

JK LAKSHMIPAT UNIVERSITY JAIPUR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End-Term Examination

Programme: B.Tech (CSE/ECE) & BCA
 Course Name: Introduction to Linux based RT system design
 Maximum Marks: 30

Semester: 6th /4th /6th
 Course Code: EE1226
 Time Allowed: 3 Hours

- Do not write anything other than your roll number on question paper.
- Mention all the assumptions for your answers clearly.
- The student, before starting to write the solutions, should please check the question paper for any discrepancy and ensure that they have been delivered the question paper of right course code.
- Total 5 Questions are there.

Sr. No.		Question	Marks	CO
1.		Explain the use of DMA controllers in a computing system with complete DMA data transfer flow chart and list any constraints related to use of DMA.	4 + 2	4
2		In this question, you will answer some questions about scheduling algorithms. Assume that sorting is an expensive computation, and requires some amount of time per element sorted; you can estimate the time to sort <i>NumJobs</i> elements with a function <i>Sort(NumJobs)</i>. Further assume that switching between jobs takes a fixed amount of time (say, on a context switch, when one job ends and another begins, or to switch in a new job for the first time); we will call this value <i>Switch</i>. Also Turnaround time (TAT)= Sorting time + Switching time + Waiting time + Execution time. Also <i>it is OK to assume there is no context switch between 'sort' and 'job 1'</i> “ First, assume three jobs arrive at the same time, of lengths 30, 20, and 10 (they arrive in this order). Assume that <i>Sort(NumJobs: total number of jobs/process) = NumJobs × 10</i>, and that <i>Switch = 0</i> (no switching overhead). Assume we use non-preemptive SJF (Shortest Job First) Policy.” A) How long will the system take to <i>compute the schedule</i>? 2 B) How long will it take to run the jobs once the schedule has been computed? 2 C) Including scheduling and switching overhead, what is the average <i>turnaround</i> time for each job? Assume switching time =10 2		1
3	a	What are the two models of inter-process communications?	2	1
	b	Write a program to implement write and read two messages using pipe.	3	

		Also mention the steps involved in implementing the pipe for the said task		
4.	a	Consider the following code: Thread 1: <pre>1 lock(L1); 2 lock(L2); 3 // critical section requiring L1 and L2 locked. 4 unlock(L2); 5 unlock(L1);</pre> Thread 2: <pre>6 lock(L3); 7 lock(L1); 8 // critical section requiring L3 and L1 locked. 9 unlock(L1); 10 unlock(L3);</pre> Thread 3: <pre>11 lock(L2); 12 lock(L3); 13 // critical section requiring L2 and L3 locked. 14 unlock(L3); 15 unlock(L2);</pre> In the beginning, all three locks are initialized as “not locked”. Will there be any problem with this code? If yes, given reasons. If no, why?	2	3
	b	“Two processes can implement mutual exclusion by using a binary semaphore”. Prove that the said statement is true, support your explanation with an example.	4	3
5	a	Why a thread is sometimes referred to as a “light weight process”?	2	2
	b	Most computers support at least two modes (e.g. Kernel Mode and User Mode) and Briefly discuss how are these modes used?	2	2
	c	Write a hello world kernel module. That will print a message when we load the module and an exit message when we unload the module.	3	3