

(Please write you Exam Roll No.)

Exam Roll No. ....

## **END TERM EXAMINATION**

### **SECOND SEMESTER [MCA] MAY-JUNE 2012**

**Paper Code: MCA107**

**Subject: Operating System**

**Time : 3Hours**

**Maximum Marks :60**

**Note : Attempt any five questions including Q.no.1 which is compulsory**

Q1 Answer the following:-

- (a) Compare distributed systems and real-time systems. Give their applications. (2)
- (b) Explain how monitors are used in synchronization. (2)
- (c) Mention the necessary conditions for a deadlock to occur. (2)
- (d) Explain features of device management. (2)
- (e) Mention the components in storage area network. Give its working. (2)
- (f) Explain various types of program threats. (2)
- (g) Explain the working mechanism of symmetric key and asymmetric key encryption techniques used in cryptography. (3)

### **UNIT-I**

- Q2 (a) Explain the features of operating system components. (5)
- (b) explain Process Control Block. Draw the block diagram of process transition states. (5)
- (c) What resources are used when a thread is created? How do they differ from those used when a process is created? Describe the actions taken by a thread library to context-switch between user-level threads. (1+1+3)

**OR**

- Q3 (a) Explain the term operating system. Differentiate between Hard operating system and soft operating system. (5)
- (b) Write short note on multiple processor scheduling with the examples. (5)

(c) Discuss and explain the scheduling criteria and its algorithms in brief. (5)

### UNIT-II

Q4 (a) Compare segmentation and paging schemes used in memory management. Give their applications. (6)

(b) Consider the following workload:

Process	Burst Time	Priority	Arrival Time
P1	50ms	4	0ms
P2	20 ms	1	20ms
P3	100ms	3	40ms
P4	40ms	2	60ms

(i) Draw the Gantt chart to illustrate the cpu scheduling for shortest remaining time, non-preemptive priority (a smaller priority number implies higher priority) and round robin with quantum 30ms. (6)

(ii) Calculate the turnaround time for each process in the above mentioned CPU scheduling algorithms. (3)

**OR**

Q5 (a) Define Semaphores. Write the functions for wait() and signal() used in semaphores. Give the applications for binary semaphores and counting semaphores.

**(1+2+2)**

(b) Consider a system consisting of m resources of the same type which are being shared by n processes. A process can request or release only one resource at a time. Show that the system is deadlock free if the following two conditions hold: (4)

(i) The maximum need of each process is between one resource and m resources.

(ii) The sum of all maximum needs is less than m+n.

(c) Consider the following page reference strings:- (6)

1, 2, 3, 4, 2, 1, 5, 2, 3, 7, 6, 3, 5, 1, 2, 3, 6

How many page faults would occur for the following replacement algorithms, assuming four frames? Assuming all frames are initially empty and first unique pages will cost one fault each.

(i) LRU replacement (ii) FIFO replacement (iii) Optimal replacement

### UNIT-III

- Q6 (a) Compare the features of dedicated devices, shared devices and virtual device. Give their respective applications. (6)
- (b) Explain buffering and multiplexing in device management. (6)
- (c) Explain device allocation strategies in multi-user systems. (3)

OR

- Q7 (a) compare performance issues in disk scheduling algorithms. (6)
- (b) Explain how bad blocks are managed in disk structures? (3)
- (c) Disk requests are made for disk driver to cylinders 10, 22, 20, 2, 40, 6 and 38. A seek takes 6 msec per cylinder. The initial position of disk arm is at cylinder 20. How much seek time is needed for the following:- (6)
- (i) FCFS      (ii) SSTF      (iii) C-SCAN

### UNIT-IV

- Q8 (a) Explain network related threats and give their respective solutions. (4)
- (b) Draw and explain the architecture of Linux Operating System. (4)
- (c) Mention the features of various file allocation methods. (4)
- (d) Explain virtual file system. (3)

OR

- Q9 Write short notes on any three of the following:- (5X3=15)
- (a) Authentication and Intrusion detection
- (b) Directory Implementation
- (c) Windows XP
- (d) Security and Cryptography

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