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

AMIETE – CS/IT

Time: 3 Hours | **DECEMBER 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. 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

b. Which of the following are 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. Inter process 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. 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

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) Compiler   **(B)** Interpreter
   (C) Assembler   **(D)** Translator

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

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

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

   c. Explain the following: **(4×2)**
       (i)   Distributed System
       (ii) Parallel System
       (iii) Real Time System
       (iv) Threads

Q.3 a. Differentiate between preemptive and non-preemptive scheduling.   **(8)**

   b. What do you mean by deadlock avoidance? Write the Banker's algorithm for
       multiple resources.   **(2+6)**

Q.4 a. Explain and also write the code for Producer-Consumer problem using Semaphore. **(8)**

   b. Describe the different mechanisms used to protect a file. **(8)**

Q.5 a. What is memory allocation? Differentiate between contiguous and non contiguous memory allocation. Explain the concept of virtual memory.**(2+3+3)**

   b. Compare and contrast paging with segmentation. In particular, describe issues related to fragmentation. **(8)**

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

Q.6 a. What are the benefits of using "language processors"? **(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? What do you understand by cross-compilation? **(6+2)**

Q.7 a. Explain the difference between scanning and parsing. **(5)**

   b. Explain the following:
   (i) Macro definition
   (ii) Macro call **(3+3)**

   c. Briefly describe why programming language influence the linking requirements of programs? **(5)**

Q.8 a. Mention some advantages of assembly language over machine language. **(5)**

   b. What are assembler directives in assembly languages? Illustrate with an example the importance of assembler directives. **(2+4)**

   c. Explain the differences between two pass and single pass translation. **(5)**

Q.9 a. What are the major stages in the process of compilation? **(5)**

   b. Write short note on code optimization. **(5)**

   c. Compare and contrast the following parameter passing mechanisms in terms of execution efficiency and power to produce side effects:
   (i) call by value-result
   (ii) call by reference
   (iii) call by name **(6)**