

2014

END Sem (II) – MCA (X) OS

Time : 3 hours

Full marks : 70

Group – A

(All questions are compulsory)

1. [A] Select the correct answer of the following: 1 x 5 = 5
- a. An operating system contains 3 user processes each requiring 2 units of resource R. The minimum number of units of R such that no deadlocks will ever arise is:
 - i. 4
 - ii. 3
 - iii. 5
 - iv. 6
 - b. A UNIX device driver is :
 - i. Structured into two halves called top half and bottom half
 - ii. Three equal partitions
 - iii. Unstructured
 - iv. None of the above
 - c. A set of techniques that allow to execute a program which is not entirely in memory is called :
 - i. Demand paging
 - ii. Virtual memory
 - iii. Auxiliary memory
 - iv. Secondary memory
 - d. The total time to prepare a disk drive mechanism for a block of data to be read from is its:
 - i. Latency
 - ii. Latency plus transmission time
 - iii. Latency plus seek time
 - iv. Latency plus seek time plus transmission time
 - e. The memory allocation scheme subject to “external” fragmentation is:
 - i. Segmentation
 - ii. Swapping
 - iii. Pure demand paging
 - iv. Multiple fixed contiguous partitions

[B] Write 'True' or 'False' of the following:

1 x 5 = 5

- a. Two processes are allowed to get access the shared resource at the same point of time is known as mutual exclusion.
- b. Wait-for graph is used for deadlock avoidance
- c. C-SCAN algorithm is sometimes called elevator algorithm
- d. Mirroring of hard disk is done through RAID.
- e. Fairness is an important goal in time sharing systems

[C] Fill in the blacks of the following :

1 x 5 = 5

- a. Process scheduling is often known as scheduling.
- b. SCSI stands for.....
- c. PCB is also called as.
- d. is a non-preemptive scheduling algorithm.
- e. Selects the process from the pool and load it into the memory.

GROUP – B

Answer any **FIVE** questions of the following:

4 x 5 = 20

- 2. Write down different system calls for performing different kinds of tasks.
- 3. What are interrupts? How are they handled by the operating system?
- 4. Compare and contrast Multiprogramming, Multitasking and Multiprocessing.
- 5. Discuss how virtual memory is managed?
- 6. What is parsing? Write down the drawback of top down parsing of backtracking.
- 7. Differentiate between pre-emptive and non-preemptive scheduling.
- 8. CPU burst time indicates the time, the process needs the CPU. The following are the set of processes with their respective CPU burst time (in milliseconds) :

Processes	CPU-burst time
P1	21
P2	3
P3	3

Calculate the average waiting time if the process arrived in the following order :

- a. P1, P2 and P3
 - b. P2, P3 and P1
9. What are the four necessary conditions of deadlock prevention?

GROUP – C

Answer any **five** questions of the following:

7 x 5 = 35

10. Explain the differences between:
 - a. Internal and external fragmentation
 - b. Paging and segmentation
11. What is I/O buffer? What is the advantage of buffering? Is buffering always effective? Justify your answer with help of an example.
12. Define the essential properties of the following types of OS.
 - a. Multiprogrammed System
 - b. Time-sharing System
13. Draw the state diagram of a process from its creation to termination, including all transitions, and briefly elaborate **every state** and **every transition**.
14. What is swapping? Does swapping increase the Operating Systems' overheads? Justify your answer.
15. Define the following:
 - a. FIFO Page replacement algorithm
 - b. LRU Page replacement algorithm
16. Explain the concept of variable-partition contiguous storage allocation.
17. Explain the following:
 - a. Real-time Systems
 - b. Distributed Systems
18. Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order is:
86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

Starting from the 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?

- a. FCFS
- b. SSTF
- c. SCAN
- d. LOOK