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## COMPUTER APPLICATIONS

(Theory)

(Two Hours)

*Answers to this Paper must be written on the paper provided separately.*

*You will **not** be allowed to write during the first 15 minutes.*

*This time is to be spent in reading the question paper.*

*The time given at the head of this Paper is the time allowed for writing the answers.*

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*This Paper is divided into two Sections.*

*Attempt **all** questions from **Section A** and **any four** questions from **Section B**.*

*The intended marks for questions or parts of questions are given in brackets [ ].*

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### SECTION A (40 Marks)

*Attempt **all** questions*

#### Question 1.

- (a) Why is a class called a *factory of objects*? [2]
- (b) State the difference between a boolean literal and a character literal. [2]
- (c) What is the *use and syntax* of a ternary operator? [2]
- (d) Write one word answer for the following:
  - (i) A method that converts a string to a primitive integer data type.
  - (ii) The *default initial value* of a boolean variable data type. [2]
- (e) State one similarity and one difference between *while* and *for* loop. [2]

#### Question 2.

- (a) Write the function prototype for the function "sum" that takes an integer variable (x) as its argument and returns a value of float data type. [2]
- (b) What is the use of the keyword *this*? [2]
- (c) Why is a class known as composite data type? [2]
- (d) Name the keyword that:
  - (i) is used for allocating memory to an array.
  - (ii) causes the control to transfer back to the method call. [2]
- (e) Differentiate between pure and impure function. [2]

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**This Paper consists of 5 printed pages and 1 blank page.**

**Question 3.**

- (a) Write an expression for  $\frac{(a+b)^n}{\sqrt{3}+b}$  [2]

- (b) The following is a segment of a program.

```
x = 1; y = 1;
if (n>0)
{
    x=x+1;
    y=y-1;
}
```

What will be the value of x and y, if n assumes a value (i) 1 (ii) 0? [2]

- (c) Analyze the following program segment and determine how many times the body of loop will be executed (show the working).

```
x = 5;    y = 50;
while (x<=y)
{
    y = y/x;
    System.out.println(y);
}
```

[2]

- (d) When there are multiple definitions with the same function name, what makes them different from each other? [2]

- (e) Given that `int x[ ][ ] = { { 2,4,6}, {3,5,7} }`;

What will be the value of `x [1] [0]` and `x [0] [2]`? [2]

- (f) Give the output of the following code fragment:

when i) `opn = 'b'` ii) `opn = 'x'` iii) `opn = 'a'`

```
switch (opn)
{
    case 'a':
        System.out.println("Platform Independent");
        break;
    case 'b':
        System.out.println("Object Oriented");
    case 'c':
        System.out.println("Robust and Secure");
        break;
    default:
        System.out.println("Wrong Input");
}
```

[3]

- (g) Consider the following code and answer the questions that follow:

```
class academic
{
    int x,y;
    void access()
    {
        int a,b;
        academic student = new academic( );
        System.out.println("Object created");
    }
}
```

- (i) What is the object name of class academic?  
(ii) Name the class variables used in the program.  
(iii) Write the local variables used in the program.  
(iv) Give the type of function used and its name. [4]  
(h) Convert the following segment into an equivalent *do* loop.

```
int x,c;
for ( x=10,c=20; c>=10; c=c-2)
    x++;
```

[3]

### SECTION B (60 Marks)

*Attempt any four questions from this Section.*

*The answers in this Section should consist of the Programs in either Blue J environment or any program environment with Java as the base.*

*Each program should be written using Variable descriptions/Mnemonic*

*Codes such that the logic of the program is clearly depicted.*

*Flow-Charts and Algorithms are not required.*

#### Question 4.

An electronics shop has announced the following seasonal discounts on the purchase of certain items.

| Purchase Amount<br>in Rs. | Discount on<br>Laptop | Discount on<br>Desktop PC |
|---------------------------|-----------------------|---------------------------|
| 0 – 25000                 | 0.0%                  | 5.0%                      |
| 25001 – 57000             | 5.0%                  | 7.5%                      |
| 57001 – 100000            | 7.5%                  | 10.0%                     |
| More than 100000          | 10.0%                 | 15.0%                     |

Write a program based on the above criteria, to input name, address, amount of purchase and the type of purchase (L for Laptop and D for Desktop) by a customer. Compute and print the net amount to be paid by a customer along with his name and address.

(Hint:  $\text{discount} = (\text{discount rate}/100) * \text{amount of purchase}$

$\text{Net amount} = \text{amount of purchase} - \text{discount}$ )

[15]

### Question 5.

Write a program to generate a triangle or an inverted triangle till  $n$  terms based upon the user's choice of triangle to be displayed.

Example 1

Input : Type 1 for a triangle and  
type 2 for an inverted triangle

1

Enter the number of terms

5

Output:

```

1
2 2
3 3 3
4 4 4 4
5 5 5 5 5

```

Example 2

Input: Type 1 for a triangle and  
type 2 for an inverted triangle

2

Enter the number of terms

6

Output:

```

6 6 6 6 6
5 5 5 5 5
4 4 4 4
3 3 3
2 2
1

```

[15]

### Question 6.

Write a program to input a sentence and print the number of characters found in the longest word of the given sentence.

For example if  $S = \text{"India is my country"}$  then the output should be 7.

[15]

### Question 7.

Design a class to overload a function `num_calc ( )` as follows:

- (a) `void num_calc (int num, char ch)` with one integer argument and one character argument, computes the square of integer argument if choice `ch` is 's' otherwise finds its cube.

- (b) void num\_calc (int a, int b, char ch) with two integer arguments and one character argument. It computes the product of integer arguments if ch is 'p' else adds the integers.
- (c) void num\_calc (String s1, String s2) with two string arguments, which prints whether the strings are equal or not.

[15]

**Question 8.**

Write a menu driven program to accept a number from the user and check whether it is a 'BUZZ' number *or* to accept any two numbers and print the 'GCD' of them.

- (a) A BUZZ number is the number which either ends with 7 or divisible by 7.
- (b) GCD (Greatest Common Divisor) of two integers is calculated by continued division method. Divide the larger number by the smaller; the remainder then divides the previous divisor. The process is repeated till the remainder is zero. The divisor then results the GCD.

[15]

**Question 9.**

The annual examination results of 50 students in a class is tabulated as follows.

| Roli no. | Subject A | Subject B | Subject C |
|----------|-----------|-----------|-----------|
| -----    | -----     | -----     | -----     |

Write a program to read the data, calculate and display the following:

- (a) Average mark obtained by each student.
- (b) Print the roll number and average marks of the students whose average mark is above 80.
- (c) Print the roll number and average marks of the students whose average mark is below 40.

[15]