ROLL NO. _____

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

AMIETE – CS/IT (Current & New Scheme)

Time: 3 Hours **June 2019** **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. In which type of Operating System the response time is critical?
(A) Batch Operating System **(B)** Real Time Operating System
(C) Unix Operating System **(D)** Network Operating System

b. Banker's algorithm for recourse allocation deals with
(A) Deadlock resolution **(B)** Deadlock prevention
(C) Deadlock avoidance **(D)** Deadlock Detection

c. One of the following condition is true for a deadlock to occur.
(A) resources cannot be pre-empted **(B)** resources can be shared
(C) circular wait does not exist **(D)** Both **(B)** and **(C)**

d. The memory allocation scheme subject to "external" fragmentation is
(A) multiple fixed contiguous partitions **(B)** swapping
(C) pure demand paging **(D)** segmentation

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

f. Rocket Launching and Telephone Switching equipments are the example of
(A) Network Operating System **(B)** Time Sharing Operating System
(C) Real Time Operating System **(D)** Distributed Operating System

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

h. The syntax of the assembler directive EQU is
(A) <symbol> EQU **(B)** EQU <address space>
(C) EQU <symbol> **(D)** <symbol>EQU<address space>

i. 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

j. In pre-emptive scheduling,
(A) a new request has to wait for its turn in a round robin fashion
(B) shorter jobs get higher priority during scheduling
(C) a new request can be serviced before the completion of a request scheduled earlier
(D) scheduling is according to a pre-determined order

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

Q.2 a. Explain the process control block (PCB). Explain its contents through its diagram. **(8)**

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

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

Q.3 a. Not every unsafe state leads to a deadlock. Give an example to show that the processes in an unsafe state complete their execution without entering a deadlock state. **(5)**

b. What is dispatch latency? How does it affect Real time scheduling? Suggest some solutions to keep dispatch latency low. **(5)**

c. Explain various deadlock handling techniques. **(6)**

Q.4 a. Describe the implementation of semaphores in attaining process synchronization. Explain any two classical process synchronization problems. **(3+6)**

b. What is Semaphore? Write the code for Producer-Consumer problem using Semaphore. **(7)**

Q.5 a. 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.) **(2+2)**

b. Write short notes on the following:
(i) Major file allocation strategies for files.
(ii) Pre-emptive and Non-Pre-emptive scheduling algorithms.
(iii) Banker's Algorithm. **(4×3)**

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

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

b. Explain in detail any two allocation data structures. **(10)**

Q.7 a. What is macro? Identify and explain the different kinds of macro expansion. **(6)**

b. Explain Top-Down parsing algorithm with the help of the following example:
Source String <id>+<id>*<id> to be parsed according to given grammar

E::=T+E|T
T::=V*T|V
V::= <id>

What advantages one will have due to elimination of backtracking in top down parsing? **(10)**

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

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

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

Q.9 a. What are the features that a compiler uses to implement function calls? **(4)**

b. What is an interpreter? Discuss briefly three main components of the interpreter. **(8)**

c. Write short notes on Dynamic and Static Pointer. **(4)**