ROLL NO. _____

Code: AC59/AT59 Subject: OPERATING SYSTEMS & SYSTEMS SOFTWARE AC110/AT110

AMIETE – CS/IT (Current & New Scheme)

Time: 3 Hours **JUNE 2015** **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. Which amongst the following is not a valid page replacement policy?

(A) LRU policy (Least Recently Used)
(B) FIFO policy (First in first out)
(C) RU policy (Recurrently used**)**
(D) Optimal page replacement policy

b. A scheduler which selects processes from secondary storage device is called

(A) Short term scheduler **(B)** Long term scheduler
(C) Medium term scheduler **(D)** Process scheduler

c. Before proceeding with its execution, each process must acquire all the resources it needs is called

(A) hold and wait **(B)** no pre-emption
(C) circular wait **(D)** starvation

d. Which of the following loader is executed when a system is first turned on or restarted?

(A) Boot loader **(B)** Bootstrap loader
(C) Compile and Go loader **(D)** Relating loader

e. "Throughput" of a system is

(A) Number of programs processed by it per unit time
(B) Number of times the program is invoked by the system
(C) Number of requests made to a program by the system
(D) None of these

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

(A) Recursive Descend **(B)** Operator Precedence
(C) LL(1) parser **(D)** LALR Parser

g. The memory allocation scheme subject to "external" fragmentation is

(A) segmentation **(B)** swapping
(C) pure demand paging **(D)** multiple fixed contiguous partitions

h. Page fault frequency in an operating system is reduced when the

(A) processes tend to the I/O-bound
(B) size of pages is reduced
(C) processes tend to be CPU-bound
(D) locality of reference is applicable to the process

i. An operating system contains 3 user processes each requiring 2 units of resource R. The minimum number of units of R such that no deadlocks will ever arise is

(A) 3 **(B)** 4
(C) 5 **(D)** 6

j. 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) will always lead to a page fault

PART A

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

Q.2 a. Define the following: **(8)**
(i) Process
(ii) Process Control Block (PCB)
(iii) Multi programming
(iv) Time sharing

b. What is an operating system? List the typical functions of operating systems. **(8)**

Q.3 a. Differentiate between pre-emptive and non-pre-emptive scheduling. **(4)**

b. What are the disadvantages of FCFS scheduling algorithm as compared to shortest job first (SJF) scheduling? **(4)**

c. Define deadlock? Explain the necessary conditions for deadlock to occur. **(4)**

d. Write an algorithm for deadlock detection. **(4)**

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

b. What is a race condition? Explain how does a critical section avoid this condition. What are the properties which a data item should possess to implement a critical section? **(6)**

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

Q.5 a. Explain the differences between: **(8)**
(i) Logical and physical address space
(ii) Internal and external fragmentation

b. Why are Translation Look-aside Buffers (TLBs) important? In a simple paging system, what information is stored in a typical TLB table entry? **(8)**

PART B

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

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

b. How can be classified data structures used for language processors? **(8)**

Q.7 a. What is parsing? Explain any three parsing techniques. **(8)**

b. Explain macro definition, macro call and macro expansion. **(8)**

Q.8 a. What are the functions of passes used in two-pass assembler? Explain pass-1 algorithm. **(8)**

b. Describe Data structures used during passes of assembler and their use. **(8)**

Q.9 a. Explain analysis and synthesis phase of a compiler. **(8)**

b. Write short note on code optimization. **(8)**