

**S.E. (Computer Engg.) (First Semester) EXAMINATION, 2010**

**PROGRAMMING AND PROBLEM SOLVING**

**(2008 COURSE)**

**Time : Three Hours**

**Maximum Marks : 100**

- N.B. :—** (i) Answer *three* questions from Section I and *three* questions from Section II.
- (ii) Answers to the two Sections should be written in separate answer-books.
- (iii) Neat diagrams must be drawn wherever necessary.
- (iv) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
- (v) Assume suitable data, if necessary.

**SECTION I**

1. (a) Consider any *one* problem and solve that problem using six steps of problem solving. Explain each step in detail. [8]
- (b) State and explain any *four* difficulties with problem solving. [4]
- (c) Compare an algorithmic solutions and heuristic solution. Support your answer with suitable example. [4]

*Or*

2. (a) The railway ticket reservation system (single counter) is to be computerized. Prepare solution to this problem using the following tools :
- (i) IPO chart
- (ii) Problem analysis chart
- (iii) Interactivity chart. [8]
- (b) Write a pseudo code algorithm to solve the problem given in Q. 2 (a). [4]

P.T.O.

- (c) What is the order of processing of the following equations ?  
 $R = P < Q \text{ AND } S * T \text{ OR } U > V + W - C/3$   
 $R = A + (((B - C)/D) + E ^ F + (G - H) * I) ^ (J - K)$  [4]

3. (a) Write an algorithm to calculate and print result of your exam. (Semester – I). Identify the modules (functions) and the parameters to find the solution to this problem. Create a data dictionary for the parameters you have identified. [8]
- (b) Draw and explain coupling diagram for problem given in Q.3 (a). [4]
- (c) Take three integers and find the minimum integer among three. Create a decision table to solve this problem. [4]

*Or*

4. (a) Design an algorithm to calculate the salary of an employee using the following problem solving strategies :
- (i) Sequential logic
  - (ii) Decision logic
  - (iii) Iterative logic
  - (iv) Selection.
- To calculate the salary consider designation, no. of days worked, wages per day, basic salary, allowances, and deductions. Calculate salary according to the designation of an employee. [8]
- (b) What are the different parameters passing methods ? Explain each method with suitable example. [4]
- (c) Explain the concept of local variables and global variables with suitable example. [4]
5. (a) How one can develop efficient computer solutions to problem ? [4]
- (b) Design and explain an algorithm to find the sum of the digits of an integer number. [6]

- (c) Design an algorithm for exchanging values of two variables. Explain one application in detail in which we use this algorithm. [8]

*Or*

6. (a) State and explain the rules for designing modules while finding solution to a problem. [4]
- (b) Design and explain an algorithm for finding the multiplication of set of numbers. [6]
- (c) Design an algorithm to calculate a result of 'N' students of a class and find number of students passed in grades distinction, first class, higher second class, second class, pass class. Also find count value of failed students.  
(For result consider the subjects of S.E. Computer Semester-I) [8]

## SECTION II

7. (a) Design an algorithm to find the maximum absolute difference between adjacent pairs of element in an array of 'N' elements. [6]
- (b) Write an algorithm to find the frequency of each vowel in a line of text. [6]
- (c) Devise and write a pseudo algorithm to remove duplicate elements from two-dimensional array. [6]

*Or*

8. (a) Design an algorithm to find the maximum number occurs and how many times it occurs in an array of 'N' elements. Only one pass should be made. [6]
- (b) Write a pseudo algorithm to find the sum of rows, sum of columns, and sum of major diagonal of a square matrix ( $N \times N$ ). [6]
- (c) Design an algorithm to search an integer number from an array of 'N' elements. Use binary search. [6]

9. (a) Write a pseudo algorithm for text length adjustment. Explain it. [4]
- (b) Write and explain an algorithm for left and right justification for text. [6]
- (c) Write and explain an algorithm that will search a string in a text. [6]

*Or*

10. (a) Take two ordered sets of numbers 'A' and 'B'. Design an algorithm to determine whether or not the set 'A' is contained within the set 'B'. [4]
- (b) Design and explain an algorithm that will search a line of text for particular substring. [6]
- (c) Write and explain an algorithm to count the number of times a particular word occurs in a text. [6]

11. (a) Explain the following features of an object oriented programming with suitable examples : [8]
- (i) Polymorphism
- (ii) Encapsulation.
- (b) Write a C++ program to implement the concept of inheritance with suitable examples. [8]

*Or*

12. (a) Explain with example : [8]
- (i) Visibility modifiers of C++
- (ii) Constructor
- (iii) Destructor. [8]
- (b) Compare procedural language and object oriented language for solving problems. What are their advantages and disadvantages ? [8]