

RW-6389**581101****M.Phil. DEGREE EXAMINATION, DECEMBER 2010****Physics****RESEARCH METHODOLOGY AND PROGRAMMING**

(CBCS–2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** the questions. (5 × 15 = 75)

Each questions carries 15 marks.

1. (a) (i) What are the applications of internet e-mail and e-journal during research ? What is the role of WWW- Web browsing ?
- (ii) How do you asses the status of the research problem ?

(Or)

- (b) (i) What is research report ? Why should a researcher report his research findings ?
- (ii) How is literature survey and reference helpful in carrying out the research ?

2. (a) (i) Using the method of least squares fit a curve of the following form $Y = ab^x$ to the following data :

x	:	1	2	3	4
Y	:	4	11	35	100

- (ii) Find the smallest positive root of the equation $x^3 - 2x + 0.5 = 0$ using Newton-Raphson method.

(Or)

- (b) (i) Derive an expression for solving differential equation by second order Runge-Kutta method.

- (ii) Evaluate $\int_4^{5.2} \ln x \, dx$ using Trapezoidal rule by dividing the interval of integration into six equal parts of width $h = 0.2$.

3. (a) Explain how will you interface a stepper motor using 8085.

(Or)

- (b) Write an essay about the various interrupts involved in 8085.

4. (a) (i) Explain scanf and printf functions with examples.
- (ii) What are Library functions ? Mention its applications.

(Or)

- (b) (i) Explain with examples the rules to be followed in using While and Do-while loop.
- (ii) Differentiate switch and break statements with example.

5. (a) (i) Explain the program structure of a function.
- (ii) State the explain the different types of storage class variables in C language.

(Or)

- (b) (i) What are multidimensional arrays ? Explain with example.
- (ii) Write a C program for arranging the given set of numbers in the descending order.

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RW-6390**581102****M.Phil. DEGREE EXAMINATION, DECEMBER 2010****Physics****ADVANCED PHYSICS**

(CBCS–2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

(5 × 15 = 75)

Answer **all** questions.

Each question carries 15 marks.

1. (a) Show that the Classical Hamiltonian equations of motion for a field agree with the Lagrangian equation in a cell approximation.

(Or)

- (b) Give a simple derivation of Klein-Gordon equation. Discuss the difficulties historically associated with the interaction of this equation and how they have been overcome.

2. (a) Give short notes on Localised Bonds and Valence Bond theory.

(Or)

- (b) Discuss the elementary ideas of :

(i) Hartree method ;

(ii) Hartree and Fock method in Field techniques.

3. (a) Explain with a neat diagram, the construction and working of He-Ne Laser. State any three applications of lasers.

(Or)

- (b) Give short notes on Q-switching and Mode locking.

4. (a) Draw the block diagram of Fourier transform interferometer and explain its working.

(Or)

- (b) Describe the construction and working of X-ray powder diffractometer.

5. (a) Explain the electron spectroscopy for Chemical analysis.

(Or)

- (b) Discuss the theory of SEM and TEM.

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