Register Number: ………….

B.E DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2013)

Third Semester

COMPUTER SCIENCE AND ENGINEERING

U13CST303 : Operating System

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. …………………… increases the CPU utilization by organizing jobs so that the CPU always has one to execute.

   a) Multiprocessor systems b) Distributed systems

   c) Time sharing systems d) Multiprogramming systems

2. ……………. threads are directly supported by the operating systems.

3. Which one of the following is a non-preemptive scheduling algorithm?

   a) First Come First Serve b) Round Robin

   c) Shortest Job First d) Priority

4. A …………… semaphore is a semaphore with an integer value that can range between 0 and 1.

5. Resource allocation graph is used for……………….

   a) Deadlock avoidance b) Deadlock detection

   c) Deadlock prevention d) Deadlock recovery

6. The run-time mapping from virtual to physical addresses is performed by a hardware device called …………...................

7. The technique that allows the execution of processes that may not be completely in memory is termed as …………………

   a) Thrashing b) Paging

   c) Virtual memory d) Segmentation

8. The very high page fault activity is known as…………………

9. ……………… algorithm is called as elevator algorithm.

   a) SCAN b) LOOK

   c) C-SCAN d) C-LOOK

10. The process of dividing a disk into sectors before storing data is called as …………..

PART B (10 x 2 = 20 Marks)
(Not more than 40 words)

11. Compare tightly coupled and loosely coupled systems.
12. Mention the purpose of system calls.
13. Write the requirements that a solution to critical section problem must satisfy.
14. Sketch the process state diagram.
15. Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames. How many bits are there in the logical address and the physical address?
16. Specify the purpose of wait for graph.
17. How to compute the effective access time for demand paging?
18. What is Belady's anomaly?
19. Give the attributes of File Control Block.
20. Define Sector sparing.

PART C (5 x 14 = 70 Marks)
(Not more than 400 words)

Q.No. 21 is Compulsory

21. (i) Draw the Gantt charts & calculate the average waiting time and turnaround time (8) as indicated by (process name, arrival time, execution time) for the following (A, 0, 4), (B, 2, 7) (C, 3, 2) (D, 4, 5) for Shortest Job First and Round Robin (quantum = 2) CPU scheduling.

  (ii) Explain how semaphores are used as synchronization tool in the classical (6) synchronization problem?

22. a) (i) Elaborate the major classification of system calls. (10)
   (ii) Outline the concept of time sharing operating systems. (4)

(OR)

  b) (i) With a neat sketch, illustrate the hardware protection mechanisms. (10)
   (ii) Recall the essential properties of multiprocessor operating systems. (4)

23. a) (i) For the following situation find out whether the system is in a deadlock state (or) (6) not. Find the total instances of the resources?

	Allocation			Request			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	0	0	0	0	0	0
P_1	2	0	0	2	0	2			
P_2	3	0	3	0	0	0			
P_3	2	1	1	1	0	0			
P_4	0	0	2	0	0	2			

(ii) With a neat diagram, discuss tree-structured and acyclic-graph directories for (8) defining the logical structure of a directory.

(OR)

b) (i) Illustrate the concept of segmentation with paging technique for mapping virtual (8) address to physical address.

(ii) List the necessary conditions for deadlock and draw resource allocation graph (6) for following situation.

$$P=\{p_1,p_2,p_3\} \qquad R=\{r_1,r_2,r_3,r_4\}$$
$$E=\{p_1\rightarrow r_1, p_2\rightarrow r_3, r_1\rightarrow p_2, r_2\rightarrow p_2, r_1\rightarrow p_1, r_3\rightarrow p_3\}$$

24. a) (i) Apply optimal and LRU page replacement algorithm using 4 frames & (8) determine the number of page fault for the following reference string 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

(ii) Write the concept of demand paging. (6)

(OR)

b) (i) Mention the cause of thrashing and summarize the methods by which thrashing (8) could be controlled.

(ii) Given memory partitions of 150K, 500 K, 300K, 250 K, and 600K (in order), (6) how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 317K, 112K, 436 and 526K (in order)? Which algorithm makes the most efficient use of memory?

25. a) (i) Analyze the merits and demerits of various disk scheduling algorithms with (10) example.

(ii) Suggest the methods available for implementing free space management. (4)

(OR)

b)   (i)   Identify and elaborate the various methods for allocating disk space.   (10)

      (ii)   Enlighten the importance of Virtual File System.   (4)

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