

M.E. First Semester (Computer Science & Engg.) (F.T.) (CGS)
13143 : Operating System Design : 1 RMEF 3 / 1 RME 3 / 1 KMEF 3

P. Pages : 2

Time : Three Hours



AX - 3403

Max. Marks : 80

- Notes :
1. Due credit will be given to neatness and adequate dimensions.
 2. Assume suitable data wherever necessary.
 3. Illustrate your answer necessary with the help of neat sketches.
 4. Use of mobile phone is prohibited.
 5. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) Differentiate between: 9
 - i) Device driver and device controller. ii) Task & thread.
 - iii) Multiprogramming & multiprocessing.
- b) Define and explain the following: 5
 - i) Context switch. ii) Task interruptible.
 - iii) Uninterruptable.

OR

2. a) Define the term process with the help of neat diagram, describe various states of process under Linux. Give relevant system calls responsible from transition from one state to another. 7
- b) Compare & contrast Linux kernel with Unix kernel giving advantages and disadvantages of Linux kernel over Unix kernel. 7
3. a) Differentiate between : 6
 - i) Direct and indirect block in inode.
 - ii) Preemptive and Non-preemptive scheduling.
- b) With reference to process scheduling under Linux, explain meaning/significance of each of the following. 7
 - i) Priority. ii) Realtime.
 - iii) Context switching.

OR

4. a) Differentiate between : 9
 - i) Interrupt () & trap () system call. ii) Fork () & exec () system call.
 - iii) Sleep () & wait () system call.
- b) Explain task scheduling under Linux, bringing out task structure and the purpose of schedule (). 4
5. a) Enumerate and describe three conditions that must be satisfied by a good solution to critical section problem. Give a solution to critical section problem using semaphores. Show that this solution satisfies all the three conditions. 7

- b) Define the each of the following terms giving its significance: 6
 i) Deadlocks. ii) Critical section.
 iii) Contention.

OR

6. a) Define the each of the following terms giving its significance: 6
 i) Live locks. ii) Spin locks.
 b) What is meant by Race condition? Why does it occur? Describe any one solution to avoid race condition. 7
7. a) Differentiate between. 6
 i) Page fragment and page fault. ii) Jiffies and tick rate.
 b) Describe the three types of zones used by Linux kernel. How is 'Ezone' represented. 7

OR

8. a) Describe Kmalloc () and Vmalloc () functions. Give the situation under which each of the functions shall be used. 7
 b) Explain kernel notion of time. Give meaning of tick rate with its benefits and drawbacks. 6
9. a) What is super block object? How it is related with dentry object and file object? Explain. 7
 b) Describe I/O scheduling as implemented under Linux. 6

OR

10. a) With reference to virtual file system with Linux describe each of the following. 6
 i) File object. ii) Super block.
 iii) Dentry object.
 b) Describe common file system interface under Linux. Indicate how an application program can have access to file system. 7
11. a) Differentiate between. 9
 i) Page cache & Buffer Cache. ii) Page write back & page write through.
 iii) Page descriptor & file descriptor.
 b) With the help of suitable example describe the use of page table? Explain how address translation is done from logical address to physical address. 5

OR

12. a) What is meant by portability of an operating system? Describe the features of Linux to support portability. 7
 b) Enumerate various kernel modules under Linux and describe the purpose of each module. 7
