VIT

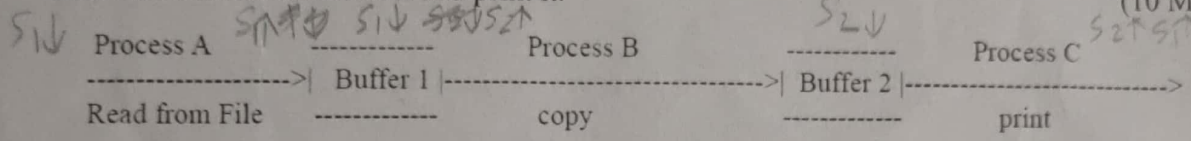
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

School of Computer Science and Engineering
Continuous Assessment Test II - Fall Semester 2018-19

Course Code : CSE2005 | **Duration: 90mns**
Course Name : Operating System | **Slot : F2**
(Common for all batches) | **Marks: 50**

Answer all the questions.

1. Three processes are involved in printing a file (pictured below). Process A reads the file data from the disk to Buffer 1, Process B copies the data from Buffer 1 to Buffer 2, finally Process C takes the data from Buffer 2 and print it. (10 Marks)



Assume all three processes operate on one (file) record at a time, both buffers' capacity are one record. Write a program to coordinate the three processes using semaphores.

2. Assume that there are 4 resources A, B, C and D. The snapshot of the system is given below

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	1	1	0	0	2	1	0	1	3	1	0
P_1	1	4	4	1	1	6	5	2				
P_2	1	3	6	5	2	3	6	6				
P_3	0	6	3	2	0	6	5	2				
P_4	0	0	1	4	0	6	5	6				

Is the system in a safe state? Why or why not? If a request from process P0 (0, 1, 0, 0) and (0, 6, 4, 2) arrives. Can it be granted immediately? (10 marks)

3. (a) On a simple paged system, associative registers hold the most active page entries and the full page table is stored in the main memory. If the references satisfied by the associative registers take 85 ns, and references through the main memory page table take 215ns, what is the

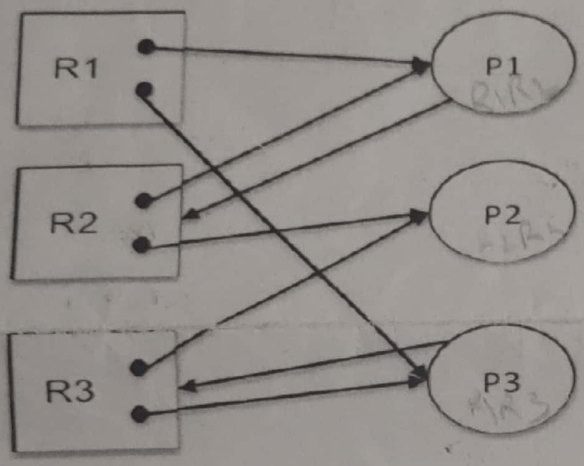
effective access time if 65% of all memory references find their entries in the associative registers? (2 Marks)

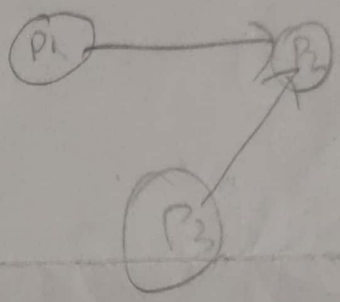
3. (b) In paging (assuming the page size is a power of 2), why is it not necessary to add the page offset to the starting address of the page frame to generate a physical address? (2 Marks)

(c) On a system using segmentation compute the physical address for 0, 99 (segment no, offset) for the logical address. Given is the entry in the segment table. Is there is a segment fault?
Segment – 0 Base – 330 Length - 124 (1 Mark)

(d). In two level nested loops, the outer index (i) runs from 1 to 5 and the inner index (j) runs from 1 to 10.The page faults seem to occur for every 7th innermost iteration. If it takes 0.02 micro second to load a new page – what is the extra time required because of occurrence of page faults. (5 Marks)

4. (a). Consider the following resource allocation graph:





Does the above allocation graph contain a deadlock? If there is a deadlock justify your answer. (5 marks)

(b). In the Dining Philosopher problem with n philosophers but with n+1 forks. The extra fork is in the middle of the table and can be used by any philosopher (but only by one of them at a time. Is deadlock possible? Justify it with your code. (5 Marks)

5. Consider the below page reference string How many page faults would occur in the case? (10 Marks)
Note that initially all frames are empty.

a. LRU
b. FIFO- Check for Belady's anomaly
c. Optimal algorithm assuming (i) 3 frames (ii) 4 frames

page reference string : 0 1 3 6 2 4 5 2 5 0 3 1 2 5 4 1 0 3 2