Operating System

May 19

Computer Engineering (Semester 4)

Total marks: 80
Total time: 3 Hours

INSTRUCTIONS
(1) Question 1 is compulsory.
*(2) Attempt any **three** from the remaining questions.*
(3) Draw neat diagrams wherever necessary.

Q-1 Attempt any FOUR

a	Define Operating System. Brief the Functions of OS.	(Marks 5)
b	Explain Shell. Explain use of chmod command in linux.	(Marks 5)
c	Discuss various scheduling criteria.	(Marks 5)
d	Explain the effect of page frame size on performance of page replacement algorithms.	(Marks 5)
e	Explain Thrashing	(Marks 5)

2-a   Differentiate between monolithic, layered and microkernel structure of OS.   (Marks 10)

 b   Describe the differences among short term,medium term,long term

     scheduling   (Marks 10)

3-a   Discuss how the following pairs of scheduling criteria conflict in certain settings.

    a) CPU utilization and response time

    b) Average Turnaround time and maximum waiting time   (Marks 10)

b Consider the following snapshot of the system. Using Bankers Algorithm, determine whether or not system is in safe state. If yes determine the safe sequence

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

(10 marks)

4 a   Calculate number of page faults and page hits for the page replacement policies FIFO, Optimal
       and LRU for given reference string 6, 0, 5, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 5, 2, 0, 5, 6, 0, 5
       (assuming three frame size.)   (10 marks)

 b   Explain synchronization problem in detail. How counting semaphore can be used to solve
       readers writers problem.   (10 marks)

5-a   Given memory partitions of 150k,500k,200k,300k,550k(in order) how would each of the
        first fit, best fit and worst fit algorithm places the processes of 220k,430k,110k,425k
        (in order).Evaluate, which algorithm makes most efficient use of memory?   (10 marks)

 b   Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving
        a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending
        requests in FIFO is ordered as 80, 1470, 913, 1777, 948, 1022, 1750,130. What is the
        total distance that the disk arm moves for following by applying following algorithms?
         1. FCFS 2. SSTF 3. LOOK 4. SCAN

                                                                                 (10 marks)

Q-6 Write short notes on: (any two):

(a) Linux Virtual File system

(b) Process State transition

(c) System Calls