Total No. of Questions—**12**] [Total No. of Printed Pages—**4+2**

[4062]-202

S.E. (Computer Engg.)

(First Semester) EXAMINATION, 2011

PROGRAMMING AND PROBLEM SOLVING

(2008 PATTERN)

Time : Three Hours **Maximum Marks : 100**

N.B. :— (*i*) Answer any *three* questions from each Section.

(*ii*) Answers to the two Sections should be written in separate answer-books.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Figures to the right indicate full marks.

(*v*) Assume suitable data, if necessary.

SECTION I

1. (*a*) Develop a flow chart for the instructions for withdrawing money from an ATM machine. Be sure to include all steps, such as card validation. [8]

(*b*) Evaluate for A = 5, B = 3 and C = 2 : [8]

(*i*) F = A * C \ (A + C)

(*ii*) F = 3 * B / A ^ 2

(*iii*) F = (A + 7 – C) MOD B

(*iv*) F = (C * (B + 3 * A) + 5 * A) / C.

P.T.O.

Or

2. (*a*) Draw interactivity chart and IPO chart to balance your check-book. [8]

(*b*) Define a function. Explain each category with a suitable example. [4]

(*c*) Set up an equation to calculate the following : [4]

(*i*) The average of 3 numbers

(*ii*) The sale price of an item given an original price and a discount percentage.

3. (*a*) An admission charge for a theater varies according to the age of the person. Using positive logic, develop a solution to print the ticket charges given the age of the person : [8]

Age	Charges
over 55	Rs. 150
21—54	Rs. 250
13—20	Rs. 150
3—12	Rs. 100
under 3	free

(*b*) Explain what is meant by the cohesion of a module and the coupling of modules. [5]

(c) What is a Data Dictionary ? Build a data dictionary for the parameters in the problem. Calculate salary of an employee; according to designation, No. of days worked, wages per day and deductions. [5]

Or

4. (a) Make a decision table and draw a flow chart for the following set of conditions : [8]

Gross Income	Tax Rate
Gross < = 5,000	5%
5,000 – 10,000	8%
10,000 – 15,000	10%
Gross > 15,000	15%

(b) Explain with a suitable example the parameter passing between modules. [5]

(c) Name the major types of modules and explain their functions. [5]

5. (a) Design an algorithm that for the integers in the range 1 to 100 finds the number that has the most divisors. [8]

(b) Design an algorithm that will reverse the digits in a given number. For e.g. algorithm should convert the number 251 to the number 152. [8]

Or

6. (*a*) Design an algorithm to iteratively compute the reciprocal of a number. [8]

(*b*) Design an algorithm that converts binary numbers to hexadecimal. [8]

SECTION II

7. (*a*) Design an algorithm to find the second largest value in an array of n elements. [8]

(*b*) Write an algorithm for searching a number in an array using binary search technique. [8]

Or

8. (*a*) Write short notes on : [8]

(*i*) Pointer technique

(*ii*) Table look up technique.

(*b*) An instructor has a class of 25 students. Each student is identified by a number from 1 to 25. All tests are stored in a 2-dimensional array, with each column containing the grades for each test. The instructor would like to enter the student number and the test number and have the grade for that test printed on the monitor. Develop a solution to output the needed information. [8]

9. (*a*) Design and implement a word searching algorithm that on finding a mismatch with the current word simply reads characters to the start of the next word before attempting a match again. [8]

(*b*) Explain algorithm for line editing. [8]

Or

10. (*a*) Design and implement an algorithm that reverses the justification process by removing multiple blanks. Paragraph indentations should be preserved. [8]

(*b*) Design an implement an algorithm that will search a line of text for a particular pattern or substring. [8]

11. (*a*) Explain multiple inheritance. Elaborate your answer with suitable example. [6]

(*b*) Write a C++ program to find the average of *five* numbers. [6]

(*c*) What is the advantage of encapsulation in object oriented program. Explain with a suitable example. [6]

Or

12. (*a*) Explain with a suitable example how code reusability is achieved in C++. [6]

(*b*) Write a C++ program to implement the concept of polymorphism. [6]

(*c*) Explain the following terms : [6]

(*i*) Access specifier

(*ii*) Static member functions.