DF-1517
M. Sc. (Sem. III) Examination
March/April – 2016
Physics : Paper - PH(T)-533
(Computer Applications in Physics)
(Specialization : Theoretical Physics)

Time : 3 Hours] [Total Marks : 70

Instructions :

(1) Fill up strictly the details of signs on your answer book.
   Name of the Examination:
   M. SC. (SEM. III)
   Name of the Subject:
   PHYSICS : PAPER - PH(T)-533
   Subject Code No.: 1 5 1 7 Section No. (1, 2,....): Nil

   Seat No.:
   Student's Signature

(2) Symbols used have their usual meaning.

(3) Figures to the right indicate full marks.

1 Attempt any two out of the (a), (b) and (c) below.

(a)(i) Explain the following commands with proper examples in Mathematica.

   (i) % (ii) %% (iii) %%,.....% (k times) (iv) %n

   (ii) Explain difference between N [] and //N with appropriate example.

(b)(i) Write down and explain syntax of import and export data in Mathematica
   with suitable examples.

(ii) Define function in Mathematica. Explain it with proper example.

(c)(i) Explain the meaning of following commands with proper syntax in
   Mathematica.

   (i) ContourPlot (ii) DensityPlot (iii) Plot3D (iv) LogPlot

(ii) By taking proper example explain the meaning of expr /. → value and
   expr /. { x → x value, y → y value}
2 Attempt any two out of the (a), (b) and (c) below.

(a) Explain various matrix operations in Mathematica by giving examples. 7

(b) (i) What are "kernel" and "fontend" in Mathematica? 4

(ii) Discuss the use of Expand, Factor and Apart in Mathematica with suitable example. 3

(c) (i) Explain the meaning of Union, Join, Intersection and Limit command with suitable example. 4

(ii) Write down the program in Mathematica for multiplication, summation and inversion of 3x3 matrices. 3

3 Attempt any two out of the (a), (b) and (c) below.

(a) What is an operating system? What are the general features of Windows operating system? 7

(b) (i) How to plot graph in SigmaPlot? 4

(ii) Write down the steps to generate data $x$ versus $\sin(x)$ and plot graph in Excel Worksheet. 3

(c) (i) Explain the meaning of the following command in DOS and also write its equivalent command in Linux:

(a) dir  (b) copy  (c) del  (d) md

(ii) How to define function in Mathcad? Explain it with Proper Example. 3

4 Attempt any two out of the (a), (b) and (c) below.

(a) Explain Multilink Multidimensional Computing System. 7

(b) (i) Write down note on Array Processor. 4

(ii) Draw task graph of this expression, $a = \cos(f^3(x)) + \cos(g(y)) + e h(z)$. 3

(c) (i) Explain the method of Temporal Parallelism. 4

(ii) Explain the need of Parallel Computers. 3

5 Attempt any two out of the (a), (b) and (c) below.

(a) Discuss the difference between FORTRAN 90 and FORTRAN 77. 7

(b) (i) Write down the syntax of MODULE statement in FORTRAN 90 with proper example. 4

(ii) Discuss the PARAMETER statement in FORTRAN 90. 3

(c) (i) Discuss Array operations with Mask. 4

(ii) Write down the program for 3x3 matrix addition in FORTRAN 90. 3