Enrollment No......................................

Faculty of Engineering
End Sem (Odd) Examination Dec-2018
IT3CO01 Introduction to Problem Solving and Programming

Programme: B.Tech.   Branch/Specialisation: IT

Duration: 3 Hrs.   **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Second step in problem solving process is to: **1**
       (a) Practicing solution   (b) Organizing data
       (c) Design a solution   (d) Define a problem

   ii. There are _____ steps in the problem solving and decision making   **1**
       process.
       (a) Nine   (b) Seven   (c) Five   (d) Six

   iii. Numbers that are written with base 8 are classified as   **1**
       (a) Octal numbers   (b) Hexadecimal
       (c) Two digit positive integers   (d) Real numbers

   iv. Code used in computing 'BCD' stands for   **1**
       (a) Binary coded decimal   (b) Binary coded digits
       (c) Binary characters digits   (d) Binary conducting digits

   v. Which of the following is the advantage of declarative languages over   **1**
       imperative languages?
       (a) Can use abstract data type;
       (b) Easy to verify the properties of the program;
       (c) Is more efficient
       (d) Can be strong-typed.

   vi. The combination of the top-down and the bottom-up approach may be   **1**
       referred to as an:
       (a) Interactive approach   (b) Interpretive approach
       (c) Integrative approach   (d) All of these

vii. A decision table **1**
    (a) Represents the information flow
    (b) Documents rules, that select one or more actions, based on one or more conditions, from a set of possible conditions.
    (c) Gets an accurate picture of the system
    (d) Shows the decision paths

viii. Diamond shaped symbol is used in flowcharts to show the **1**
    (a) Decision box   (b) Statement box
    (c) Error box   (d) If-statement box

ix. Method which uses a list of well defined instructions to complete a task starting from a given initial state from a given initial state to end state is calls as **1**
    (a) Program   (b) Flowchart   (c) Algorithm (d) Both (a) & (b)

x. Which of the following is a program planning tool? **1**
    (a) Sequential   (b) Decision
    (c) Pseudo code   (d) Both (b) and (c)

Q.2 i. What is heuristic solution to a problem? **2**
  ii. What are main difficulties to Problem Solving? **3**
  iii. For each of the following tasks, write a set of numbered, step-by-step instructions (a solution) so complete that another person could perform the task without asking questions. Define the knowledge base of this person by listing what you expect the person to know in order to follow your directions. For example, for task "a" (below), make a cup of cocoa, the knowledge base might include such things as knowledge of milk or water, a refrigerator, pan, spoon, cocoa, cup, range top or microwave, and so forth. **5**
    (a) Make a cup of cocoa.   (b) Sharpen a pencil.

OR iv. State a reason why each of the six problem-solving steps is important in developing the best solution for a problem. Give one reason for each step. **5**

Q.3   Attempt any two:
  i. Write a solution to the problem of finding the largest number out of three numbers. **5**

ii. Write a solution to the problem of Computing the nth Fibonacci Number. **5**
iii. Write a solution to the problem of Generating Prime Numbers. **5**

Q.4 i. What is the difference between an event and a user-defined event? **3**
  ii. Differences between imperative and declarative programming with example. **7**
OR iii. Explain top down and bottom up approach with suitable example. **7**

Q.5 i. What are the main limitations of Flow Chart? **2**
  ii. What is the difference between a decision tree and a flow chart apart from how they are drawn? **3**
  iii. You are given hundred numbers divided in ten sets in the following order. **5**
    Set 1: 1-10
    Set 2: 11-20
    Set 3: 21-30
    …
    Set 10: 91-100
    You have to draw a flowchart that will print the sum of each set.
OR iv. What are the rules to create a decision table? Illustrate with example. **5**

Q.6 i. What are the main steps to write an algorithm? **2**
  ii. What do you mean by a term Analysis of Algorithm? **3**
  iii. Write pseudo code that performs the following: Ask a user to enter a number. If the number is between 0 and 10, write the word blue. If the number is between 10 and 20, write the word red. If the number is between 20 and 30, write the word green. If it is any other number, write that it is not a correct color option. **5**
OR iv. Write an algorithm for given problem: Input 100 positive (>=0) numbers. Add up the numbers, and print the total. If a negative number is encountered, the program should terminate, and print the sum so far. **5**

******

<div align="center">

Marking Scheme

IT3CO01 Introduction to Problem Solving and Programming

</div>

Q.1 i.   Second step in problem solving process is to: **1**
    (c) Design a solution

  ii.   There are _____ steps in the problem solving and decision making   **1**
    process.
    (b) Seven

  iii.   Numbers that are written with base 8 are classified as   **1**
    (a) Octal numbers

  iv.   Code used in computing 'BCD' stands for   **1**
    (a) Binary coded decimal

  v.   Which of the following is the advantage of declarative languages over   **1**
    imperative languages?
    (b) Easy to verify the properties of the program;

  vi.   The combination of the top-down and the bottom-up approach may be   **1**
    referred to as an:
    (a) Interactive approach

  vii.   A decision table   **1**
    (b) Documents rules, that select one or more actions, based on one or more
        conditions, from a set of possible conditions.

  viii.   Diamond shaped symbol is used in flowcharts to show the   **1**
    (a) Decision box

  ix.   Method which uses a list of well defined instructions to complete a task   **1**
    starting from a given initial state from a given initial state to end state is
    calls as
    (c) Algorithm

  x.   Which of the following is a program planning tool?   **1**
    (d) Both (b) and (c)

Q.2 i.   Heuristic solution to a problem   **2**

  ii.   Difficulties to Problem Solving   **3**
    Minimum 3 points

  iii.   (a) Make a cup of cocoa.   2.5 marks   **5**
    (b) Sharpen a pencil.   2.5 marks

OR iv.   Six problem-solving steps is important in developing the best solution   **5**
    for a problem

Q.3   Attempt any two:

  i.   Solution for finding the largest number out of three numbers.   **5**
  ii.   Solution for Computing the nth Fibonacci Number.   **5**
  iii.   Solution for Generating Prime Numbers.   **5**

Q.4 i.   Difference between an event and a user-defined event   **3**
    Minimum 3 points

  ii.   Differences b/w imperative and declarative programming with example.   **7**
    Minimum 7 points

OR iii.   Top down and bottom up approach with example.   **7**
    Minimum 7 points

Q.5 i.   Limitations of Flow Chart?   **2**

  ii.   Difference between a decision tree and a flow chart apart from how they   **3**
    are drawn. Minimum 3 points

  iii.   You are given hundred numbers divided in ten sets in the following   **5**
    order.
    Set 1: 1-10
    Set 2: 11-20
    Set 3: 21-30
    …
    Set 10: 91-100
    You have to draw a flowchart that will print the sum of each set.

OR iv.   Rules to create a decision table with example.   **5**

Q.6 i.   Steps to write an algorithm   **2**
  ii.   Analysis of Algorithm   **3**
  iii.   Ask a user to enter a number.   **5**
    If the number is between 0 and 10, write the word blue.
    If the number is between 10 and 20, write the word red.
    If the number is between 20 and 30, write the word green.
    If it is any other number, write that it is not a correct color option.

OR iv.   Write an algorithm for given problem: **5**
    Input 100 positive (>=0) numbers.
    Add up the numbers, and print the total.
    If a negative number is encountered, the program should terminate, and
    print the sum so far.

<div align="center">

******

</div>