

ICSE 2012
Class X
Computer Applications

Section A

Answer all questions in this section.

Question 1.

- a) Give one example each of a primitive data type and a composite data type.
- b) Give one point of difference between unary and binary operators.
- c) Differentiate between call by value or pass by value and call by reference or pass by reference.
- d) Write a Java expression for $\sqrt{2a^2 + u^2}$
- e) Name the type of error(syntax, runtime or logical error) in each case given below:
 - i) Division by a variable that contains a value of zero.
 - ii) Multiplication operator used when the operation should be division.
 - iii) Missing semi colon.

[2 x 5 = 10]

Question 2.

- a) Create a class with one integer instance variable. Initialize the variable using :
 - i) Default constructor
 - ii) Parameterized constructor
- b) Complete the code below to create an object of Scanner class.
Scanner sc= _____ Scanner(_____)
- c) What is an array? Write a statement to declare an integer array of 10 elements.
- d) Name the search or sort algorithm that:
 - i) Makes several passes through the array, selecting the next smallest item in the array each time and placing it where it belongs in the array.
 - ii) At each stage, compares the sought key value with the key value of the middle element of the array.
- e) Differentiate between private and public modifiers for members of a class.

[2 x 5 = 10]

Question 3.

- a) What are the values of x and y when the following statements are executed?
int a=63,b= 36;
boolean x = (a>b)? true : false;

```
int y=(a<b) ? a : b;
```

b) State the values of n and ch.

```
char c='A';  
int n= c+1;  
char ch=(char)n;
```

c) What will be the result stored in x after evaluating the following expression?

```
int x=4; x+=(x++) + ( ++x) + x;
```

d) Give the output of the following program segment:

```
double x=2.9, y=2.5;  
System.out.println(Math.min(Math.floor(x),y));  
System.out.println(Math.max(Math.ceil(x),y));
```

e) State the output of the following program segment.

```
String s= "Examination";  
int n= s.length();  
System.out.println(s.startsWith(s.substring(5,n)));  
System.out.println(s.charAt(2)== s.charAt(6));
```

f) State the method that:

- i) Converts a string to a primitive float data type
- ii) Determines if the specified character is an uppercase character.

g) State the data type and values of a and b after the following segment is executed.

```
String s1= "Computer", s2= "Applications"; a=  
(s1.compareTo(s2));  
b=(s1.equals(s2));
```

h) What will the following code output? String s=

```
"malayalam";  
System.out.println(s.indexOf('m'));  
System.out.println(s.lastIndexOf('m'));
```

i) Rewrite the following program segment using while instead of for statement. int f=1,i;

```
for(i=1;i<=5;i++)  
{  
    f*=i;  
    System.out.println(f);  
}
```

j) In the program given below, state the name and value of the

- i) Method argument or argument variable
- ii) class variable
- iii) local variable
- iv) instance variable

```

class myClass
{
static int x= 7; int y=2;
public static void main(String args[])
{
myClass obj = new myClass();
System.out.println(x);
obj.sampleMethod(5);
int a=6; System.out.println(a);
}
void sampleMethod(int n)
{
System.out.println(n);
System.out.println(y);
}
}

```

[2 x 10 = 20]

Section B

Attempt any 4 questions from this section. The answers in this section should consist of the programs in either BlueJ environment or any program environment with Java as the base. Each program should be written using variable descriptions/ mnemonic codes so that the logic of the program is clearly depicted.

Question 4.

Define a class called Library with the following descriptions.

Instance variables/Data members:

int acc_num	stores the accession number of the book.
String title	stores the title of the book.
String author	stores the name of the author

Member methods:

i) void input()	to input and store the accession number, title and author.
ii) void compute()	to accept the number of days late, calculate and display the fine charged at the rate of Rs.2/- per day.
iii) void display()	to display the details in the following format.
<u>Accession Number</u>	<u>Title</u> <u>Author</u>

Write a main method to create an object of the class and call the above member methods.

[15]

Question 5.

Given below is a hypothetical table showing the rates of income tax for male citizens below the age of 65 years:

Taxable Income (TI) in Rs.	Income Tax in Rs.
Does not exceed Rs.1,60,000	Nil
Is greater than Rs. 1,60,000 & less than or equal to Rs. 5,00,000	$(TI - 1,60,000) \times 10\%$
Is greater than Rs. 5,00,000 & less than or equal to Rs. 8,00,000	$[(TI - 5,00,000) \times 20\%] + 34,000$
Is greater than Rs. 8,00,000	$[(TI - 8,00,000) \times 30\%] + 94,000$

Write a program to input the age, gender(male or female) and Taxable Income of a person. If the age is more than 65 years and the gender is male, compute and display the income tax payable as per the table given above.

[15]

Question 6.

Write a program to accept a string. Convert the string to uppercase. Count and output the number of double letter sequences that exist in the string.

Sample Input: "SHE WAS FEEDING THE LITTLE RABBIT WITH AN APPLE"

Sample Output: 4

[15]

Question 7.

Design a class to overload a function polygon() as follows:

- i) void polygon(int n, char ch) with one integer argument and one character type argument that draws a filled square of side n using the character stored in ch.
- ii) void polygon(int x, int y) with two integer arguments that draws a filled rectangle of length x and breadth y, using the symbol @.

iii) void polygon() with no argument that draws a filled triangle below.

Example :

- i) Input value of n=2. Ch='O'
Output: OO
OO
- ii) Input value of x=2, y=5 Output: @@@@
@@@@
- iii) Output:
*
**

[15]

Question 8.

Using the switch statement, write a menu driven program to :

- i) Generate and display the first 10 terms of the Fibonacci series 0,1,1,2,3,5....The first two Fibonacci numbers are 0 and 1, and each subsequent number is the sum of the previous two.
- ii) Find the sum of the digits of an integer that is input.

Sample Input : 15390

Sample Output: Sum of the digits = 18

For an incorrect choice, an appropriate error message should be displayed.

[15]

Question 9.

Write a program to accept the names of 10 cities in a single dimension string array and their STD(Subscriber Trunk Dialing) codes in another single dimension string array. Search for a name of a city input by the user in the list, if found, display "Search Successful " and print the name of the city along with the STD code, or else display the message " Search unsuccessful, No such city in the list ".

[15]