Please check that this question paper contains 9 questions and 3 printed pages within first ten minutes.

[Total No. of Questions: 09] [Total No. of Pages: 3]

Uni. Roll No. .....

Program: B.Tech. (Batch 2018 onward)
Semester: 1ST /2ND
Name of Subject: Programming for Problem Solving
Subject Code: ESC-104
Paper ID: 15935
Scientific calculator is Not Allowed

Time Allowed: 03 Hours **Max. Marks: 60**

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately. For programs, it is expected that suitable assumptions are made and stated wherever micro-level requirement related to the code to be developed is not mentioned.

Part – A **[Marks: 02 each]**

Q1

a) Differentiate between algorithm and pseudocode

b) Justify quoted text with example, "A pointer stores the memory address of a variable".

c) How many passes does a Bubble sort algorithm require for sorting a given list of 'n' items? Give example.

d) Differentiate between semantic and logical errors.

e) Is it possible to declare more than one array in the same declaration statement? Justify you answer.

f) What will be the output of following code?

```
int main ( )
{
int i,j;
for(i=2;i<=4;i++)
  {
  for(j=2;j<=4;j++)
    {
    if(++i ==3 || --j==3)
      {
       continue;
      }
     printf(" %d",i);
     printf(" %d",j);
     if(++i==5 || --j==4)
       {
       break;
       }
    }
  }
printf(" %d",i);
printf(" %d",j);
return 0;
}
```

Part – B **[Marks: 04 each]**

Q2 With the help of block-diagram, explain components of computer system.

Q3 Write steps for conversion of source code to executable code with the help of a diagram.

Q4 Explain recursion with the help of an example.

Q5 Create a user-defined function to find the sum of digits of any positive integer number read through the keyboard. Make use of parameter passing and return type concepts.

Q6 Construct a flowchart and write an algorithm to find how many times the digit 'D' appears in the number 'N'.

Q7 Develop a code that accepts an array, interchanges the first element with the last element, the second element with the second last element, and so on, and finally prints the new array.

Part – C [Marks: 12 each]

Q8 Explain selection and insertion sort algorithms. Also implement the same.

OR

Write a program to multiply two 2-D arrays.

Q9 Develop a menu driven code that does the following:

If '**A**' is entered, user-defined function '**isPalindrome**' must be able find whether number entered by user is palindrome or not.

If '**B**' is entered, user-defined function '**add**' must be able to add positive two numbers which are read through the keyboard.

If any other 'character' is entered, code must be able to terminate with a suitable message.

[Make use of parameter passing and return type concepts while developing code.]

OR

Create a structure '**Student**' that contains the fields like: **studentID**, **name**, **age**, and **marks**. Write a program that allows the user to perform the following tasks:

Input student details (ID, name, age, marks) for '**n**' students (where '**n**' is read through the keyboard).

Display the details of all students in the record.

Find and display details of student who has highest marks.

In your program, make use of an array of structures and functions.

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