

Total No. of Questions : 10]

SEAT No. :

P3002

[Total No. of Pages : 3

[5669]-594

**T.E. (Information Technology)**  
**OPERATING SYSTEM**  
**(2015 Pattern) (Semester - I)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

**Instructions to the candidates:**

- 1) Answer Question 1 or 2, 3 or 4, 5 or 6, 7 or 8 and 9 or 10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

- Q1)** a) Elaborate on the functions of operating system. [5]  
b) Write a shell program to check if a given string is a palindrome or not. [5]

OR

- Q2)** a) Explain the concept of Context Switching with the help of a neat diagram. [5]  
b) Differentiate between user-level and kernel-level threads. [5]
- Q3)** a) Explain monitors in brief. [5]  
b) Explain the following terms : [5]  
i) Critical Section.  
ii) Race Condition.

OR

- Q4)** a) Write a semaphore solution for dining philosopher's problem. [5]  
b) Explain with an appropriate example, how resource allocation graph determines a deadlock. [5]

**P.T.O.**

- Q5)** a) For the following reference string. [12]  
6,5,1,2,5,3,5,4,2,3,6,3,2,1,2  
Count the number of page faults that occur with 3 frames using FIFO, Optimal and LRU page replacement methods. Discuss the result.
- b) Explain different ways to remove external fragmentation. [6]
- OR
- Q6)** a) Free memory holes of sizes 15K, 10K, 5K, 25K, 30K, 40K are available. The processes of size 12K, 2K, 25K, 20K, are to be allocated. How processes are placed using the first fit, best fit and worst fit partitioning algorithm. Calculate internal and external fragmentation. [10]
- b) Write a short note on : [8]
- i) Buddy System.
  - ii) Compaction.
- Q7)** a) A disk drive has 200 cylinders, numbered 0-199. The drive is currently serving the request at cylinder 63. The queue of pending requests in FIFO order is 27,129,110,186,147,41,10,64,120. Starting from the current head position what is the total distance that disk arm moves to satisfy all the pending requests for the following disk scheduling algorithms. [12]
- i) FCFS
  - ii) C-SCAN
  - iii) C-LOOK
  - iv) SSTF
- b) Explain I/O buffering mechanism. [4]
- OR
- Q8)** a) Write a short note on the following : [8]
- i) Directory Structure.
  - ii) File sharing.
- b) Explain Free Space Management technique. [8]

- Q9)** a) Describe the steps for adding new system call in the Linux Kernel. [8]
- b) List and explain different inter-process communication mechanisms in the Linux operating system. [8]

OR

**Q10)** Write a short note on following : [16]

- a) Memory Management in Linux.
- b) Linux File System.
- c) Kernel Modules.
- d) Process Scheduling in Linux.

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