Registration No :

B.Tech
PCS5G001

5th Semester Regular Examination 2018-19
OPERATING SYSTEMS
BRANCH : CSE
Time : 3 Hours
Max Marks: 100
Q.CODE : E555
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1   Short Answer Type Questions (Answer All-10)   **(2 x 10)**
- **a)** Explain how multiprogramming increases the utilization of CPU.
- **b)** Write the differences between user-level and kernel-level threads.
- **c)** When Does Thrashing Occur?
- **d)** Consider a machine with 64 MB physical memory and a 32-bit virtual address space. If the page size is 4KB, what is the approximate size of the page table?
- **e)** How does swapping result in better memory management?
- **f)** What is Belady's Anomaly?
- **g)** When and how does a device driver work?
- **h)** Enlist the deadlock recovery methods.
- **i)** Differentiate between mutex and semaphore.
- **j)** Consider a virtual memory system with FIFO page replacement policy. What will happen if we increase the number of page frames in main memory for an arbitrary page access pattern?

Part- II

Q2   Focused-Short Answer Type Questions- (Answer Any EIGHT out of TWELVE)   **(6 x 8)**
- **a)** Design and explain the layered structure of operating systems.
- **b)** What is a process? Explain about various fields of Process Control Block.
- **c)** What are the advantages and disadvantages of using the same system call interface for manipulating both files and devices?
- **d)** Mention the advantages of inter-process communication? How communication takes place in a shared-memory environment? Explain.
- **e)** Define Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem?
- **f)** Describe Banker's algorithm
- **g)** What is a Virtual Memory? Discuss the virtual memory mapping technique.
- **h)** Discuss the Bounded-Buffer problem.
- **i)** What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy.
- **j)** Explain and compare the SCAN and C-SCAN disk scheduling algorithms.
- **k)** Briefly explain about single-level, two-level and Tree-Structured directories.
- **l)** Enumerate the different RAID levels.

Part-III

Long Answer Type Questions (Answer Any TWO out of FOUR)

Q3 What is a deadlock? What are necessary conditions which can lead to a deadlock situation in a system? How deadlocks are detected? Explain the Resource-Allocation-Graph algorithm for deadlock avoidance. **(16)**

Q4 Consider the set of processes are P1, P2, P3, P4, P5 with arrival time(sec.) 5,6,4,0,9 with burst time(sec.) 5,10,2,6,5. Calculate the waiting time and turn around time of each process & average waiting time. Explain and compare the FCFS and SSTF scheduling algorithms. **(16)**

Q5 What is a semaphore? List the types of semaphores and Show that, if the wait() and signal() semaphore operations are not executed atomically, then mutual exclusion may be violated. **(16)**

Q6 What is a page fault? Explain the steps involved in handling a page fault with a neat sketch. Consider the following page reference string :
1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
How many page faults would occur for the optimal page replacement algorithm, assuming three frames and all frames are initially empty. **(16)**