ROLL NO. _____

Code: AC13 **Subject: OPERATING SYSTEMS**

AMIETE – CS (OLD SCHEME)

Time: 3 Hours **OCTOBER 2012** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: **(2 × 10)**

a. The page fault occurs when

(A) the page is corrupted by the software
(B) page not in main memory
(C) division by zero
(D) none of these

b. If the number of pages in a *32* bit machine is *8 kb* then what is the size of the page table?

(A) 8 kb **(B)** 16 kb
(C) 4 kb **(D)** none of the above

c. At a particular time, the value of a counting semaphore is *10*. It will become 6 after.

(A) 4 P operation
(B) 3 V operation
(C)13 P operation and 10 V operation
(D)13 V operation and 10 P operation

d. Dirty bit is used to

(A) show the page with corrupted data
(B) show page with unknown extension
(C) show the page modified after being modified into cache
(D) None of the above

e. Which of the following features are NOT used for Inter Process Communication in UNIX?

(A) Signals **(B)** Semaphores
(C) Message Queues **(D)** None of the above

f. The technique that allows only one user to work with file at a particular instant in UNIX is called

(A) Locking **(B)** critical region
(C) semaphores **(D)** All of the above

g. The PID of the Kernel process is

(A) 0 **(B)** 1
(C) -1 **(D)** None of the above

h. The number of bits in logical address for *32* segments each of size *1024* bits is

(A) 6 **(B)** 15
(C) 10 **(D)** 5

i. Context switching is not associated with the following

(A) Shortest job first **(B)** Round Robin
(C) Pre emptive **(D)** none of the above

j. If the time quantum is increased, the average turnaround time in the case of Round Robin scheduling will

(A) Decreases **(B)** Increases
(C) Not change **(D)** change irregularly

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. What is the main purpose of an operating system? **(3)**

b. Explain various process states. **(5)**

c. Explain any three directory structures used by the Operating system to manage data. **(8)**

Q.3 a. What are the major activities of an operating system in regard to process management and memory management? **(6)**

b. Describe *any two* disk allocation methods. **(4)**

c. Describe a typical interrupt driven I/O cycle. **(6)**

Q.4 a. Explain why SSTF scheduling tends to favor the middle cylinders of a disk over the innermost and outermost cylinders. **(4)**

b. What do you mean by system programs? What is its purpose? **(4)**

c. Write short notes on: **(8)**

(i) Circuit Switching
(ii) Packet Switching
(iii) Dynamic Routing
(iv) CSMA/CD

Q.5 a. Why threads are called light-weight processes? **(4)**

b. What are the benefits of multi-threaded programs? **(4)**

c. What is the difference between preemptive and non-preemptive scheduling? **(4)**

d. What are the various criteria for comparing CPU Scheduling algorithms? **(4)**

Q.6 a. Explain the four necessary conditions that must coexist for a deadlock. **(4)**

b. What do you mean by **(4)**

(i) Deadlock prevention
(ii) Deadlock avoidance

c. Consider the following page reference string: **6, *7, 8, 9, 7, 6, 10, 11, 7, 6, 7, 8, 12, 11, 8, 7, 6, 7, 8, 11.*** How many page faults would occur for the
(i) LRU replacement
(ii) FIFO replacement algorithms, assuming one, three, five, six, or seven frames? Suppose that all frames are initially empty. **(8)**

Q.7 a. Bakery problem is a classic synchronization problem in operating system. It can be stated as follows. A bakery has room for *20* customers. As customers enter, they take a number, then wait to be served. The baker serves *100* customers a day, in order from *1 to 100*. When a customer has his turn, he purchases an item, then leaves. The baker sleeps when there are no customers. Write a procedure/algorithm to synchronize the customers and the baker. **(12)**

b. Compare the various network topologies based on reliability. **(4)**

Q.8 a. Given memory partitions of *200K, 600K, 300K, 400K, and 700K* (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of *222K, 427K, 122K, and 436K* (in order)? **(8)**

b Explain the *two- phase commit* protocol. How failure is handled in this protocol? **(8)**

Q.9 a. Explain the access matrix model for protection. How can it be implemented? **(8)**

b. Explain the public key encryption scheme. **(4)**

c. Explain the various Inter Process Communication Techniques used in UNIX. **(4)**