

AQ – 2696

First Semester M. E. (Comp. Sci. and Engg.) (CGS) Examination

**OPERATING SYSTEM DESIGN**

Paper – 1 RMEF 3 / 1 KMEF 3/ 1 RME 3

P. Pages : 3

Time : Three Hours ]

[ Max. Marks : 80

- Note :** (1) Assume suitable data wherever necessary.  
(2) Illustrate your answer wherever necessary with the help of neat sketches.  
(3) Use pen of Blue/Black ink/refill only for writing the answer book.

1. (A) Compare and contrast Linux Kernel with Unix Kernel giving advantages and disadvantages of each. 7  
(B) What is process descriptor and the task structure ? Explain how the process descriptor is allocated ? 6

**OR**

2. (A) List and explain all the process states. Describe in brief the flow chart of all process states. 7  
(B) What is Forking ? What is the work done by "Copy-process ( )" ? 6
3. (A) What is the scheduling algorithm implemented under Linux for task scheduling? Explain with various data structures involved. 7  
(B) Explain in brief the implementation of interrupt handlers. 6

**OR**

4. (A) What is fair scheduling ? Explain in brief. 7  
(B) Explain the Wait( ) and sleep( ) system calls. 6
5. (A) What is meant by locking ? Explain with an example. 7  
(B) What is meant by completion variables ? 7

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**OR**

6. (A) List and explain the different causes of concurrency. How can a designer identify if race condition may occur and Kernel code need to be synchronized? 7
- (B) What are semaphores ? Explain counting and Binary Semaphores. 7
7. (A) How the time interrupt handler is actually implemented ? Explain in brief. 7
- (B) Explain :—
- (i) Pages.
- (ii) Zones. 6

**OR**

8. (A) What is the need of delaying the execution for the Kernel code ? Explain busy looping. 7
- (B) What are the three types of Zones used by Linux Kernel ? Explain. 6
9. (A) What is a superblock object ? Explain in brief any three superblock operations. 7
- (B) What is the job of I/O scheduler ? Describe in brief the Linus Elevator. 6

**OR**

10. (A) What is an Inode object ? Explain the three link related operations/functions of Inode operations. 7
- (B) Describe the various data structures associated with process. 6
11. (A) Describe the process address space under Linux. 7

(B) Differentiate between :—

(i) Virtual Address and Physical Address.

(ii) Page Cache and Buffer Cache.

7

**OR**

12. (A) What is the purpose of memory descriptor ? Explain the meaning of each field in it. 7

(B) What is meant by portability of an operating system ? Describe the features of Linux to support portability. 7



