

This paper is divided into 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 []

SECTION A (40 MARKS)

Question 1

- a) What is encapsulation ? [2]
- b) What is a compound statement? Give an example. [2]
- c) Illustrate the array values after each iteration of bubble sorting on the following numbers to arrange them in descending order : 5,10,2,8,12,6 [2]
- d) How many bits are reserved for boolean data type [1]
- e) Explain with an example when do we require to define a variable as static? [3]

Question 2

- a) Write a program which accept two numbers and prints the product of those two numbers without using * operator [5]
- b) What is the difference between formal parameters and actual parameters? [2]
- c) Write a conditional statement that compares string str with string constant "I AM NOT" [1]
- d) Write the statement given below correctly [1]
`x ? x <= y & x > 0 : y;`
- e) Give the output for the following code [1]
`void display()`

```
{  
    String s = "I am 14";  
    for (int i=0; i<s.length(); i++)  
        System.out.println(Character.isDigit(s.charAt(i)));  
}
```

Question 3

- a) Write the header of a function 'divide' that takes two integer values and returns the quotient of double type [1]
- b) What happens when no access specifier is given to a variable or method [1]
- c) Rewrite the following statements using switch case construct (you can assume that variables have been declared) [5]

```
if ( value == 'A')  
{  
    if (code == 1)  
        salary +=2000;  
    else  
        if (code == 2)  
            salary +=15000;  
}  
else if ( value == 'B')  
{  
    if ( id == 3)  
        y +=5;  
    else  
        if (id == 4)  
            y +=10;  
}
```

- d) What do you understand by passing message to an object? [2]
- e) What is the value of a % b where a= 5, b = 10 [2]
- f) Write the result of [2]
`x - y + x / (y * Math.pow(x,2))*2` when x = 10, y = 2
- g) Initialise a character array with the following characters : ?, A, 1, ~, ! [1]
- h) Write a statement to create an object named act of a class Action that invokes a parameterised constructor that accepts two int type values [2]

The answers in the following questions should be written using variable descriptions such that the logic of the program is clearly depicted.

Question 4

Write a program in java to compute the railway fare depending on the criteria as given [15]
below :

Age (in years)	Distance (in kms)	Fare (in Rupees)
Below 10	Below 10	Rs. 5
	Between 10 and 50	Rs. 20
	Above 50	Rs. 50
Between 10 and 60	Below 10	Rs. 10
	Between 10 and 50	Rs. 40
	Above 50	Rs. 80
Above 60	Below 10	Rs. 4
	Between 10 and 50	Rs. 15
	Above 50	Rs. 35

Question 5

Write a program to enter a sentence from the keyboard and count the number of times a [15]
particular word occurs in it . Display the frequency of the search word

Example :

Input : Enter a sentence : the quick brown fox jumps over the lazy dog.

Enter a word to be searched : the

Output : Searched word occurs : 2 times

Question 6

Write a java class that contains a method compound() and a main method. The [15]
compound method computes the compound interest, based on the following conditions:
if time is less than or equal to 1 year then $r = 3\%$, if time is between 1 and 2 yrs then $r = 5\%$ and if time is greater than or equal to 2 year, $r = 7\%$.
The method returns the interest to main(), where the result is displayed. Assume
principal amount (P) and time (T) to be inputted from the console. The interest should be
calculated for 10 investors

Question 7

Write a program in Java that defines class Table whose description is given below: [15]

Data members : instance variables length, breadth, and height in metres

Member methods :

- 1) To accept the values
- 2) To display the values
- 3) Convert metres to centimetres

Define a menu allowing the user to perform the above actions and take users choice to
call above methods

Question 8

Write a program to compute and display the sum of the following series [15]

$$\begin{array}{ccccccc}
 X^2 & - & X^3 & + & X^4 & - & X^5 & \dots\dots\dots & X^n \\
 \text{---} & & \text{---} & & \text{---} & & \text{---} & & \text{---} \\
 3! & & 4! & & 5! & & 6! & & (n+1)!
 \end{array}$$

Define method **vfact** to find the factorial of a number and the method **vpow** to find the
number raised to the power. Use this two methods to find the sum of the above series.

Question 9

Write a program to check whether a given number is automorphic or not. Automorphic [15]
numbers are those numbers whose square has the same digits excluding a single digit in
extreme left