

**B.Sc. 3rd Semester (Honours) Examination, 2020-21**

**PHYSICS**

**Course ID: 32415**

**Course Code: SH/PHS/305/SEC-1**

Course Title: Computational Physics

**Time: 2 Hours**

**Full Marks: 40**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words*

*as far as practicable.*

1. Attempt any *five* questions: (2x5=10)
    - a) Write down the latex environment for inserting mathematical equations.
    - b) Give an example declaring double precision for a numerical value in FORTRAN.
    - c) Write GNU plot statement for plotting first column against second column of 'out.dat' file.
    - d) Declare variable types of real value R and complex value C in FORTRAN.
    - e) Give one example each for high level and low level programming languages.
    - f) What is the need for subroutines in programming?
    - g) What is the syntax for citation in a latex document?
    - h) What is the role of INTENT in FORTRAN programming?
  
  2. Attempt *any four* questions: (5x4=20)
    - a) Using DO loop statement in FORTRAN generate a voltage data set varying from 0V to 20V with an interval of 1V.
    - b) Give an example for inserting a '.jpg' figure into a latex environment.
    - c) Give a nested loop structure consisting of two DO loops.
    - d) What is control statement in FORTRAN? What is the role of arithmetic IF?
    - e) Write a small programme to print 'Negative' if a variable 'x' is less than zero.
    - f) Write a FORTRAN statement for opening a '.dat' file. What does it mean to read a file in programming?
  
  3. Attempt *any one* questions: (10x1=10)
    - a) Give GNU plot command for plotting the function  $f(x)=e^{-0.1x} \sin x$  within the range  $x=\{0, 100\}$ . How to put x and y axis labeling as 'x' and 'f', respectively? Write the command for saving the plot as 'func.eps' file. 4+3+3=10
  
    - b) What is the role of IMPLICIT NONE in FORTRAN programming? Write a short FORTRAN programme for adding first twenty positive integers. 2+8=10
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