ROLL NO. _____

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

AMIETE – CS/IT (Current & New Scheme)

Time: 3 Hours **December - 2017** **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. _____examines the information in PCB's to select a process for execution and hands over its PCB to the dispatcher.
(A) Process dispatcher **(B)** Process scheduler
(C) Process terminator **(D)** Event handler

b. Elimination of redundancies in program statements and rearranging of program statements without the change in logic are features of _____.
(A) code optimization **(B)** interpreters
(C) parameter passing **(D)** code fragmentation

c. 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

d. 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

e. 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

f. Which of the following are(is) Language Processor(s)
(A) assembles **(B)** compilers
(C) interpreters **(D)** all of these

g. Analysis which determines the meaning of a statement once its grammatical structure becomes known is termed as
(A) Syntax analysis **(B)** Semantic analysis
(C) Code analysis **(D)** None of these

h. In _____, a programmer identifies the logical entities in his/her program and declares them as program components for the purpose of virtual memory implementation.
(A) Paging **(B)** Demand segmentation
(C) Segmentation **(D)** Fragmentation

i. Processes synchronization means
(A) all processes start at the same time
(B) one process starts as soon as another process ends
(C) a process performs an action only when some other process(es) reach specific points in their execution
(D) none of the above

j. Distributed systems provide
(A) Resource sharing. **(B)** Speed.
(C) Reliability **(D)** All of these.

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

Q.2 a. Distinguish between multiprogramming and multiprocessing systems. **(4)**

b. What is cooperating process? Give reasons for providing an environment that allows process cooperation. **(4)**

c. List typical functionalities of an OS Kernel. What are the disadvantages of the layered OS model based on Kernels that became primary motivation for a microkernel? **(8)**

Q.3 a. Consider the following set of processes: **(7)**

Process Name	Arrival Time	Processing Time
A	0	7
B	1	5
C	2	2
D	3	4

Find the average turn round time for the FCFS, SJF and RR (time quantum = 4) non-preemptive CPU scheduling methods.

b. Compare the following scheduling algorithms with an example:
(i) FCFS (ii) SJF
(iii) Priority Based **(3x3)**

Q.4 a. Discuss the different techniques with which a file can be shared among different users. **(6)**

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

c. What is Critical-Section problem? What are the requirements that critical – section problem must satisfy for its solution? **(6)**

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. Describe the First fit, Best fit and Worst fit allocation algorithms. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K and 426K (in order)? Which algorithm makes the most efficient use of memory? **(6+2)**

PART B

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

Q.6 a. What are the various *language processing* activities in the domain of system software ? **(4+4)**

b. Discuss about intermediate representation of programs. **(4)**

c. Discuss the different criteria used to classify the data structures used for Language Processors? **(4)**

Q.7 a. Give the specifications of LEX scanner with regular expression and respective semantic actions. **(6)**

b. What is parsing? Write down the drawback of top down parsing using backtracking. **(5)**

c. Differentiate between non-relocatable, relocatable and self relocatable programs. **(5)**

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

b. What are assembler directives in assembly languages? Illustrate with an example the importance of assembler directives. **(3+5)**

Q.9 a. Explain analysis and synthesis phase of a compiler. **(6)**

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

c. Consider the following program segment:

```
main()
{
int i, j;
float x, y;
        y = 10; .....(A)
        i = 5;
        x = y + i; .....(B)
}
```

Explain what action the compiler must take during the compilation of assignment statements marked as (A) and (B)? **(6)**