

THE FIRST PRE-BOARD EXAMINATION 2015-16

Class X (ICSE)

COMPUTER APPLICATIONS (Theory)

Time: Two hours

Maximum marks: 100

Instructions:

- * Answers to this paper must be written on the answer script provided separately.
- * All subsections of each question are to be answered in the correct order.
- * All working including rough work should be done on the same sheet as the rest of the answer.
- * You will not be allowed to write during the first 15 minutes. The time is to be spent in reading the question paper.
- * Please do not write anything on the question paper except your name and roll number.
- * The intended marks for questions or parts of questions are given in brackets [].
- * Attempt all questions from Section A and any four questions from Section B.

SECTION A [40 marks]

Attempt all questions from this Section.

Question 1

Answer the following questions:

- (a) Define the terms Abstraction and Encapsulation. [2]
- (b) What is meant by a package? Name any two already available Java application programming interface packages. [2]
- (c) Name the Java keyword that:
- (i) stores the address of the currently-calling object *This* [1]
 - (ii) instantiates an object in Java. *Constructor* [1]
- (d) State the values of variables x and ch after the execution of the following statements:
- ```
char c = 'X';
int x = c - 1;
char ch = (char) x;
```
- 0*  $x = 121$   
 $ch = 'w'$  [2]
- (e) What will be the value stored in variables x and y after executing the following statements?
- ```
int x = 10, y = 6;  
x *= (y++) - (y++) + (++y);
```
- [2]

Question 2

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

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

Two time

[2]

65
25
90

- (b) Differentiate between Binary Search and Linear Search. [2]
- (c) Create a class ABC with two integer instance variables. Initialize the variables using: [2]
- (i) default constructor (ii) parameterized constructor. [2]
- (d) Write corresponding Java expressions for the following mathematical expressions: [2]
- (i) $z = -\frac{\sqrt{xy}}{3}$ (ii) $\frac{a^3 + b^3}{4ab}$ [2]
- (e) Differentiate between call by value (or pass by value) and call by reference (or pass by reference). [2]

Question 3

Answer the following questions:

- (a) Give the output of the following program snippet: [2]
- ```
int i;
for (i = 1; i <= 5; i++);
System.out.print(i);
System.out.println(i);
```
- Handwritten output: 11, 22, 33, 44, 55*
- (b) State the output of the following program segment: [2]
- ```
String s = "databases";
int n = s.length();
System.out.println(s.startsWith(s.substring(5, 7)));
System.out.println(s.charAt(5) == s.charAt(7));
```
- Handwritten output: - False, - False*
- (c) State the purpose and return data type of the following String functions: [2]
- (i) indexOf() [1]
- (ii) compareTo(). [1]
- (d) State the difference between == operator and equals() method. Give suitable examples of each. [1]
- (e) Explain the function of each of the following: [2]
- (i) break
- (ii) continue.
- (f) Give the output of the following program: [1]
- ```
class m
{ void calc(int a, int b)
{ int i;
for (i = a; i <= a * b; i++)
if (i % a == 0 && i % b == 0) break;
System.out.println(i);
}
}
```
- Handwritten output: 45*

What will the function calc( ) print if value of a = 9 and of b = 15?

(g) Rewrite the following program segment using ternary operator:

```
if (salary <= 20000) tax = 10;
else tax = 15;
```

[2]

(h) What will be the output of the following program?

```
class abc
{
 public void main()
 {
 char arr [] = {'c', 'o', 'm', 'p'};
 for (int i = 0; i < 4; i++)
 {
 for (int j = 0; j <= i; j++)
 {
 System.out.print(" " + arr [i]);
 }
 System.out.println();
 }
 }
}
```

Output: C  
o o  
m m m  
p p p p

[2]

(i) What will be the output when the following program segment is executed?

```
int sum = 0;
for (int a = 1; a <= 10; a++)
{
 sum = sum + a;
 if (a%2 == 1 || sum%5 != 0) continue;
 System.out.println(a + sum);
}
```

Output: 14  
65

[2]

(j) Write the Java statement to:

- (i) create an object of the class employee using its non-parameterized constructor. [1]
- (ii) declare prototype of a function IsBuzz( ) that receives an integer argument and returns either true or false. [1]

### SECTION B [60 marks]

Attempt any four questions from this Section.

The answers in this Section should consist of the Program in Blue J environment with Java. 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

Write a program in Java which accepts the number from the keyboard and prints the digit which occurs maximum number of times and also prints its frequency.

[15]

### Question 5

Write a program in Java to accept an array containing employee code of 50 employees of a company which are of alphanumeric type and are arranged in the ascending order of values. The program should then ask for an employee code to be searched. Search the entered employee code using binary search technique. Print the position of the code in the array if it is present otherwise print an appropriate message.

[15]

### Question 6

Write a menu driven program in Java to print either of the following patterns depending on the user's choice:

|     |          |     |                 |
|-----|----------|-----|-----------------|
| (a) | 1        | (b) | 0 1             |
|     | 1 4      |     | 0 1 0 1         |
|     | 1 4 9    |     | 0 1 0 1 0 1     |
|     | 1 4 9 16 |     | 0 1 0 1 0 1 0 1 |

[15]

### Question 7

Write a program in Java that encodes a word into Piglatin. To translate a word into a Piglatin word, convert the word into uppercase and then place the first vowel of the original word at the start of the new word along with the remaining letters of the string. The alphabets present before the vowel being shifted towards the end followed by "AY". Print the original word and the Piglatin word.

Example: Input : London

Output : London

ONDONLAY

[15]

### Question 8

Write a program in Java to define a class mobiCall having the following details:

Data members:

|      |                                                    |
|------|----------------------------------------------------|
| name | : stores the name of the user                      |
| ct   | : stores the number of calls made during the month |
| rc   | : stores the amount of rental charge for a month   |
| tc   | : stores the total cost for the month.             |

Member functions:

|            |                                                                                                                 |
|------------|-----------------------------------------------------------------------------------------------------------------|
| mobiCall() | : non-parameterized constructor to initialize data members with their default values and rental charge by ₹ 150 |
|------------|-----------------------------------------------------------------------------------------------------------------|

void ask( ) : accepts the name and the number of calls made  
 void process( ) : computes total cost for a month (total cost = monthly rental + call charges). Call charge is calculated on the following basis:

| Calls             | Rate per call     |
|-------------------|-------------------|
| first 200 calls   | free of cost      |
| next 300 calls    | 90 paise per call |
| next 200 calls    | 50 paise per call |
| any further calls | 25 paise per call |

void display( ) : displays all the information with proper messages  
 void main( ) : creates an object of the class mobiCall and calls the above functions to enable the task.

[15]

### Question 9

Design a class in Java to overload a function count( ) as follows:

- (a) void count (int num) with an integer argument that counts and prints the number of odd digits present in the number.

For example: If num = 13967 then the output should be 4.

- (b) void count (String str, char C) with a string argument and a character argument that counts and prints the occurrence of character in variable C in the string str.

For example: If str = "Java is interesting"

C = 'i'

then the output should be 3.

[15]