LUCKNOW PUBLIC COLLEGE OF PROFESIONAL STUDIES
VINAMRA KHAND, GOMTI NAGAR, LUCKNOW

1st INTERNAL EXAMINATION April, 2022

COURSE: BCA IV SEMESTER

PAPER NAME: DISCRETE MATHEMATICS

Paper Code: BCA-401

Time: 1 Hour **M.M: 15 (3 X 5)**

Note: *Attempt any FIVE questions from the given questions. Each question carries equal marks.*

Q. 1 Explain the following terms: (Any Three)

i) Symmetric ii) Anti Symmetric iii) Transitive iv) Partial Order Relation V) quasi Order

Q. 2 Let A={1,2,3} & let R={(1,1),(1,2),(1,3),(3,1),(2,3),(2,1)} be a relation on A. Draw the digraph of R.

Q.3 Show that the relation is reflexive & circular if and only if it is reflexive, symmetric and transitive.

Q. 4 Discuss the various type of mechanism that is used to represent a relation. Elaborate with example for each of them.

Q. 5 Determine whether or not the each relation of the following relation is a function with domain {1,2,3,4} . If any relation is not a function, explain why. (Attempt any three)

i) R_1**={(1,1),(2,1),(3,1),(4,1), (3,3)}**

ii) R_2**={(1,2),(2,3),(4,2)}**

iii) R_3**={(1,4),(2,1),(3,1),(4,1)}**

iv) R_4**={(1,4),(2,3),(3,2),(4,1)}**

Q. 6 Give an example of a function N-> N as set of ordeed pair which is: (Attempt any three)

a) one-to-one but not onto

b) onto but not one-to-one

c) both one-to-one and onto

d) neither one-to-one nor onto.

Q.7 Define the following terms with respect to example for each of them.

i) Domain ii) Range iii) Characteristics function of set

Q. 8 From the following formulae, find out tautology, contingency & contradiction

i) ~ (A->B) V (~A V(A^ B))

ii) (p->(q->r))->((p->q)->(p->r))

ii) [(p->q) ^ (q->r)]->(p->r)

Q. 9) Find the disjunctive normal form of

(p->(q^r))^(~p->(~p^~r))

Q.10 Explain Law of Modus Ponens & Modus Tollens

LUCKNOW PUBLIC COLLEGE OF PROFESIONAL STUDIES
VINAMRA KHAND, GOMTI NAGAR, LUCKNOW

2nd SESSIONAL EXAMINATION December, 2021

BCA(IIIrd Semester)

PAPER NAME: OBJECT ORIENTED PROGRAMMING USING JAVA

Paper Code: BCA-302

Time: 3.00 Hours **M.M: 70**

Note: *Attempt any FIVE questions from the given questions. Each question carries equal marks.*

Q. 1 (a) What do you mean by object oriented programming? How is it different from Procedural language? Explain advantages of using object oriented programming. (5)

(b) Explain characteristics of OOPS with example? (5)

(c) Explain role of JVM in java? Explain the role & differentiate between JDK, JRE & JVM? (4)

Q. 2 **(a)** Describe the uses of final and super keywords with respect to inheritance. (2)

(b) What are the differences between Array and ArrayList in java? (3)

(c) What are the differences between the constructors and methods? How many types of constructors do java supports? Explain in detail. (3)

(d) An employee works in a particular department of an organization. Every employee has an employee number, name and draws a particular salary. Every department has a name and a head of department. The head of department is an employee. Every year a new head of department takes over. Also, every year an employee is given an 'annual' salary enhancement. Identify and design the classes for the above description with suitable instance variables and methods. The classes should be such that they implement information hiding. You must give logic in support of your design. Also create two objects of each class. (6)

Q. 3 (a) what is method overloading? How does it differ from method overloading? Discuss the rule for overriding methods? (5)

(b) What is difference between abstract class & interface? Write down the procedure for designing &implementing an interface? (5)

(c) What do you mean by exception? Differentiate between checked & unchecked exception? (4)

Q. 4 (a) Create class Number with only one private instance variable as a double primitive type. To include the following methods (include respective constructors) isZero( ), isPositive(), isNegative( ), isOdd( ), isEven( ), isPrime(), isAmstrong() the above methods return boolean primitive type. getFactorial(), getSqrt(), getSqr(), sumDigits(), getReverse() the above methods return double primitive type. void listFactor(), void dispBinary(). (8)

(b) Differentiate between following (6)

i) String & StringBuffer Class?

ii) Array & vector

iii) Final, Finalize & finally

Q. 5 (a) what is package? What is advantage of using a package? Explain some important built in packages? (5)

(b) Write a program to create a vector with seven elements, first 2 are integers, next 2 are strings and remaining are float. Remove element at 3rd position and insert new element at 5th location. Display the updated vector. (5)

(c) Why java doesn't support multiple inheritances? Is there any process to achieve it? (4)

Q. 6 Explain the following methods with sytax & example for each class (6)

i) Split() ii) charAt() iii) substring() iv) getChars() v) CompareTo() vi) IndexOf()

(b) What is the use of class path? How it helps in the execution of a java program? (3)

(c) Explain the following terms & their pupose (5)

i) instanceof ii) API iii) length() iv) capacity()

Q. 7 Explain the following terms with respect to exception handling. (6)

i) try ii) catch iii) throw iv) finally

(b) Differentiate between public, private , protected & default access specifier? (4)

(c) Differentiate between throw and throws? (4)

Q. 8 (a) Explain the relevance of super & this keyword in java. Elaborate with an example? (6)

(b) What is Unicode? How it is useful? (4)

(c) What is inner class? Explain whether inner class is secure and useful. Justify your answer. (4)

Q. 9 (a) What is Class? How does it accomplish Data Hiding? Explain with an example. (5)

(b) Why is Java called Machine Independent Language? Explain the functionality of JVM. (4)

(c) What are Interfaces in Java ? What do you understand by 'implementing interfaces ' ? Explain with the help of an example.(5)

Q.10 (a) Consider the 'following class hierarchy & construct java program that effectively represent the solution of given problem: (10)

Sportsperson (Name) has two hierarchical elements as

i) Athlete (Event)

ii) Hockey player (Goals scored)

In this hierarchy, you can assume that a sportsperson can either be an athlete or a hockey player. Every sportsperson has a unique name. An athlete is characterized by the event in which he/she participates; whereas a hockey player is characterized by the number of goals scored by him/her. Perform the following tasks using Java : (i) Create the class hierarchy with suitable instance variables and methods.

(ii) Create a suitable constructor for each class.

(iii) Create a method named display_all_info with suitable parameters. This method should display all the information about the object of a class.

(iv) Write the main method that demonstrates polymorphism.

(b) Explain the following and their usage using suitable examples : (4)

(i) Extends (ii) Implements