ROLL NO. _____

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

AMIETE – CS/IT

Time: 3 Hours **JUNE 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. _____ is the activity of determining which service request should be handled next by a server.

(A) Scheduling
(B) Scanning
(C) Forwarding
(D) Requesting

b. A _____ feature is needed to ensure that the user job does not corrupt the batch monitor code.

(A) Memory security
(B) Memory protection
(C) Memory Synchronization
(D) Memory segmentation

c. Full form of RRAG

(A) Resource Round and Allocated Graph
(B) Round Robin Allocated Graph
(C) Resource Request and Allocation Graph
(D) None of these

d. A _____ is used to speed up address translation.

(A) Dynamic Address translation
(B) Translation look-aside buffer
(C) Paging
(D) Demand-Paging

e. The "blocking factor" of a file is

(A) the number of blocks accessible to a file
(B) the number of blocks allocated to a file
(C) the number of logical records in one physical record
(D) none of these

f. A _____ of a program entity is a reference to the entity which precedes its definition in the program.

(A) Generation **(B)** Forward reference
(C) Phase **(D)** Analysis

g. _____ is the association of an attribute of a program entity with a value.

(A) Identifier **(B)** Associativity
(C) Binding **(D)** Compilation

h. Name the translator that performs some preliminary processing of the source program to reduce the analysis overheads during interpretation.

(A) Pre-processor **(B)** Linker
(C) Loader **(D)** Impure interpreter

i. Address of the origin assigned by the linker while producing a binary program is _____.

(A) Translated origin **(B)** Linked origin
(C) Relocated origin **(D)** Self-relocated origin

j. The _____ is executed when the computer is turned on or restarted.

(A) Cross-Compiler loader **(B)** Relating loader
(C) Boot Strap loader **(D)** Compile and go loader

PART A

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

Q.2 a. What is operating system? Discuss the various features of operating system? **(8)**

b. Explain the following facilities for implementing interacting processes in programming languages and Operating systems:
(i) Fork-Join primitives
(ii) Unix processes **(4x2)**

Q.3 a. Explain Event Control Block (ECB)? With the help of suitable diagram discuss the organization of the different modules of event handler. **(8)**

b. Write down Banker's algorithm for multiple resources? List different Inputs and Data structures used in the algorithm. **(8)**

Q.4 a. What is a semaphore? Explain binary semaphore with the help of an example. **(4)**

b. What is Critical-Section problem? What are the requirements that critical – section problem must satisfy for its solution? **(6)**

c. Discuss the different techniques with which a file can be shared among different users? **(6)**

Q.5 a. With the help of example, discuss overlay? **(6)**

b. Consider a paging system with the page table stored in memory

(i) If a memory reference takes 200 nanoseconds, how long does a paged reference take?

(ii) If we add associative registers, and 75 percent of all page-table references are found in the associative registers, what is the effective memory reference time? (Assume that finding a page-table entry in the associative registers takes zero time, if the entry is there.) **(3+3)**

c. What is the cause of thrashing? How does the system detect thrashing? **(4)**

PART B

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

Q.6 a. Define Intermediate Representation? What are the desirable properties of Intermediate Representation? **(2+2)**

b. Define Grammar of a language. Identify the different classes of grammar. Explain their characteristics and limitations. **(6)**

c. Discuss the different criteria used to classify the data structures used for Language processors? **(6)**

Q.7 a. What is parsing? Give difference between top down parsing and bottom up parsing. **(5)**

b. What are self-relocating programs? Why self-relocating programs are less efficient then relocatable programs? **(7)**

c. The translated origin of the assembly program P is 500. If the program is loaded for execution in the memory area starting with the address 900, calculate the relocation factor of P. **(4)**

Q.8 a. What is assembly language? What are the basic features provided by assembly language that simplifies programming as compared to machine language? **(1+3)**

b. Explain the following Assembler Directives:-
(i) ORIGIN
(ii) EQU
(iii) LTORG
(iv) START & END **(3x4)**

Q.9 a. Consider the following program segment:

```
main()
{
int i, j;
float x, y;
        y = 10; .....(A)
        i = 5;
        x = y + i; .....(B)
}
```

Explain what action the compiler must take during the compilation of assignment statements marked as (A) and (B)? **(6)**

b. What are the features used by compiler during implementing function calls?**(5)**

c. Give an account of the issue pertaining to compilation of "if" statement in C language? **(5)**