BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSC **SEMESTER : IV/ADD**
BRANCH: MATHS & COMP. **SESSION : SP/2025**

SUBJECT: CS233 OBJECT ORIENTED PROGRAMMING AND DESIGN PATTERN

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Explain three key features of Java in detail. What do you understand by command line argument? [5]

Q.1(b) Consider the following scenario and answer the following: [5]

i) What would happen if the main() method was present in many classes?
ii) What would happen if more than one class contains the access modifier public.
iii) A class without main() method is possible or not? Justify your answer.

Q.2(a) Provide a relevant example to illustrate the distinction between shallow and deep copy. What do you understand by static and instance initializer block? [5]

Q.2(b) Write a program to create a customized arraylist of a class named Employee where the data members are given as: id, name and salary. Use the constructor to initialize the values whereas method named addEmp() will take 3 arguments for id, name and salary. The method addEmp() will create an arraylist of Employee class and add the values in the customized arraylist. Another method named display() will display the total arraylist elements. Main() method will accept user defined values for each input and calls the corresponding method and constructor will add the details of employee. [5]

Q.3(a) In a given scenario of multilevel inheritance three classes named class A, B and C have been created. Class B extends class A and class C extends B. Each class consists of default constructor. The main() method consist the object of class C. Use the super keyword to call constructor of each class using the object of class C. Also, discuss three usage of this keyword. [5]

Q.3(b) What are the possible ways to request garbage collector to collect the unused object. Write a program that explain the concept of “island of isolation”. [5]

Q.4(a) Discuss the difference between stack unwinding and chained exception. Write a Java program that accepts a string input from the user. Create a custom exception class to check whether the string contains at least one vowel. If no vowel is found, throw the user-defined exception and handle it appropriately using a try-catch block in the program. [5]

Q.4(b) What is the difference between Character User Interface (CUI) and Graphical User Interface (GUI)? Explain the constructors and methods of Frame in GUI component using a suitable program. [5]

Q.5(a) What is the difference between string and string builder class. Write a program that accepts one pattern from the user and matches with another user entered text where the special characters are also involved. Check if the entered pattern contains special characters (@,#,$,%). [5]

Q.5(b) Explain the thread lifecycle in detail. Also, discuss the difference between yield() and join() method using an example. [5]

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