17P213 (Pages: 2) Name……..……..

Reg. No……

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, MAY 2018

(Supplementary/Improvement)

(CUCSS - PG)

CC15P PHY2 C08 – COMPUTATIONAL PHYSICS

(Physics)

(2015 & 2016 Admissions)

Time: Three Hours Maximum: 36 Weightage

Section A

Answer ***all*** questions. Each question carries 1 weightage.

1. Why *strings* in python are called immutable?
2. Give the results of following python codes.
   a) for i in "india":
      print i
   b) 7.//2
   c) zeros(3)
   d) (7+4)/2.0*2-8%5
3. Write a python program to find the inverse of a matrix, if it exists.
4. How arrays can be created in Python? Specify two methods with example.
5. What is meant by inverse of a function? Find out the inverse of $f(x) = \frac{2y+3}{2}$
6. What are the differences between "input" function and "raw_input" function?
7. Explain the use of cubic spline.
8. Explain Bolzano's Theorem.
9. Explain the difference between "brake" function and "continue" function.
10. What is the difference between the instructions 'figure' and 'subplot'?
11. Write a programme for visualizing a parametric plot.
12. Explain the shooting method used in numerical analysis.

(12 × 1 = 12 Weightage)

Section B

Answer any ***two*** questions. Each question carries 6 weightage

13. Write a python program to simulate the central field motion.
14. Write a python program to simulate the LCR circuit.
15. What are the compound data types in python? Explain various operations on *list* and *set* in python.

16. a) Explain the basics of Monte Carlo methods.

    b) Write a python program to find the value of π by monte Carlo method

(2× 6 = 12 Weightage)

Section C

Answer any ***four*** questions. Each question carries 3 weightage.

17. Write a Python programme to find the current in a loop using Kirchoff's laws.
18. Write a python program using *linalg* module to solve the equations

    $2x - 3y + z = 12$

    $x + y - 2z = -9$

    $3x - y - z = 1$

19. What is FFT? Why it is called so?
20. What are the characteristics of logistic equation?
21. Write a Python programme to simulate the beeta function
22. Given that

    $s(x) = x^3 + Ax^2 - 4x + C$ within the limit $0 \leq x \leq 2$ &

    $s(x) = -x^3 + 9x^2 + Bx + 34$ within the limit $2 \leq x \leq 4$

    Find the constants A,B and C, such that s(x) is twice continuously differentiable on the interval [0, 4].

(4 × 3 = 12 Weightage)

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