ROLL NO. _____

Code: AC59/AT59 Subject: OPERATING SYSTEMS & SYSTEMS SOFTWARE

AMIETE – CS/IT

Time: 3 Hours **DECEMBER 2013** **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, selecting at least TWO questions from each part. 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 process of merging many object modules to form a single machine language program is known as

(A) Linking **(B)** Loading
(C) Interpreting **(D)** Assembling

b A parser which is a variant of top-down parsing without backtracking is

(A) LL(1) parser **(B)** LALR parser
(C) Recursive descend **(D)** Operator precedence

c. Load address for the first word of the program is called

(A) Linker address origin **(B)** Load address origin
(C) Virtual address **(D)** Absolute address

d. Analysis which determines the meaning of a statement once its grammatical structure becomes known is termed as

(A) Syntax analysis **(B)** Semantic analysis
(C) Code analysis **(D)** None of these

e. The syntax of the assembler directive EQU is

(A) <symbol>EQU<address space> **(B)** EQU <address space>
(C) EQU <symbol> **(D)** <symbol> EQU

f. Interval between the time of submission and completion of job is called

(A) Throughput **(B)** Waiting time
(C) Response time **(D)** Turnaround time

g. Wait and Signal primitives belong to

(A) Mailboxes **(B)** Stacks
(C) Lists **(D)** Semaphores

h. Locality of reference implies that the page reference being made by a process

(A) will always be to the page used in the previous page reference
(B) is likely to be the one of the pages used in the last few page references
(C) will always be to one of the pages existing in memory
(D) none of these

i. Bankers algorithm is a

(A) Deadlock Detection Algorithm **(B)** Deadlock Prevention Algorithm
(C) Deadlock Avoidance Algorithm **(D)** Deadlock Creation Algorithm

j. In _____, a programmer identifies the logical entities in his/her program and declares them as program components for the purpose of virtual memory implementation.

(A) Paging **(B)** Demand segmentation
(C) Segmentation **(D)** Fragmentation

PART A
Answer at least TWO questions. Each question carries 16 marks.

Q.2 a. List the major activities of an operating system in regard to process management and memory management. **(4)**

b. Distinguish between multiprogramming and multiprocessing systems. **(4)**

c. What is a process? Discuss briefly, the different process states. **(4)**

d. What is cooperating process? Give reasons for providing an environment that allows process cooperation. **(4)**

Q.3 a. State different scheduling criteria that must be kept in mind while choosing different scheduling algorithms. **(4)**

b. List the different actions taken by time sharing scheduler. **(4)**

c. Define Deadlock. Discuss the four necessary conditions for deadlocks to occur. **(8)**

Q.4 a. Define critical regions. Give a solution for reader-writers problem using conditional critical regions. **(8)**

b. With the help of examples, differentiate between the following:
(i) absolute and relative access paths
(ii) linked and indexed allocation of disk space **(4+4)**

Q.5 a. Discuss the two approaches used to identify and reuse free memory areas in a heap. **(6)**

b. Describe the First fit, Best fit and Worst fit allocation algorithms. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K and 426K (in order)? Which algorithm makes the most efficient use of memory? **(6+4)**

PART B
Answer at least TWO questions. Each question carries 16 marks.

Q.6 a. Explain the different fundamental language processing activities. **(8)**

b. What properties should a hash function possess to ensure good search performance? Discuss two collision handling techniques. **(2+6)**

Q.7 a. Compare and contrast non-relocatable program, relocatable program and self-relocatable program. **(6)**

b. Define top down parsing. Discuss the features that are needed to implement top down parsing. Also, give an algorithm for Operator Precedence Parsing. **(2+4+4)**

Q.8 a. Discuss the different data structures used during Pass I of the Assembler. **(6)**

b. Discuss the registers set and control transfer instructions of Intel 8088. **(6)**

c. Explain forward and cross references. **(4)**

Q.9 a. Discuss the following:

(i) Local and Global optimization
(ii) Triples and Quadruples
(iii) Call by value and Call by reference
(iv) Pure and Impure interpreter **(4*2½)**

b. Discuss the issues involved that contribute to the semantics gap between a programming language domain and an execution domain. **(6)**