



ST. JOSEPH'S COLLEGE, PRAYAGRAJ

HALF-YEARLY EXAMINATION 2025-26

COMPUTER APPLICATIONS

TIME: 2 Hours

CLASS – X

MM: 100

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 from this Section)

Question 1 Choose the correct answer and write the correct option.

[20]

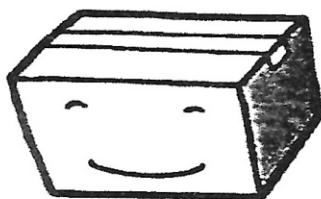
- (i) Which of the following is not a valid Java keyword?
 - a) class
 - b) public
 - c) main
 - d) static
- (ii) Which operator is used to compare two values in Java?
 - a) =
 - b) ==
 - c) !=
 - d) <>
- (iii) What is the purpose of the **break** statement?
 - a) Exit the program
 - b) Exit the current loop or switch
 - c) Skip an iteration
 - d) Stop compilation
- (iv) Which access specifier makes members accessible only within a program?
 - a) public
 - b) private
 - c) protected
 - d) default
- (v) What is the scope of a local variable?
 - a) Whole class
 - b) Entire package
 - c) Block in which it is declared
 - d) Inherited classes only
- (vi) What will be the output of: `System.out.println(10 + 20 + "Hello");`
 - a) 30Hello
 - b) 1020Hello
 - c) Hello1020
 - d) Hello30
- (vii) **Assertion (A):** Java is an object-oriented programming language.
Reason (R): Java allows defining classes and creating objects.
 - a) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
 - b) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a not correct explanation of **Assertion (A)**.
 - c) **Assertion (A)** is true and **Reason (R)** is false.
 - d) **Assertion (A)** is false and **Reason (R)** is true.
- (viii) **Assertion (A):** A for loop is preferred when the number of iterations is known.
Reason (R): The while loop does not support loop initialization or increment.
 - a) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
 - b) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a not correct explanation of **Assertion (A)**.
 - c) **Assertion (A)** is true and **Reason (R)** is false.
 - d) **Assertion (A)** is false and **Reason (R)** is true.
- (ix) **Assertion (A):** A class can have multiple constructors in Java.
Reason (R): Java supports constructor overloading.
 - a) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.



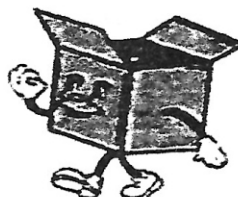
In the image, the labels Batterylevel and isMoving represent the robot's:

- a) Behavior
- b) Actions
- c) State
- d) Class name

(xvii)



int age=18



```
Name=Ami  
roll number=17  
display()
```

Which of the following best describes the difference between the two boxes in the image?

- a) Both are primitive types
- b) Both are objects
- c) The first box is primitive data type and the second box is composite data type.
- d) The first box is composite data type and the second box is primitive data type.

(xviii)

In Shopping malls behave like

CUSTOMER

In Bus behave like

PASSENGER

In School behave like

STUDENT

At Home behave like

SON



Name the feature of Java depicted in the given picture.

- a) Encapsulation
- b) Inheritance
- c) Polymorphism
- d) Abstraction

(xix)



Why does spillage occur in explicit conversion?

- a) Value increases during conversion
 - b) Target type is smaller causing data loss
 - c) Automatic widening happens
 - d) Conversion fails due to syntax error
- (xx) What is the purpose of a constructor?
- a) Destroy an object
 - b) Perform calculations
 - c) Initialize data members
 - d) Call a method



Question 2

- a) How are the *private members* of a class different from *protected members*? [2]
- b) What is *Autoboxing* and *Unboxing*? Explain with the help examples. [2]
- c) Write characteristics of a *Constructor*. [2]
- d) Write is the difference between *isUpperCase()* and *toUpperCase()* with examples. [2]
- e) What is *Inheritance*. Write its types. [2]

Question 3

- a) i) Write a Java statement to declare a class named *Book* with instance variables *title* and *author* of type *String*. [1]
- ii) Define an object *myBook* of the *Book* class and assign "*Introduction of Java*" as the *title* and "*James Gosling*" as the *author* using dot notation. [1]
- b) Difference between *parseFloat()* and *valueOf()*. [2]
- c) Explain *Instance Variable*. Give an example. [2]
- d) When there are multiple definitions with the same function name, what makes them different from each other? [2]
- e) How many times will the following loop execute? What value will be returned? [2]
int execute()
{
 int x = 2, y = 50;
 do
 {
 ++x;
 y -= x++;
 }while(x<=10);
 return y;
}

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.

Flow-Charts and Algorithms are not required.

Question 4

[15]

An electronics shop has announced the following seasonal discounts on the purchase of certain items.

<u>Purchase Amount in Rs.</u>	<u>Discount on Laptop</u>	<u>Discount on PC</u>
0 to 25000	0.0%	5%
25001 to 60000	5%	7.5%
60001 to 100000	7.5%	10%
more than 100000	10%	15%

Write a program based on the above criteria, to input name, address, amount of purchase and the type of purchase (L or l for Laptop and D or d for Desktop) by a customer. Compute and print the net amount to be paid by a customer along with his name and address.

Question 5

[15]

The International Standard Book Number (ISBN) is a unique numeric book identifier which is printed on every book. The ISBN is based upon a 10-digit code.

The ISBN is legal if:

$1 \times \text{digit1} + 2 \times \text{digit2} + 3 \times \text{digit3} + 4 \times \text{digit4} + 5 \times \text{digit5} + 6 \times \text{digit6} + 7 \times \text{digit7} + 8 \times \text{digit8} + 9 \times \text{digit9} + 10 \times \text{digit10}$ is divisible by 11.

Example:

For an ISBN 1401601499

Sum = $1 \times 1 + 2 \times 4 + 3 \times 0 + 4 \times 1 + 5 \times 6 + 6 \times 0 + 7 \times 1 + 8 \times 4 + 9 \times 9 + 10 \times 9 = 253$

which is divisible by 11.

Write a program to Input the ISBN code as a 10-digit integer. If the ISBN is not a 10-digit integer, output the message **"Illegal ISBN"** and terminate the program.

If the number is divisible by 11, output the message **"Legal ISBN"**. If the sum is not divisible by 11, output the message **"Illegal ISBN"**.

Question 6

[15]

PC_Corp Transport Company charges for the parcels of its customers as per the following specifications given below:

Class name : *PCCTransport*

Member variables:

String name: To store the name of the customer.
double w: To store the weight of the parcel in Kg.
double 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:

<u>Weight in Kg</u>	<u>Charge per Kg</u>
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 display (): To print the name of the customer, weight of the parcel, total bill inclusive of surcharge in a tabular form in the following format:

<u>Name</u>	<u>Weight</u>	<u>Bill amount</u>
-----	-----	-----

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

Question 7

[15]

Design a class to overload a function **sum()** as follows:

(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:

pro = 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 8

[15]

Write a *menu – driven* program to calculate and print the sum of the following series:

case 1: $s = x^2/2! + x^5/5! + x^8/8! + \dots + x^n/n!$

case 2: $s = 1!/3 + 3!/5 + 5!/7 + \dots + n!/n+2$

default: "Wrong Choice, Enter Again!"

Question 9

[15]

Design a class to overload a function *sum()* as follows:

(i) *void show()*:

To print the pattern:

```
1
3    5
7    9    11
13   15   17   19
21   23   25   27   29
```

(ii) *boolean show(int n)*:

To check whether *n* is a **Dudeney Number**, a number is **Dudeney** if the cube of the sum of the digits is equal to the number itself.

Example: $512 = (5 + 1 + 2)^3 = (8)^3 = 512$

(iii) *void show(int n, char ch)*:

if *ch* = *s* or *S* then print the square of the number *n*,
else if *ch* = *c* or *C* then print the cube of the number *n*.

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

**“Your first
experience
with
programming
shapes how
you see it
forever”**

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