Program:	S.Y.B.Sc DS	**Semester:**	III	**Program Code:**	UGDS03
Course:	Object Oriented Programming using Java			**Course Code:**	NUDS305
Duration:	1 Hour	**Examination Pattern:**	NEP-Autonomous - External.	**Max. Marks:**	30

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat diagrams wherever necessary.
4. CO (Course Outcome), KL (Knowledge Level).

Examination:

REGULAR

Q. 1		**Attempt any TWO of the following.**	[10]	CO's	KL's
	(a)	Compare and contrast the compile-time and run-time polymorphism.		CO1	L4
	(b)	Explain the significance of static data members and static methods.		CO1	L2
	(c)	What is the use of BufferedReader and BufferedWriter in file handling?		CO4	L1
	(d)	Design a class *Interest* with the following specifications. Data members (Declare the variables using appropriate data types) • p - stores the principal amount • n - stores the time period in years • r - stores the rate of interest • a - stores the amount Member methods • void accept () - input values for p, n, r using Scanner class methods only. • void calculate () - calculate the amount using the following equation. $a = p\left(1 + \frac{r}{100}\right)^n$ • void display () - display the details in the given format. Write the main method to create an object and call the above methods.		CO2	L6
Q. 2		**Attempt any TWO of the following.**	[10]	CO's	KL's
	(a)	What is the significance of abstract keyword when used with classes, methods, and variables?		CO1	L1
	(b)	Explain the significance of access specifiers in Encapsulation.		CO1	L1
	(c)	"HashSet collection eliminates all the duplicate values of a dataset." Justify the statement, supported with a suitable Java program.		CO4	L5
	(d)	Write a Java program to create a HashMap<String, Double> that stores student names and marks. Perform the following operations with the HashMap. • Add at least 5 student records. • Find the student with the highest marks. • Display students scoring above 75. • Remove students scoring below 40.		CO4	L3

Q. 3		Attempt any TWO of the following.	[10]	CO's	KL's
	(a)	Implement multilevel inheritance using the following hierarchy of classes: *Person* → *Employee* → *Manager* • *Person* contains *name* and *age*. • *Employee* contains *employeeId* and *salary*. • *Manager* contains *department* and *teamSize*. Define constructors to assign values to the data members, and create suitable methods to display all details of a manager. (Note: use the *super* keyword appropriately.)		CO3	L3
	(b)	Explain how getter and setter methods help achieve encapsulation.		CO1	L2
	(c)	Differentiate between a single catch block and multiple catch blocks with suitable examples.		CO4	L4
	(d)	Design a Java class *SensorData* containing suitable attributes such as *sensorID*, *temperature*, *humidity*, and *timestamp*. Enable it with suitable functions to represent sensor readings.		CO5	L6

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