NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHAETRA
THEORY EXAMINATION
Question Paper

Month and Year of Examination: Nov.- Dec. 2019
Programme: B.Tech   Semester: IVth
Subject: Operating systems
Course No: ITPC20   Maximum Marks:50
Number of Questions to be attempted: 5   Time Allowed: 3 hrs
Total no of Questions: 5   Total No of Pages Used:2

Note: All questions are compulsory. Marks are indicated against each question.
There is internal choice within Question 1 and Question 5

Q1	(i) Given a system using shortest job first algorithm for short term scheduling and exponential averaging with α =0.4, what would be the next expected burst time for a process with burst times of 2,7,4 and 5 and initial value for e_1 of 5? (5 marks) (ii) How are system programs are different from system calls? (5 marks) *Or* (i)Consider the following preemptive priority scheduling algorithm based on dynamically changing priorities. Larger priorities numbers imply higher priority. When a process is waiting for the CPU (in the ready queue, but not running), its priority changes at a rate α; when it is running, its priority changes at a rate of β. All processes are given a priority of 0when they enter the ready queue. The parameters α and β can be set to give many different scheduling algorithms.(10 marks) a. What is the algorithm that results from $\beta >\alpha>0$ and why? b. What is the algorithm that results from $\alpha <\beta<0$ and why?
Q 2	What are the necessary conditions for a deadlock to occur? Suppose we have a system which has one tape and one printer device? Currently there are two processes P1 and P2. Both these processes read some data from tape and output the processed data to the printer. what would happen if the processes make requests for the device in the following order?(10 marks) A, process P1 requests the tape b. Process P2requests the printer c. process P1 requests the printer d. Process P2 requests the tape Analyse and see if any deadlock can occur. if yes, how and if no, why?
Q3	(i) Why is locality of reference important? How does paging help in this context? Why does one need to have a logical to physical page map? is it by design or is it incidental, that the page sizes are chosen to be a power of two?(5 marks) (ii) Would you recommend placing program segments in contiguous memory using the segmentation scheme? or alternatively would you use pages in sequence while using segmentation with paging?(5 marks)
Q4	(i) What is a security breach? What different forms do the security breaches take?(5 marks) (ii) Suppose we use fixed blocking for a file with 10 byte logical records and 25 byte physical blocks. How much space do we waste per block? does this result in internal or external fragmentation or both?(5 marks)

Q5	Give a short note on following (5*2marks=10 marks) **attempt any five**
	a. Access control lists
	b. Semaphores and monitors
	c. Threading issues
	d. Distributed operating system
	e. Difference between deadlock detection and avoidance
	f. Thrashing