ROLL NO. _____

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

AMIETE – CS/IT (Current & New Scheme)

Time: 3 Hours **June 2018** **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 main function of the command interpreter is
(A) to get and execute the next user-specified command
(B) to provide the interface between the API and application program
(C) to handle the files in operating system
(D) none of these

b. When the process issues an I/O request:
(A) It is placed in an I/O queue **(B)** It is placed in a waiting queue
(C) It is placed in the ready queue **(D)** It is placed in the Job queue

c. In the bakery algorithm to solve the critical section problem:
(A) each process is put into a queue and picked up in an ordered manner
(B) each process receives a number (may or may not be unique) and the one with the lowest number is served next
(C) each process gets a unique number and the one with the highest number is served next
(**D)** each process gets a unique number and the one with the lowest number is served next

d. Which one of the following is a visual (mathematical) way to determine the deadlock occurrence?
(A) Resource allocation graph **(B)** starvation graph
(C) inversion graph **(D)** none of these

e. Which one of the following explains the sequential file access method?
(A) random access according to the given byte number
(B) read bytes one at a time, in order
(C) read/write sequentially by record
(D) read/write randomly by record

f. Load address for the first word of the program is called
(A) Linker address origin **(B)** Load address origin
(C) Phase library **(D)** Absolute library

g. Parsing is also known as
(A) Lexical Analysis **(B)** Syntax Analysis
(C) Semantic Analysis **(D)** Code Generation

h. Logical extension of computation migration is
(A) process migration **(B)** system migration
(C) thread migration **(D)** data migration

i. If there are 32 segments, each of size 1Kb, then the logical address should have :
(A) 13 bits **(B)** 14 bits
(C) 15 bits **(D)** 16 bits

j. If the size of logical address space is 2 to the power of m, and a page size is 2 to the power of n addressing units, then the high order _____ bits of a logical address designate the page number, and the ____ low order bits designate the page offset.
(A) m, n **(B)** n, m
(C) m – n, m **(D)** m – n, n

PART A (Operating Systems)
Answer at least TWO questions. Each question carries 16 marks.

Q.2 a. What are Multiprocessor Systems? Explain different types of Multiprocessing system & give their advantages? **(4)**

b. What is meant by Real time system? What are the types of Real time systems nd the applications of real-time systems? **(4)**

c. What is threads and how it provides concurrency in application? How we implement threads in Kernel? What are the advantages of threads? **(8)**

Q.3 a. How can deadlock be detected? Explain **(4)**

b. Write about the various CPU scheduling algorithms. **(4)**

c. Consider the following five processes, with the length of the CPU burst time given in Milliseconds.

Process	Burst time
P1	10
P2	29
P3	3
P4	7
P5	12

Consider the First come First serve (FCFS), Non Preemptive Shortest Job First (SJF), Round Robin (RR) (quantum=10ms) scheduling algorithms. Illustrate the scheduling using Gantt chart. Which algorithm will give the minimum average waiting time? Discuss. **(8)**

Q.4 a. Explain Bakery Algorithm. **(4)**

b. What is the important feature of critical section? State the dining philosopher's problem and show how to allocate the several resources among several processes in a deadlock and starvation free manner? **(4)**

c. How Disk Space Allocation is performed for creating or updating the file in the disk space? And how file sharing semantics works to access that files. **(8)**

Q.5 a. Explain the basic concepts of segmentation and paging. **(4)**

b. What is virtual memory? Mention its advantages. **(4)**

c. Explain page replacement algorithms. **(8)**

PART B (Systems Software)
Answer at least TWO questions. Each question carries 16 marks.

Q.6 a. Explain in brief about language processing activity. **(8)**

b. What type of data structures are used for language processors? **(8)**

Q.7 a. What is parsing? What are the approaches for parsing? **(4)**

b. Draw the parse tree and abstract syntax tree for the source string a-b*c/d. **(4)**

c. What is Macro Expansion? List the key notions concerning macro expansion. Write an algorithm to outline the macro-expansion using macro-expansion counter. **(8)**

Q.8 a.What is assembler? **(3)**

b. Design the two-pass assembler. **(5)**

c. Describe data structure used for the assembler. **(8)**

Q.9 a.What are the differences between Compiler and Interpreter? **(4)**

b. Explain the difference between Static and Dynamic Memory Allocation. **(4)**

c. Explain various parameter passing techniques. **(8)**