

Answer Script Upload Link: <https://forms.gle/gb4TuE4BXfets3mw8>

ASUTOSH COLLEGE
 (Affiliated to University of Calcutta)
Semester 1- Examination
Physics-Honours (practical)
Paper-CC1
Full Marks-30
Time- 2Hrs

Answer any one question

(15+15=30)

1. a) Write a GNUPLOT code for a function $y=2x^2$. Set the range of x values from -3 to +3 and the range of y values from 0 to 18. The labels of x axis and y axis will be “x values” and “y values” respectively. Set the title as “My Plot”. Ticks on the x axis will be at an interval of 0.5 and on the y axis will be 2. Write also the code to plot the function. (2+3+3+2+3+2)

b) Roots of a quadratic equation: Input the coefficients of a quadratic by prompting the form $ax^2 + bx + c$, with a, b, c being real. Then find the discriminant and print it. Next depending on the value of the discriminant print, ‘real roots’ with pair of roots, ‘equal roots’ with the root, and ‘complex roots’ with the pair of roots. (4+4+7)

2. a)

x	-2	-1	1.2	2.1	3.3
y	-4	-1	2.1	4.2	6.6

Write a GNUPLOT code to plot the data in the y axis against that of x axis. Set the range of x values from -2 to +4. Write the code to fit the data with the equation of the type $f(x)=mx+c$. Code will be such that the given data points and the fitted line will be on the same plot. Set the label of x axis as “x values” and label of y axis as “y values” and give the title as “data fitting”. Write the code to show the $x=0$ and $y=0$ axis on the plot. (3+3+3+3+3)

b) Decimal to Binary conversion: Take a positive integer as user input by prompting ‘Enter the number’. Define an empty string. Calculate the quotient and remainder in each successive step of division and print it in ‘q | r’ form. Hence store the remainder in the initial empty string. Print the final binary equivalent computed. (4+4+7)

3. a) Write a GNUPLOT code to define following functions in the given range:-

$$f_1(x)=x^3 \quad x>2$$

$$f_2(x)=x \quad -1<x<2$$

$$f_3(x)=3 \quad x<-1$$

Write the code to set the range of x values from -4 to +4 and the range of y values from -2 to +8. Set tick of x axis at an interval of 1. Set the label of x axis as "x values" and of y axis as "y values". Set the title as "Ternary Operator". Write the code to plot the functions.

(3+3+3+3+1+2)

- b) **Truncated Exponential series:** Take a number 'x' as user input for 'computing exponent', and 'n' as 'number of terms to be computed in the series'. Create the terms of the exponential series upto order 'n' by list comprehension. Hence sum the series. Print the 'approximate value of the truncated series' and 'the actual value of the exponent' with the prompts.

(4+4+7)