

15P209

(Pages: 2)

Name.....

Reg. No.....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, JULY 2016

(CUCSS)

(Physics)

CC 15P PHY2 C08 - COMPUTATIONAL PHYSICS

(2015 Admission)

Time: Three Hours

Maximum: 36 Weightage

Section A

Answer *all* questions

1. Distinguish between compilers and interpreters. Mention the advantages and disadvantages of both.
2. What is meant by operator precedence? Mention the different arithmetic operators in Python and give its precedence.
3. Compare between list and dictionaries in Python
4. What is a module? How modules are used in Python?
5. What are the different methods to create arrays in Python?
6. Explain briefly any four functions in *linalg* sub-package.
7. What are the methods available to solve simultaneous equations using *numpy*?
8. What are log-log plots and semi-log plots? How such plot can be made in Python?
9. What are parametric plots? How parametric plots can be created in Python?
10. What do you mean by zero of polynomials?
11. Define inverse of a function. Find the inverse of $f(y)=2y-8$
12. Explain Euler method. In what respect the modified Euler method differ from it?
(12 x 1 = 12 weightage)

Section B

Answer *any two* questions

13. Discuss with necessary examples, the different methods to implement repetitive structure (looping) in Python.
14. Discuss Discrete Fourier Transform (DFT) and explain the advantages of Fast Fourier Transform over DFT.
15. Explain Monte-Carlo method of integration and error analysis. Give the importance of sampling in Monte-Carlo method.
16. (a) Differentiate between analytical method and numerical methods. b) Discuss a Python program to study the working of a driven LCR circuit.
(2 x 6 = 12 weightage)

Section C

Answer *any four* questions

17. Develop a Python program to print prime numbers up to a number given as input.
18. Write a program to print the cross product and dot product of two vectors by entering the coefficients as input.
19. Find the roots of the following polynomial using Lauguerre's method.
$$P(x) = x^3 - 3x^2 + 3x - 1$$
20. Explain the relaxation method to solve differential equation.
21. Write a Python program to plot bifurcation diagram of logistic map function.
22. Write a Python program to simulate the Rutherford's experiment.

(4 x 3 = 12 weightage)
