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P.E.S. College of Engineering, Mandya - 571 401
 (An Autonomous Institution affiliated to VTU, Belgaum)
Second Semester - Master of Computer Applications (MCA)
Semester End Examination; June - 2016
Operating Systems

Time: 3 hrs

Max. Marks: 100

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

UNIT - I

- 1 a. Explain operating system structure. 6
- b. With diagram, explain computer system architecture. 8
- c. What is system call? Explain different types of system call. 6
- 2 a. Discuss system programs and their categories. 8
- b. With a neat diagram, explain VMware architecture. 8
- c. Explain storage structure. 4

UNIT - II

- 3 a. With a neat diagram, explain process control block. 6
- b. Compare shared memory systems and message passing system in Inter process communication. 8
- c. Discuss the benefits of multi threaded programming. 6
- 4 a. Which are the five present challenges in programming for multicore? Explain. 8
- b. What is scheduling? What is the need of scheduling? 4
- c. Consider the following set of processes with length of the CPU burst given in milliseconds. Arrive time = 0.

Process	Burst time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

8

- i) Draw Four Gantt charts and illustrate the execution with FCFS, SJF, preemptive priority, RR (Quantum = 1)
- ii) Find turnaround time of each process also find Waiting Time of each process with respect to algorithms specified above.

UNIT - III

- 5 a. Discuss critical-section problem. 6
- b. What are Semaphores? Explain its usage. 6

- c. Define deadlock. Explain the necessary conditions for a deadlock. 8
- 6 a. Explain synchronization in windows XP. 8
- b. With figure, discuss resource allocation graph. 6
- c. Briefly explain any two classic problems of synchronization. 6

UNIT - IV

- 7 a. With a neat diagram, explain swapping in memory management. 6
- b. What is page replacement technique? List out the different forms of page-replacement technique and explain any one. 8
- c. What do you mean by fragmentation? List out differences between internal and external fragmentation. 6
- 8 a. Explain segmentation with its hardware. 8
- b. Consider a logical address space of 32 pages with 1,024 words per page mapped onto a physical memory of 16 frames : 6
 - i) How many bits are required in the logical address?
 - ii) How many bits are required in the physical address?
- c. Define : 6
 - i) First fit ii) Best fit iii) Worst fit algorithm.

UNIT - V

- 9 a. Consider the following page reference theory :
 12,3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3 ,6
 How many page faults would occur for the following replacement algorithms assuming three frames? Remember that all frames are initially empty. 10
 - LRU replacement
 - FIFO replacement
 - Optimal replacement.
- b. Discuss Two-level and Tree structured directories. 10
- 10 a. What is a file? Explain different attributes and various operations on a file that could be performed. 10
- b. Consider a disk queue with requests for I/O to blocks on cylinders in the order 98, 183, 37, 122, 14, 124, 65, 67. If the disk head is initially at cylinder 53, Find the number of head movements using the following algorithms : 10
 - i) FCFS,
 - ii) SSTF.