Course Name: Data Structures

Lab # 1

Topic: Basic C++ — Variables & Arithmetic Only (No loops, no conditionals)

Instructions:

Answer the following tasks using only variables and basic arithmetic (no loops, no conditionals). Use meaningful variable names and print clear labels.

Questions:

1 Read two integers and print their sum.

2 Read two integers and print their difference (first minus second).

3 Read two integers and print their product.

4 Read two integers and print the integer quotient and remainder (use / and %).

5 Read a floating-point number and print its square.

6 Read a floating-point number and print its cube.

7 Given the side of a square, compute its perimeter and area.

8 Given the length and width of a rectangle, compute perimeter and area.

9 Given the radius r, compute circumference and area of a circle (π=3.14159).

10 Convert temperature from Celsius to Fahrenheit.

11 Convert temperature from Fahrenheit to Celsius.

12 Given distance in kilometers and time in hours, compute average speed (km/h).

13 Convert minutes to hours and remaining minutes (hint: use / and %).

14 Convert seconds to hours, minutes, and seconds (use / and %).

15 Given principal P, rate R (annual %), and time T (years), compute simple interest SI = (P×R×T)/100 and amount A = P + SI.

16 Given base and height, compute area of a triangle (A = 0.5×base×height).

17 Given three sides a, b, c, compute the semi-perimeter s and area using Heron's formula: A = sqrt(s(s−a)(s−b)(s−c)).

18 Compute Body Mass Index (BMI) given weight (kg) and height (meters): BMI = weight / (height^2).

19 Convert an amount in Pakistani Rupees to US Dollars given an exchange rate.

20 Given a number of days, compute total hours, minutes, and seconds.

21 Compute the average of three numbers.

22 Compute the weighted average of three scores given weights w1, w2, w3.

23 Compute compound amount A = P(1 + r/n)^(n*t) (use pow) for given P, r, n, t.

24 Given a mark out of 100, compute mark as a fraction and as a percentage.

25 Given two points (x1,y1) and (x2,y2), compute the Euclidean distance.

26 Given two numbers, compute their arithmetic mean, geometric mean, and harmonic mean (use sqrt for geometric).

27 Given a salary, compute annual salary after a fixed bonus and a fixed tax percentage (no conditionals).

28 Convert a total number of inches to feet and remaining inches.

29 Convert a total number of centimeters to meters and centimeters.

30 Compute the final price after applying a discount percentage to an item price.

31 Compute the GST/VAT amount and final bill given price and tax rate.

32 Given base b and exponent e, compute b^e using pow (no loops).

33 Compute the perimeter of an equilateral triangle given side a.

34 Compute the area of a regular hexagon of side a using A = (3*sqrt(3)/2)*a^2.

35 Compute the final velocity using v = u + a*t.

36 Compute displacement using s = u*t + 0.5*a*t^2.

37 Compute the time to cover a distance d at constant speed v.

38 Given monthly rent and months, compute total rent and average per day (assume 30 days per month).

39 Given the diameter of a circle, compute radius and area.

40 Given two angles of a triangle, compute the third angle (sum is 180).