Time: 1 hour 30 mints   **B-JET Training Program**   Marks: 50
Start Time: 3:00 PM   **Question Paper**
Set-A

Note: Each question has 10 marks.

Please use any standard Computer Programming Language like C/C++, Java, Python etc. to solve the following problems:

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1. One arithmetic series is given below. You have to write a program to take needed input and print output of the result using those input.

    result = a + (a+r)^p+ (a+2r)^p+ (a+3r)^p+…….+(a+n.r)^p

    Example:
    Input:
         a = 2
         r = 1
         p = 2
         n = 5
    Output:
         result = 137

2. What will be return/output from the following programs.
    a)
    ```
    int function1(int x) {
            int r = 1;
            r += x;
            if (x > 4 && x < 10) {
                    r += 2 * x;
            } else if (x <= 4) {
                    r += 3 * x;
            } else {
                    r += 4 * x;
            }
            return r;
    }
    ```
    What will return for **function1(10)** call?
    b)
    ```
    function2(int x) {
            for (int i = 1;  i < x;  i++){
                    for(int j = x;  j >= i-1;  j--) {
                            print(j);

                    }
                print("\n");
            }
    }
    ```
    What will the output for **function2(10)** call?

1. You are given a doubly linked list of fractional numbers and total number of elements n(n>2 and n<10). Write a function that will sort the numbers smallest to largest

   Example:

   Input:

     1/2, 2/3, 4/7

   output:

   1/2, 4/7, 2/3

2. Design a toll booth Application of Padma bridge. At booth, it will collect the amount of toll from all the vehicles passing through based on the vehicle types (i.e. motorcycle, Buss, Truck, Car, Train etc.) and categories (Govt, Personal, carriage of Goods, Public etc.) and weight of the vehicles etc.

   Let's assume that Govt wants to encourage its citizen for paying tax regularly. So, it has categorized the taxpayer and provided a card (Platinum, Gold, Silver) to get discount on various public and non-public services. Let's consider that Govt has declared (Platinum->10%, discounts, Gold->8%, Silver->5%) in Tolls Fees, and for Govt vehicles (No Tool fees), for Personal Vehicles-> Govt Official (2%).

   Design the model and implement the program from OOD and OOP (Inheritance, polymorphism) concept. Also implement a method ie. calculateToll(Vehicle) which is taking and returning the tollAmount to be paid at toll booth.

3. A graph G with 13 edges is shown in the figure:
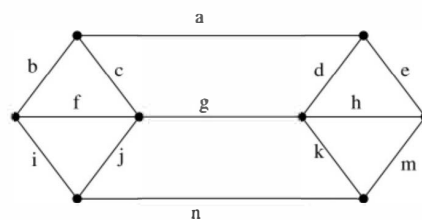
   The edges of G have weights given by the following table

Edge	a	b	c	d	e	f	g	h	i	j	k	m	n
Weight	1	1	3	3	6	4	5	6	2	4	2	7	2

Use any standard algorithm to find a minimum spanning tree S in G. Write the edges of S in the order in which they are added to S. (If there is more than one possible solution then write only one of them.) Write a function to implement the algorithm?