job	J <sub>0</sub>	J <sub>1</sub>	J <sub>2</sub>	J <sub>3</sub>	J <sub>4</sub>
Arrival time	3	1	4	0	2
Burst time	1	4	2	6	3

Consider SJF (Non-preemptive) and SRTF (Preemptive) scheduling algorithm for a set of Jobs and calculate for both AWT and ATT.

- b) What is meant by process and thread? How we differentiate both are. 7
3. a) Explain the concept of paging and segmentation. 7  
b) Consider the following reference starting. 7  
1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6  
How many page fault would occur and give the frame size = 3. Find out through  
i) FIFO  
ii) LRU  
iii) Optimal

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PTO

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- 4. a) Explain the techniques. 7
  - i) Virtual memory
  - ii) Swapping
- b) Describe Belady's anomaly concept. 7
- 5. a) What are the necessary conditions for deadlock to occur. 7
- b) Consider the system with five process  $\langle p_0, p_1, p_2, p_3, p_4 \rangle$  and three resources,  $A = 10, B = 5, C = 7$ . 7

The following snapshot of the system has given.

	Allocation			Max-need			Available		
	A	B	C	A	B	C	A	B	C
$p_0$	0	1	0	7	5	3	3	3	2
$p_1$	2	0	0	3	2	2			
$p_2$	3	0	2	9	0	2			
$p_3$	2	1	1	2	2	2			
$p_4$	0	0	2	4	3	3			

Answer the following using Banker's algorithm.

- i) Find need matrix.
- ii) Is the system in a safe state if yes find the safe sequence.
- 6. a) Write brief note on semaphore and its types. 7
- b) What is critical-section and write solution of reader writer problem using semaphore. 7
- 7. a) Explain of I/O hardware any two. 7
  - i) I/O device
  - ii) DMA
  - iii) I/O controller

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- b) Suppose a disk has 1000 cylinders numbered from 0 to 999. The drive currently at cylinder 123 and the previous request was at 112. The queue of pending request in FIFO is 86, 146, 820, 168, 898, 500, 93, 445 starting from the current head position. What is the total difference that the disk arm moved to satisfy all the pending request for each of the following disk scheduling algorithm. 7
- i) FCFS
  - ii) C-SCAN
8. a) Compare windows and unix operating system. 7
- b) Write brief note on following: 7
- i) Performance evaluation of O/S
  - ii) Bottlenecks

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