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

(An Autonomous Institution affiliated to VTU, Belgaum)

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

Semester End Examination; Dec - 2016/Jan - 2017

### Operating Systems

Time: 3 hrs

Max. Marks: 100

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

#### UNIT - I

- 1 a. Define an operation system. Discuss the five services provided by an operating system. 10
- b. Describe the difference between symmetric and asymmetric multiprocessing. What are the advantages and disadvantages of multiprocessor system? 10
- 2 a. Explain any two computing environments. 4
- b. Differentiate between system calls and system programs. Discuss the various types of system calls and system programs. 10
- c. Discuss VMware architecture with a neat diagram. 6

#### UNIT - II

- 3 a. Define a process with the help of a process state diagram and explain the various transition of a process. 10
- b. Explain the different multithreading models. 10
- 4 a. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds

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

12

The processes are assumed to have arrived in the order P1, P2, P3, P4, and P5 all at time 0.

Using Gantt charts, compute the average waiting time using,

- i) FCFS ii) SJF iii) Non preemptive priority and RR (Q = 1) scheduling.
- b. With the help of a diagram, explain the multi level queue scheduling. 8

#### UNIT - III

- 5 a. Define critical section problem, with necessary conditions. 10
- b. What are semaphores? Discuss readers and writers problem and its solution using semaphore. 10

- 6 a. What is a deadlock? Discuss the necessary conditions for a deadlock to occur in a system. 8
- b. Discuss the various solutions for recovering from a deadlock. 8
- c. A system contains three processes and each requires three tape units for its operation. What is the minimum number of tape units which the system must have such that deadlock never arise? 4

**UNIT - IV**

- 7 a. Given memory partition of 100 KB, 500 KB, 200 KB, 300 KB and 600 KB (in order), how would each of the first fit, best fit and worst fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in order)? Which algorithm makes the most efficient use of memory? 10
- b. Explain the Belady's anomaly with the help of FIFO page replacement algorithm. Assume the reference strings to be 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 a page fault with a neat diagram. 12
- b. Explain the concept of thrashing. 8

**UNIT - V**

- 9 a. Define a file. Discuss the various file operations. 6
- b. Explain the various file directory structures. 6
- c. Describe the various file allocation methods used in disk based system. 8
- 10 a. Explain the various disk scheduling algorithms. 12
- b. Describe the access matrix model used for protection in a computer system. 8

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