Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

II SEMESTER B.TECH. (COMMON TO ALL BRANCHES)
END SEMESTER EXAMINATIONS, APRIL / MAY 2017
SUBJECT: PROBLEM SOLVING USING COMPUTERS [CSE 1001]

REVISED CREDIT SYSTEM
(29/04/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:
- Answer **ALL** questions.
- Missing data may be suitable assumed.

1A. State any **Four (4)** functions of control unit. Identify, to which software classification the following software products belong to?

i) Disk Fragmentation Utility
ii) Database

3M

1B. Describe any **FOUR (4)** properties of an Algorithm. Draw a flowchart to print the following sequence.

```
1 2 3 4 5 6 7 8 9
2 3 4 5 6 7 8 9
3 4 5 6 7 8 9
4 5 6 7 8 9
5 6 7 8 9
6 7 8 9
7 8 9
8 9
9
```

4M

1C. Explain type cast operator with an example. Showing all intermediate steps, evaluate the following expression.

-2 + 11 - 7 * 9 % 6 / 12

3M

2A. Write a C++ program that takes basic salary, grade of an employee and computes the net salary by using only conditional operator. The bonus depends on the following three grades.

Employee Grade	Bonus
1001	2000
1002	5000
1003	7500

Net Salary can be computed as basic salary + bonus.

2M

2B. Explain the syntax and draw the flowchart of else-if ladder. Write a C++ program that takes units consumed from the user, to compute and display electricity bill according to the conditions given in ***Table – 1*** in ***page 2***. Use switch case.

Units Consumed	Charges
1 – 200	Rupees. 0.50 per unit
201 – 400	Rupees. 0.65 per unit
401 – 600	Rupees. 0.75 per unit
> 600	Rupees. 1 per unit

Table – 1 **4M**

2C. Distinguish between break and continue statement by giving suitable example for each. Write a C++ Program to calculate the sum of the following series for any input value N.

$$\frac{2}{3!}+\frac{3}{4!}+\frac{4}{5!}+\cdots+\frac{N}{(N+1)!}$$

4M

3A. Explain the declaration of a one dimensional array with syntax and example. Write a C++ program to read and display 1D array. Also display the number of repeated elements in the array, otherwise display "No repeated elements found". **4M**

3B. Write a single complete C++ program to do the following:
(a) Read a 2D array of integer elements and display in matrix form.
(b) Sort the array elements in each row (row-wise) in ascending order and display the resultant matrix. **3M**

3C. Write a C++ program to accept a string from the user and display the string after deleting vowels in it. Make use of check_vowel( ) function to check if a character of the accepted string is vowel. **3M**

4A. Write and explain the general form of a function prototype. Describe why and when do we require function prototype. Write the function prototype for the function ***Minimum*** which takes 3 parameters of type float and returns a minimum value from the 3 parameters passed. **3M**

4B. Describe the rules of passing a 1D array to a function. Write a C++ program to read a 2D array, display it in matrix form and pass the 2D array into a function to check and display whether the array is a sparse matrix or not.
[Hint: Sparse matrix is a special matrix such that [*(m * n) / 2*] or more elements of the matrix are zero, where m and n are the row and column size of the matrix.] **4M**

4C. Write a C++ Program to display the binary equivalent of an input integer number using recursion. **3M**

5A. Write a C++ program to create a structure of Library Inventory that accepts 4 books details such as name, quantity and price using pointer to access structure members and displays the books details in ascending order of quantity of books. **3M**

5B. Explain inheritance and polymorphism with example for each. Write a C++ program to read and display employee details using class concept. The class definition will have the following data members and member functions:

Data Members	Member Functions
Employee id	inputData() method to read the employee details
Employee name	display() method to display the employee details
Employee salary	

5M

5C. Write any **FOUR (4)** measures to prevent cyber-crimes and threats. **2M**