

END TERM EXAMINATION

FIFTH SEMESTER [B.TECH./M.TECH.] NOVEMBER-DECEMBER 2017

Paper Code: IT-317

Subject: Operating Systems

Maximum Marks :60

Time : 3 Hours

Note: Attempt any five questions including Q No.1 which is compulsory.
Select one question from each unit.

(4x5=20)

- Q1 a) Explain the concept of process context switching with suitable example.
b) What do you mean by race condition? Explain with suitable example.
c) What is internal and external fragmentation of memory? Explain with suitable examples.
d) Explain various file operations. What do you mean by access methods in file handling?

UNIT-I

- Q2 a) What do you mean by multiprogramming, multitasking and time sharing systems? (5)
b) A system uses the following preemptive priority scheduling algorithm (larger priority number means higher priority). Processes enter the system with priority 0. While waiting in the ready queue, a process's priority changes at a rate x . While running, a process's priority changes at a rate of y . What is the algorithm that results from $y > x > 0$? (5)

OR

- Q3 a) Explain different possible states of a process with process state transition diagram. (5)
b) What do you mean by preemptive and non-preemptive CPU scheduling policies? Prove that in a round robin scheduling policy with n processes in the ready state and t as time quantum, a process will get its next CPU burst, if any, at most after $(n-1)t$ time units. (5)

UNIT-II

- Q4 a) Four processes P1, P2, P3 and P4 modify a variable x in such a fashion that processes P1 and P3 increment the value of x by 2 each whereas P2 and P4 decrement the value of x by 2 each. Assume S represents a semaphore variable with initial value as 2 initial value of x is 0, and the general structure of all processes to modify x is as follows-
Wait(S)
 Modify variable x
Signal(S)

What can the maximum values of x once all four processes are successfully executed? (5)

- b) Write safety algorithm of Banker's algorithm for deadlock avoidance (5)

OR

- Q5 a) Write solution to readers/writers problem using semaphores. (5)
b) Write four necessary and sufficient condition of deadlock. Write an algorithm that will violate hold and wait condition of deadlock. (5)

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UNIT-III

- Q6 a) Consider a machine with 128 MB physical memory and a 32 bit virtual address space. If the page size is 2KB, what is the approximate size of page table and inverted page table assuming one entry needs 2 bytes storage in either table? (5)
- b) Explain memory binding method using segmentation. (5)

OR

- Q7 a) What do you mean by inverted page table and how address mapping is done using it? (5)
- b) If an instruction takes time m if there is no page fault and time n if there is a page fault, what is the effective instruction time if page fault occurs once every i instructions? (5)

UNIT-IV

- Q8 a) Assuming current head position at 65, compute total head movement for the following cylinder requests for SCAN and SSTF disk scheduling algorithms- (5)
- 71,54,30,90,77,65,10,126,100,83,39
- b) What do you mean by various methods of free space management in hard disk? (5)

OR

- Q9 What do you mean by a file allocation method? Explain different types of file allocation techniques in detail. (10)
