

*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[.]*

SECTION A (40 Marks)

Attempt all questions

Question 1.

- (a) Define Encapsulation. [2]
- (b) What is inheritance? [2]
- (c) Name the operators listed below and arrange them in order of higher precedence to lower precedence. [2]
- (i) < (ii) ++ (iii) && (iv) ? :
- (d) State the number of bytes occupied by double and int data types. Write their default values also. [2]
- (e) Write one similarity and one difference between / and % operator. [2]

Question 2

- (a) Name the following:
- (i) A keyword used to call a package in the program.
- (ii) Any one reference data type. [2]
- (b) What do you mean keywords in java? [2]
- (c) State the value of res and ch after the following is executed:
- ```
char ch='t';
int res= ch-32;
ch=(char)res;
```
- [2]
- (d) Give the output of the following program segment and also mention the number of times the loop is executed:
- ```
int a,b=4;  
for (a = 6; a <= 24; a = a + 3)  
{ if(a%b ==0)  
break;  
}  
System.out.println(a+ " "+b);
```
- [2]

(e) What are the type of casting shown in the following examples.

```
double x=15.2;
```

```
int a=12,y;
```

```
long b;
```

```
(i) y=(int) x      (ii) b=a;
```

Question 3

a) Convert the following if else if construct into switch case

```
if( var==1)
```

```
    System.out.println("good");
```

```
else if(var==2)
```

```
    System.out.println("better");
```

```
else if(var==3)
```

```
    System.out.println("best");
```

```
else
```

```
    System.out.println("invalid");
```

b) Rewrite the following using ternary operator:

```
if (bill > 10000 )
```

```
    discount = bill * 10.0/100;
```

```
else
```

```
    discount = bill * 5.0/100;
```

c) Give the output of the following program segment and also mention how many times the loop is executed:

```
int i;
```

```
for ( i = 5 ; i < 10; i ++ )
```

```
    System.out.println( i );
```

```
    System.out.println( i * 4 );
```

d) Write a Java expression for the following:

$$\frac{\sqrt{3x+x^2}}{a+b}$$

e) State the one similarity and one difference between while and do while loop

(f) if a=48, b=13; find the value of a+=b++*5/a++ + b

(g) Write down the output of the following:

```
System.out.println(Math.cbrt(Math.ceil(-9.99)+Math.pow(6,2)));
```

f) Convert following *do-while* loop into *for* loop.

```
int i = 1, d=5;
```

```
do {
```

```
    d=d*2;
```

```
    System.out.println(d);
```

```
    i++ ; }
```

```
while ( i<=5);
```

(i) Analyze the given program segment and answer the following questions: [2]

```
for(int i=1;i<4;i++ )
```

```
{ for(int j=1;j<=i;j++ )
```

```
{ System.out.print(" "); }
```

```
System.out.println("GOOD" ); }
```

(i) How many times does the inner loop execute?

(ii) Write the output of the program segment. [2]

(j) What is the difference between the Scanner class functions `next()` and `nextLine()`? [2]

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.

Question 4

a) A class contains b number of boys and g number of girls. On a rainy day ba number of boys and ga number of girls are absent. Write a java program to input b, g, ba, ga . Calculate and display the following:

(i) Percentage of girls present in the class

(ii) Percentage of boys present in the class

(Percentage must be calculated on the total number of students) [2]

b) Write a java program to input base and altitude of a right angled triangle. Calculate hypotenuse. Check whether the given triangle is an equable triangle or not. A triangle is said to be equable triangle if its area is equal to the perimeter.

Eg. Right angled triangle with sides 5,12 is an equable triangle

Area=30 and perimeter is=5+12+13=30

Question 5.

a) Write a program to input a number and check and print whether it is a Pronic number or not. (Pronic number is the number which is the product of two consecutive integers)

Examples: $12 = 3 \times 4$

$20 = 4 \times 5$

$42 = 6 \times 7$

- b) Write a program to enter a number and check whether it is a Neon number or not. A number is said to be neon if the sum of the digits of the square of the number is equal to the number itself.
Eg: 9 Square of 9 is 81 .Sum of the digits of square=9

Question 6.

Write a program to accept name and total marks of N number of students in a class. Calculate and print:

- (i) The average of the total marks obtained by N number of students.

$$[\text{average} = (\text{sum of total marks of all the students})/N]$$

- (ii) Minimum mark

- (iii) Maximum mark

Question 7

International Standard Book number(ISBN) is a unique numeric book identifier which on every book. The ISBN is a 10 digit code. The ISBN is legal if

$1*\text{digit}1+2*\text{digit}2+3*\text{digit}3+4*\text{digit}4+5*\text{digit}5+6*\text{digit}6+7*\text{digit}7+8*\text{digit}8+9*\text{digit}9$ is divisible by 11

Eg: ISBN is 1401601499

$1*1+2*4+3*0+4*1+5*6+6*0+7*1+8*4+9*9+10*9=253$ is divisible by 11

Write a java program to input a 10 digit integer number and check whether the input is Legal ISBN or not. If the number is not a 10 digit number, output the message, "Invalid" and terminate the program.

Question 8

Using a switch statement , write a menu driven program to

- (a) Generate and display the first 10 terms of the Fibonacci series

1,1,2,3,5,8,-----

- (b) Enter two numbers and check whether they are co-prime or not.

Two numbers are said to be co-prime if their hcf is 1

Question 9

Write two separate java programs to do the following:

- 1) To find the sum of the following series

$S=x-2x+3x-4x+-----n$ terms

- 2) To generate the following pattern

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