

SET-A

Name of the Course : B.Sc. Hons. + Prog.-CBCS_SEC

Semester : III + V - Semester

Name of Paper : Computational Physics Skills

Unique Paper Code : 32223902

Duration : 3 Hours

Maximum Marks : 50

Instructions for Candidates:

Attempt any Four question in total. All questions carry equal Marks.

Q1(a) Write a Fortran program to convert a temperature given in Celsius to Fahrenheit.

(b) Write a Fortran program to calculate factorial of a number.

Write a Fortran program to calculate

$$\sum 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \frac{x^{10}}{10!}; \quad \text{at } x = 1. \quad (5+7.5)$$

Q2(a). Write a Fortran program to evaluate the following expressions:

$$w = \frac{a}{s(s-a)}; \quad x = wa; \quad t = \frac{x}{s-a}$$

(b). Write a Fortran program to calculate roots of a quadratic equations for following three cases of discriminant (D)

(i) $D=0$; (ii) $D \leq 0$; (iii) $D > 0$ **(6.0+6.5)**

Q 3(a) Explain with example, how one can insert figure and table of contents using Latex.

(b) Write a LaTeX code to write the following set of equations:

$$L = L_0 \sqrt{1 - \frac{v^2}{c^2}}$$
$$E^2 = p^2 c^2 + m_0^2 c^4$$
$$\nabla \times E = -\frac{dB}{dt}$$

$$\nabla \times B = J + \frac{dH}{dt} \quad (6.0+6.5)$$

Q 4(a) Write the basic structure of a LaTeX document and write the steps to generate output from the Latex source file.

(b) Write the latex code for including lists in a document with an example. Write the output of the following LaTeX code

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$m = m_0/\sqrt{1-\frac{v^2}{c^2}}$ \\\
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$n = n_0 e^{-\lambda t}$
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 (6.0+6.5)

Q 5(a) Explain with example, how to fit curve to a given data in gnu plot.

(b) Describe how the plot generated by gnuplot may be saved in a file.

Describe how the parametric curves may be plotted. (6.0+6.5)

Q6(a) Name any six terminal types in gnuplot and their corresponding output file extension.

(b) How can you plot three dimensional graph in gnuplot with title of the graph and title of axis. Describe how a legend may be enabled in gnuplot.

What is the use of “load” statement in gnuplot. (6.0+6.5)