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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

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 wax architecture. 6

c. What are the activities of an operating system in connection with memory management? 6

UNIT - II

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 : 12

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

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).

Contd…2

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 : 1 2 3 4 1 2 5 1 2 3 4 5.	10
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 : i) FIFO ii) LRU iii) Optimal page replacement algorithms. Assume the number of page frames available as 3.	10

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 sysytem.	6
10	a.	Explain the various disk scheduling algorithms.	12
	b.	Explain the different components of a Linux system.	8

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