
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.

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[].

SECTION A (40 Marks)

*Attempt **all** questions*

Question 1.

- (a) Define encapsulation. [2]
- (b) Explain the purpose of using a 'new' keyword in a Java program. [2]
- (c) What are literals? [2]
- (d) Mention the types of access specifiers. [2]
- (e) What is constructor overloading? [2]

Question 2.

- (a) Differentiate between boxing and unboxing. [2]
- (b) Rewrite the following condition without using logical operators: [2]

if (a>b || a>c)

System.out.println(a);

- (c) Rewrite the following loop using **for** loop: [2]
`while (true)`
`System.out.print("*");`
- (d) Write the prototype of a function **search** which takes two arguments a string and a character and returns an integer value. [2]
- (e) Differentiate between `=` and `==` operators. [2]

Question 3.

- (a) State the number of bytes and bits occupied by a character array of 10 elements. [2]
- (b) Differentiate between Binary Search and Linear Search techniques. [2]
- (c) What is the output of the following: [2]
`String a="Java is programming language \n developed by \tJames Gosling\";`
`System.out.println(a);`
- (d) Differentiate between `break` and `System.exit(0)`. [2]
- (e) Write a statement in Java for $\sqrt{\frac{(a+b)^3}{|a-b|}}$ [2]
- (f) What is the value of `m` after evaluating the following expression: [2]
`m -= 9%++n + ++n/2;` when `int m=10,n=6`
- (g) Predict output of the following: [2]
(i) `Math.pow(25,0.5)+Math.ceil(4.2)`
(ii) `Math.round (14.7) + Math.floor (7.9)`
- (h) Give the output of the following java statements: [2]
(i) `"TRANSPARENT".toLowerCase();`
(ii) `"TRANSPARENT".compareTo("TRANSITION")`
- (i) Write a java statement for each to perform the following task: [2]
(i) Find and display the position of the last space in a string **str**.
(ii) Extract the second character of the string **str**.

- (j) State the type of errors if any in the following statements: [2]
- (i) `switch (n > 2)`
- (ii) `System.out.println(100/0);`

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** so that the logic of the program is clearly depicted.*

*Flow-Charts and Algorithms **are not required.***

Question 4.

Anshul transport company charges for the parcels of its customers as per the following specifications given below: [15]

Class name : Atransport

Member variables:

- String name – to store the name of the customer
- int w – to store the weight of the parcel in Kg
- int charge – to store the charge of the parcel

Member functions:

- void accept () – to accept the name of the customer, weight of the parcel from the user (using Scanner class)
- void calculate () – to calculate the charge as per the weight of the parcel as per the following criteria.

Weight in Kg	Charge per Kg
Upto 10 Kgs	Rs.25 per Kg
Next 20 Kgs	Rs.20 per Kg
Above 30 Kgs	Rs.10 per Kg

A surcharge of 5% is charged on the bill.

void print () – to print the name of the customer, weight of the parcel, total bill inclusive of surcharge in a tabular form in the following format :

Name	Weight	Bill amount
-----	-----	-----

Define a class with the above-mentioned specifications, create the main method, create an object and invoke the member methods.

Question 5.

Write a program to input name and percentage of 35 students of class X in two separate one dimensional arrays. Arrange students details according to their percentage in the **descending** order using **selection sort** method. Display name and percentage of first ten toppers of the class. [15]

Question 6.

Design a class to overload a function Sum() as follows: [15]

- (i) int Sum(int A, int B) – with two integer arguments (A and B) calculate and return sum of all the even numbers in the range of A and B.

Sample input: A=4 and B=16

Sample output: sum = 4 + 6 + 8 + 10 + 12 + 14 + 16

- (ii) double Sum(double N) – with one double arguments(N) calculate and return the product of the following series:

sum = 1.0 x 1.2 x 1.4 x x N

- (iii) int Sum(int N) - with one integer argument (N) calculate and return sum of only odd digits of the number N.

Sample input : N=43961

Sample output : sum = 3 + 9 + 1 = 13

Write the main method to create an object and invoke the above methods.

Question 7.

Using the switch statement, write a menu driven program to perform following [15]
operations:

- (i) To Print the value of Z where $Z = \frac{x^3 + 0.5x}{Y}$ where x ranges from – 10 to 10 with an increment of 2 and Y remains constant at 5.5.
- (ii) To print the Floyds triangle with N rows

Example: If N = 5, Output:

```
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
```

Question 8.

Write a program to input and store integer elements in a double dimensional array of [15]
size 4×4 and find the sum of all the elements.

```
7 3 4 5
5 4 6 1
6 9 4 2
3 2 7 5
```

Sum of all the elements: 73

Question 9.

Write a program to input a string and convert it into uppercase and print the pair of vowels and number of pair of vowels occurring in the string. [15]

Example:

Input:

"BEAUTIFUL BEAUTIES "

Output :

Pair of vowels: EA, AU, EA, AU, IE

No. of pair of vowels: 5