



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Computer Science and Engineering

Semester End Examination; Dec - 2017/Jan - 2018

Operating System

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

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| 1 a. | Define operating system. Discuss any five services provided by an operating system. | 6 |
| b. | Describe the differences between symmetric and asymmetric multiprocessing. What are the three advantages and one disadvantage of multiprocessor systems? | 8 |
| c. | What are the activities of an operating system in connection with process management? | 6 |
| 2 a. | Differentiate between system calls and system programs. Discuss the various types of system calls and system programs. | 8 |
| b. | With a neat block diagram, discuss VM architecture. | 6 |
| c. | What are the activities of an operating system in connection with memory management? | 6 |

UNIT - II

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|------|---|---|
| 3 a. | Define a process. With the help of a process state diagram, explain the various transitions of a process. | 6 |
| b. | What is a thread? Discuss the benefits of a multithreaded programming. | 6 |
| c. | Explain the fundamental methods of inter-process communication. | 8 |
| 4 a. | Distinguish between long term, medium term and short term scheduling with the help of a diagram. | 8 |
| b. | Consider the following set of processes : | |

Process	Burst time (milli secs)	Arrival time (milli secs)	Priority
P ₁	10	0	2
P ₂	5	2	1
P ₃	2	3	0
P ₄	20	5	3

12

Draw the Gantt charts and compute the average waiting time and average turnaround time using the following scheduling algorithms :

- i) Preemptive shortest job first
- ii) Non-preemptive priority (0 = High Priority).

UNIT - III

- 5 a. What is critical section problem? Explain the three requirements to be satisfied for the solution of critical section problem. 10
- b. Write the definition of TestAndSet() and Swep() instructions. Discuss how these hardware instructions are used to solve critical section problem? 10
- 6 a. What is a deadlock? Discuss the necessary conditions for a deadlock to occur in a system. 6
- b. Explain the Banker's algorithm to avoid deadlock in the allocation of system resources. 8
- c. Discuss the various solutions for recovering from a deadlock. 6

UNIT - IV

- 7 a. With a neat diagram, explain the paging hardware with TLB. 10
- b. What is Belady's anomaly? Illustrate Belady's anomaly by using the FIFO page replacement algorithm. Assume the following reference string : 10
1 2 3 4 1 2 5 1 2 3 4 5.
- 8 a. What is a page fault? Explain the steps in handling page fault with neat diagram. 10
- b. For the reference string given below :
7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1
Compute the numbers of page faults using : 10
i) FIFO ii) LRU iii) Optimal page replacement algorithms.
Assume the number of page frames available as 3.

UNIT - V

- 9 a. What do you mean by tree space list? Describe the different approaches to manage free space on a disk. 8
- b. Define a file. Discuss the various file operations. 6
- c. Describe the various file allocation methods used in disk based system. 6
- 10 a. Explain the various disk scheduling algorithms. 12
- b. Explain the different components of a Linux system. 8

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