

## First Semester M. E. (I. T.) Examination

**OPERATING SYSTEM CONFIGURATION**

I NMEF I

P. Pages : 3

Time : Three Hours ]

[ Max. Marks : 80

- Note :** (1) Due credit will be given to neatness and adequate dimensions.  
(2) Assume suitable data wherever necessary.  
(3) Retain the construction lines.  
(4) Illustrate your answer wherever necessary with the help of neat sketches.

1. (a) Define term process. With the help of neat diagram, describe various states of process under Linux. Give relevant system calls responsible for transaction from one state to another. 6
- (b) Define each of the following terms :—
- (i) Process context
  - (ii) Context switch
  - (iii) Task interruptible and uninterruptible
  - (iv) Process hierarchy. 8

**OR**

2. (a) Give salient features of Linux operating system, giving its advantages and disadvantages. 7
- (b) Give and explain the meaning of System context, address context and hardware context with reference to Linux. 7
3. (a) Difference between :—
- (i) Preemptive and non-Preemptive scheduling
  - (ii) Interactive, Batch and Real time task
  - (iii) CPU bound and I/O bound task. 6

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- (b) Explain task scheduling under Linux, bringing out task structure & the purpose of Schedule ( ). 7

OR

4. Describe the scheduling algorithm implemented under Linux for task scheduling giving various data structure involved. 13
5. (a) Enumerate and describe five causes of concurrency. How can a designer identify if Race condition may occur and kernel code need to be synchronized ? 6
- (b) Define the term Deadlocks. Enumerate and describe four necessary conditions for deadlocks to occur. 7

OR

6. (a) What is meant by the term Atomic operation ? Enumerate its advantages. Give and explain two sets of interfaces of atomic operation. 7
- (b) What is meant by the spinlocks ? Describe the use of spinlocks in interrupt handlers. Indicate at least four methods related with spinlocks. 6
7. (a) What is meant by per cpu allocation ? Why is it needed ? Give and explain the structure of percpu interface. 7
- (b) Explain methods related to per cpu data at runtime. 7

OR

8. (a) In each of the following cases, indicate which allocation method should be used and why ?
- (1) Contiguous physical pages
  - (2) Pages in high memory
  - (3) Virtually contiguous pages
  - (4) Frequently allocation and destruction. 8
- (b) Describe kcalloc( ), vmalloc( ) function. 6

9. (a) Differentiate between
- (i) File system and Disk scheduler
  - (ii) File object and Physical file
  - (iii) Dentry object and Super block object.
- 6
- (b) What is the purpose of block I/O layer ? How is it different from character I/O layer ? With the help of neat diagram describe block I/O layer in Linux. 7

**OR**

10. (a) With reference to virtual file system with Linux describe each of following
- (i) Dentry object
  - (ii) Super block
  - (iii) File object.
- 6
- (b) Describe I/O scheduling as implemented under Linux. 7
11. (a) Describe process address space under Linux. 6
- (b) What is the purpose of page cache under Linux ? Explain page write back algorithm for page cache. 7

**OR**

12. (a) What is the purpose of memory descriptor with the help of neat diagram ? Give the purpose of various fields in memory descriptor. 6
- (b) What is the purpose of page table with the help of suitable example ? Explain address translation from logical address to physical address. 7



