Note: Q. 1 is compulsory. Attempt one question each from the Units I, II, III & IV.

(5*4=20)

Q1

(a) Give the output of the following code

```java
public class IGDTUW{
    public static void main(){
        String s = "OOPS using JAVA";
        for( int i = 0 ; i< s.length(); i++){
            System.out.print( " " +i);
            System.out.print( s.charAt(i) );
            System.out.println( 1+i);
        }
    }
} //Explain the output
```

(b) Create a class Box having multiple constructors. Box(int), Box (int, int) for cube or cuboid. Also create a default constructor. Create a cube , a cuboid and a default box object to show the running.

(c) Differentiate between an abstract class and an interface.

(d) What are final variables, final methods and final classes in java? Give example.

UNIT-I

Q2	Explain any 5 java Buzzwords. WAP to calculate and print the sum of the series $1 + \frac{1}{2} + 1/3 + \frac{1}{4} +\ldots 1/n$. where n is a user input.	(10)
Q3	What is a static variable? How is it different from local and instance variables? Write a program to create a class Animals having animal location (same for all animals), name, breed as variables and Read() print() methods to read and print the details. Show the different types of variables in the program.	(10)

UNIT-II

Q4	Differentiate between runtime and compile time polymorphism. Create a class Item (no, type) having methods read(), print(). Derive the class in Books(Title, Author. Publisher) and Pen(Color, type). Both the classes also have read() and print() methods. Create 2-2 objects of Books and Pen classes to show method overrinding. Use super to call base class methods.	(10)
Q5	What are the various types of inheritance in Java? Explain each with example. Why is multiple inheritance not allowed in java? Give example. How can it be implemented in java? Give example.	(10)

UNIT-III

Q6	What happens when an exception is thrown but there is no catch block to handle it? Explain with example. WAP to calculate the average marks of a student in 5 subjects. Throw a user defined exception if entered marks are nor between 0-100. Program in a manner that user can re-enter the marks till correctly entered and print the average in finally block.	(10)

Q7	What is the hierarchy of classes used in file handling? WAP to read the contents of a character file, reverse the contents and remove all blank spaces from it. Store the reversed without blank spaces content in a new file.	(10)

<div align="center">UNIT-IV</div>

Q8	What are the 2 methods for creating a thread? Which is better and why? WAP to calculate the sum of squares of 1-10000 natural numbers through 4 threads. (Each thread processing 2500 numbers concurrently.	(10)
Q9	What are the different stages in the life cycle of an applet? Create an applet using AWT OR Swing package. It must have 1) Greeting: "Good Morning IGDTUW!!!", 2) Label Roll_No, followed by text field to enter it, 3) Label Branch, followed by text field to read branch 4) Submit button that prints "Details Submitted" when pressed.	(10)