ROLL NO. _____

Code: DC61/DC110
Subject: OPERATING SYSTEMS & SYSTEMS SOFTWARE

DipIETE – CS (Current & New Scheme)

Time: 3 Hours **DECEMBER 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. _____ is used to bridge an execution gap without generating a machine language program.
(A) source program **(B)** interpreter
(C) target program **(D)** compiler

b. If the Disk head is located initially at 32, find the number of disk moves required with FCFS if the disk queue of I/O block requests are 98,37,14,124,65,67.
(A) 315 **(B)** 324
(C) 310 **(D)** 321

c. What is the task of the PASS II in a two-pass assembler?
(A) separate the symbol, mnemonic opcode and operand fields.
(B) synthesize the target program
(C) construct intermediate code
(D) build the symbol table

d. In a _____ real time system, it is guaranteed that critical real time tasks will be completed within their deadlines.
(A) soft **(B)** critical
(C) hard **(D)** None of these

e. A Dead-lock in an Operating System is
(A) Definite waiting process **(B)** Desirable process
(C) Undesirable process **(D)** All of these

f. _____ OS pays more attention on the meeting of the time limits
(A) Distributed **(B)** Network
(C) Online **(D)** Real time

g. The operating system manages _____.
(A) Disk and I/O devices **(B)** Processor
(C) Memory **(D)** All of these

h. OS performs the following actions when a new process is created:
(i) Allocates the memory and other resources to the process.
(ii) Assigns process id and priority
(iii) Creates a process control block (PCB) for the process
(iv) Sets up the process environment
(v) Initializes resource accounting information for the process.
What would be the correct sequence of the above actions?
(A) 4, 3, 1, 2, 5 **(B)** 3, 2, 1, 4, 5
(C) 4, 3, 5, 2, 1 **(D)** 3, 4, 2, 5, 1

i. In a two-pass assembler, the task of the Pass II is to
(A) construct intermediate code
(B) build the symbol table
(C) separate the symbol, mnemonic opcode and operand fields
(D) synthesize the target program

j. Relocatable programs
(A) cannot be used with fixed partitions
(B) can be loaded almost anywhere in memory
(C) do not need a linker
(D) can be loaded only at one specific location

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

Q.2 a. There are different ways in which resources can be shared by a set of programs. Discuss them briefly. **(8)**

b. Write the different ways in which the pthread terminates. **(4)**

c. Explain the various components of Process Control Block. **(4)**

Q.3 a. What is process scheduling? Explain the different sub-functions of process scheduling. **(8)**

b. State and explain the necessary conditions for deadlock to occur. **(4)**

c. Summarise the features of the multiprogramming scheduler. **(4)**

Q.4 a. Write a short note on each of the following: **(4+4)**
(i) Critical Section (ii) Semaphores

b. What is Context Switch? **(3)**

c. Explain the allocation method of disk space. **(5)**

Q.5 a. What is virtual memory using Demand Paging? Describe with the help of a diagram. **(8)**

b. Consider a page reference string and its reference-time string for a program as given below:
page reference string: 1,1,2,1,1,1,3,1,3,...
reference time string: $t_0,t_1,t_2,t_3,t_4,t_5,t_6,t_7,t_8,...$
Here page 1 was referenced at the logical time instants t_0,t_1,t_3,t_4,t_5 and t_7.
Discuss and describe the performance of First-in-first-out (FIFO) page replacement policy and Least Recently Used(LRU) page replacement policy , when alloc= 2, where alloc refers to the number of page blocks i.e amount of memory available. **(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. How the data structures used for language processors are classified? Explain. **(8)**

Q.7 a. What is parsing? Write down the algorithm for bottom up parsing. **(6)**

b. Explain the term self relocating program. **(2)**

c. Define Macro Definition Call. **(2)**

d. What are the different information contained by the object module of a program to relocate the link of the program with other programs? **(6)**

Q.8 a. What is assembler and also write about task performed by the passes of a two pass assembler? **(8)**

b. Discuss the concept of assembly language programming. **(8)**

Q.9 a. Write short notes on 'A toy code generator for expressions'. **(8)**

b. Explain static and dynamic memory allocation models of memory allocation. What is automatic allocation and program controlled allocation? **(8)**