19P210   (Pages: 2)   Name……..………………

Reg. No......………………..

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2020
(CUCSS - PG)
CC19P PHY2 C08 - COMPUTATIONAL PHYSICS
(Physics)
(2019 Admissions - Regular)

Time: Three Hours   Maximum:30 Weightage

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

1. Explain the difference between print a, b and print a,'\n', b.

2. Write a program to plot the 'Gaussian' function in 'matplotlib.

3. Write down the functions produces a Pie-chart in Python.

4. What do you mean by curve fitting? Explain empirical laws and curve fitting.

5. Explain the role of simulation studies in today's physics.

6. Explain the Euler's method of solving ordinary differential equations and comment on the errors in it.

7. Write a note on the condition for stability of attractor in logistic map.

8. Write a program in python to find the value of π using Monto Carlo method.

(8 x 1 = 8 Weightage)

Section B
Answer any *two* questions. Each question carries 5 weightage.

9. Explain different arithmetic operations performed on arrays.

10. (a) Explain how a straight line is fitted to a set of tabulated data, using the least square method.

    (b) How do you use this method for non-linear curve fitting in the case of (i) power function and (ii) n^{th} degree polynomial.

11. What are boundary value problems? Discuss various methods for solving boundary value problems.

12. (a) Discuss the formulation of problem from analytical method to numerical method.

    (b) Explain central field motion and write a 'Python' program for the same.

(2 x 5 = 10 Weightage)

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

13. Explain the concepts of functions in Python and also give different methods of loading built in function of a module.

14. A company give 65% of the basic pay as bonus to its employees. Write a python program to read the basic pay and print the bonus and the total.

15. Explain Monte Carlo method for doing simple integration.

16. Solve the differential equation $\frac{dy}{dx} = -y^2$ at $y(2)$ by Euler method. Given $y(1) = 1$.

17. Explain the Simpsons 3/8 method for numerical integration.

18. Explain how Euler method can be used to simulate the motion of a falling body through a viscous medium.

19. Explain the principle of radioactive decay. Write down a Python programme to simulate radioactivity.

(4 x 3 = 12 Weightage)

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