ROLL NO. _____

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

AMIETE – CS/IT

Time: 3 Hours **JUNE 2014** **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. To avoid the race condition, the number of processes that may be simultaneously inside their critical section is

(A) 8 **(B)** 1
(C) 16 **(D)** 0

b. Which of the following are(is) Language Processor(s)

(A) assembles **(B)** compilers
(C) interpreters **(D)** all of these

c. In virtual memory systems, dynamic address translation

(A) is the hardware necessary to implement paging
(B) stores pages at a specific location on disk
(C) is useless when swapping is used
(D) is part of the operating system paging algorithm

d. Interprocess communication

(A) is required for all processes
(B) is usually done via disk drives
(C) is never necessary
(D) allows processes to synchronize activity

e. The LRU algorithm

(A) pages out pages that have been used recently
(B) pages out pages that have not been used recently
(C) pages out pages that have been least used recently
(D) pages out the first page in a given area

f. Process is

(A) program in high level language kept on disk
(B) contents of main memory
(C) a program in execution
(D) a job in secondary memory

g. _____ OS pays more attention on the meeting of the time limits.

(A) Distributed **(B)** Network
(C) Real time **(D)** Online

h. Debugging is:

(A) creating program code
(B) finding and correcting errors in the program code
(C) identifying the task to be computerized
(D) creating the algorithm.c

i. Which statement is valid about interpreter?

(A) It translates one instruction at a time
(B) Object code is saved for future use
(C) Repeated interpretation is not necessary
(D) All of these

j. The translator program used in assembly language is called

(A) Complier **(B)** Interpreter
(C) Assembler **(D)** Translator

PART A

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

Q.2 a. What are the different states of a process? **(4)**

b. Explain the spooling technology. **(4)**

c. Explain features of any **TWO** of the following OS: **(4+4)**

(i) Distributed System
(ii) Parallel System
(iii) Real Time System
(iv) Threads

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

b. What do you mean by deadlock avoidance? Explain. **(4)**

c. An OS contains 3 resource classes. The number of resource units in these classes is 7, 7 and 10, respectively. The current resource allocation state is as shown below:

	Allocated resources			Maximum requirements		
	R_1	R_2	R_3	R_1	R_2	R_3
Process p_1	2	2	3	3	6	8
Process p_2	2	0	3	4	3	3
Process p_3	1	2	4	3	4	4

(i) Is the current allocation state safe?
(ii) Would the following requests be granted in the current state?
- Process p_1 requests (1, 1, 0)
- Process p_2 requests (0, 1, 0)
- Process p_3 requests (0, 1, 0) **(8)**

Q.4 a. What is Semaphore? Write the code for Producer-Consumer problem using Semaphore. **(8)**

b. Describe principle and domain of protection used to protect a file. **(8)**

Q.5 a. What is thrashing? When does it happen and how does it affect performance? What a user should do to resolve thrashing due to excessive paging? **(8)**

b. Compare and contrast the paging with segmentation. **(8)**

PART B

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

Q.6 a. Briefly describe following two allocation data structures – stacks and heaps. **(5)**

b. What do you understand by the term System Software? **(3)**

c. What are the various *language processing* activities in the domain of system software ? **(4+4)**

Q.7 a. What is parsing? Write down the drawbacks of top down parsing with backtracking. **(5)**

b. Explain Nested Macro calls using suitable example. **(5)**

c. Explain program relocation algorithm. **(6)**

Q.8 a. Mention some advantages of assembly language over machine language. **(6)**

b. What are *assembler directives* in assembly languages? Explain using suitable examples. **(10)**

Q.9 a. Write short note on code optimization. **(6)**

b. Explain analysis and synthesis phase of a compiler. **(6)**

c. Which kind of optimisation is more effective inside loops - space optimisation or time optimisation? Why? **(4)**