

JK LAKSHMIPAT UNIVERSITY, JAIPUR
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), November-December 2014

B. Tech in Computer Science Engineering, Semester V

Roll No..... CSE012.....

COURSE CODE: CSE501

Time: 3 hours

Max. Marks: 100

COURSE TITLE: Operating System

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1 Attempt the following questions (1 mark for each)

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- i. The modern OSs are _____. (a) programmed-I/O driven (b) software-driven (c) interrupt-driven (d) hardware-driven
- ii. _____ must reside in the memory forever. (a) resident (b) transient (c) OS (d) none
- iii. A process in _____ becomes ready for execution.
(a) ready queue (b) job queue (c) suspended queue (d) none
- iv. Long term scheduling has a direct relationship with the degree of _____.
(a) processes (b) devices (c) multi-programming (d) none
- v. If time quantum is too large in RR scheduling, it becomes _____.
(a) FCFS (b) SRN (c) SPN (d) HRRN
- vi. A semaphore whose value is either zero or one is known as _____.
(a) binary semaphore (b) counting semaphore (c) guard (d) none
- vii. Deadlock prevention is _____ possible.
(a) always (b) not always (c) sometimes (d) none
- viii. User threads can be _____ as compared to kernel threads.
(a) slower (b) faster (c) not comparable (d) none
- ix. The paging concept _____ context switch time. (a) decreases (b) increases (c) no effect (d) none
- x. Page fault frequency may be used to keep a check on _____. (a) paging (b) segmentation (c) thrashing (d) none

Q.2 Attempt the following questions (4 questions @ 2.5 marks)

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- i. What is difference between online and offline operation on a computer system?
- ii. What is difference between consumable and non-consumable resources? Give one example of each.
- iii. Differentiate between a system call and a function call.
- iv. What are the factors that decide swap-space size?

Q.3A Explain the process state diagram considering the suspended processes.

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Q.3B Prove or disprove SCAN algorithm is a biased scheduling algorithm.

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Q.4A Demonstrate that a long time quantum will lead RR scheduling to FCFS scheduling. 05

Q.4B What is priority scheduling? What are the methods for giving priority to a process? 05

Q.5A What is deadlock? Discuss the necessary conditions for a deadlock. 05

Q.5B Differentiate between deadlock avoidance and deadlock detection. 05

Q.6A Does an unsafe state always lead to a deadlock? Explain with an example. 05

Q.6B Consider the following set of processes with given CPU burst time 05

Process	Burst Time	Arrival Time
P1	10	0
P2	5	1
P3	20	2
P4	8	3
P5	9	4

Using FCFS and Shortest Job First algorithm find the average waiting time.

OR

Q.6B Consider the following set of processes with given CPU burst time. 05

Process	Burst Time
P1	20
P2	40
P3	5
P4	12
P5	18

All process arrived at time 0. Using Round Robin algorithm, find the average waiting time and turnaround time. The time quantum is 4.

Q.7A Give merits and demerits of kernel level thread. 05

Q.7B A system with 32-bit logical address uses a two-level page table structure. It uses page size of 2^{10} . The outer page table or directory is accessed with 10 bits of the address. Then (i) How many bits are required to specify the second-level page table? (ii) How many pages are in second level page table? (ii) How many entries are there in the directory? (iii) How many entries are there in the page table? 05

OR

Q.7B If a paging system with TLB, it takes 20ns to search the TLB and 60ns to access the memory. If the TLB hit ratio is 65%, find the effective memory access time? What should be the hit ratio to achieve an effective memory access time of 100ns? 05

Q.8 Consider the following page-reference string: 10
1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2
If the frame size is 4. Find number of page faults using FIFO, LRU and Optimal algorithm. If the frame size is increased to 5, whether there is belady's anomaly using FIFO algorithm?

Q.9A Consider the following snapshot of a system:

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

Answer the following questions using the Banker's algorithm

- What is the content of the matrix Need?
- Is the system in a safe state?
- If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?

Q.9B Explain the criteria and situation where the following disk-scheduling algorithms will perform better:

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(i) FCFS (ii) SSTF (iii) SCAN (iv) C-SCAN (v) LOOK

OR

Q.9B Suppose a disk drive has 1000 cylinders, numbered 0 to 999. The drive is currently serving a request at cylinder 43, and the previous request was at cylinder 25. The queue of pending requests, in FIFO order is:

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86,470,13,774,48,509,122,150,130.

Starting from current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms? (i) FCFS (ii) SSTF (iii) SCAN (iv) LOOK (v) C-SCAN