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**Question Paper Code : 91364**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Seventh Semester

Electrical and Electronics Engineering

CS 2411/CS 609/10144 CS 405 — OPERATING SYSTEMS

(Common to Electronics and Instrumentation Engineering and Instrumentation and Control Engineering)

(Regulation 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is virtual machine and what are the advantages of virtual machine?
2. What information about a process needs to be saved, changed or updated when context switching takes place?
3. Differentiate between hard real time system and soft real time system.
4. What is semaphore and what are the operations on semaphores?
5. What are the advantages of dynamic linking and loading?
6. What is external fragmentation and when does it occur?
7. List the responsibilities of the file manager.
8. What is a boot loader?
9. What are the advantages and disadvantages of placing functionality in a device controller than in the kernel?
10. Why is it important to scale up system bus and device speeds as the CPU speed increases?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Briefly compare the different operating system structures. (8)  
(ii) What is thread and what are the advantages of threads? Explain multi-threading models in detail. (8)

Or

- (b) (i) Explain inter process communication mechanism in Linux. (8)  
(ii) What is a process? Describe the operation on a process in detail. (8)
12. (a) (i) Given the following information :

Job Number	Arrival Time	CPU cycle
1	0	10
2	1	2
3	2	3
4	3	1
5	4	5

Find the turnaround time for each of the Job using FCFS, SJF, Round Robin (time quantum = 2) (10)

- (ii) Give and explain a monitor solution to the dining philosopher problem. (6)

Or

- (b) (i) Describe various approaches for recovering from deadlock. (10)  
(ii) N processes share M resource units that can be reserved and released only one at a time. The maximum need of each process does not exceed M, and the sum of all maximum needs is less than M + N, show that a deadlock cannot occur. (6)
13. (a) (i) Given that main memory composed of three page frames for public use and that a program requests pages in the following order :

A, B, A, C, D, A, B, D, B, A, C, A, C, D

Using FIFO and LRU page removal algorithms do a page trace analysis and compute their page faults and success. (10)

- (ii) Briefly describe the memory management scheme in Linux. (6)

Or

- (b) (i) Given memory partitions of 500 KB, 100 KB, 300 KB, 200 KB and 600 KB in order, how would each of the first-fit, best-fit and worst-fit algorithms place processes of 418 KB, 202 KB, 506 KB, 112 KB and 95 KB. Which algorithm makes the most efficient use of memory? (8)  
(ii) Describe various techniques for structuring the page table in a page memory management scheme. (8)

14. (a) (i) Describe the functions of the cache manager in Windows XP. (8)  
(ii) Explain tree-structured and acyclic-graph schemes for defining the logical structure of a directory. (8)

Or

- (b) (i) Explain the Linux ext2fs file system in detail. (8)  
(ii) Briefly compare various disk space allocation methods. (8)
15. (a) (i) Describe the life cycle of an I/O request with the diagram. (8)  
(ii) Explain various territory storage devices with their advantages and limitations. (8)

Or

- (b) (i) Describe various RAID levels in details. (8)  
(ii) Discuss in detail about the services provided by the kernel I/O sub system. (8)