16U609 (Pages: 3) Name: ……..…….

Reg. No……..……

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2019

(Regular/Supplementary/Improvement)

(CUCBCSS-UG)

CC15U PH6 E01 - COMPUTATIONAL PHYSICS

Physics - Elective Course

(2015 Admission onwards)

Time: Three Hours Maximum: 80 Marks

Section A

Answer in a word or a phrase

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

1. …….. is the originator of Python.
2. The index of 3rd element in the string y is ……..
3. Write the python code to obtain [3, 4, 5] from x = [1, 2, 3, 4, 5, 6]
4. In python the result of 24%6 ……..
5. >>>x=2

   >>>x=x**2-2

   >>> x=?
6. Write an alternative expression for n*=10
7. First order Runge kutta method is also known as.

   a) Euler’s method b) Newton Raphson method

   c) Bisection method. d) simpson’s method
8. Both trapezoidal rule and Simpson’s one-third rule follow from a general formula known as

   a) Newton-cotes formul b) Newton Raphson formula

   c) Newton’s forward interpolation formula d) Runge kutta formula
9. The angle of projection which gives maximum range is ……..
10. >>>x=’my name’

    >>>y=’is Mr.x’

    >>>print x+y=?

(10 x 1 = 10 Marks)

Section B

Answer in two or three sentences each.

Answer ***all*** questions. Each question carries 2 marks.

11. What are the features of high level languages?

12. Distinguish between compiler and interpreter.
13. What are Dictionaries?
14. Compare Numerical method and analog method.
15. What is meant by curve fitting?
16. Explain Truncation error and Rounding of error.
17. What is meant by a Viscous Force? How it can be Calculated?

(7 x 2 = 14 Marks)

Section C

Answer in a paragraph of about half a page to one page.
Answer any ***five*** questions. Each question carries 4 marks.

18. Explain precedence of operators.
19. Explain mutable and immutable data types.
20. What is difference between 'from math import sin' and 'from math import*'?
21. Explain the use of range() function in python.
22. By Newton-Raphson Method, Find the solution of x^2-2x-1
23. Discuss the Simpsons rule for numerical integration.
24. Write a python code to find the largest number of three input variables.

(5 x 4 = 20 Marks)

Section D

Problems - Write all relevant formulas, all important steps carry separate marks.
Answer any ***four*** questions. Each question carries 4 marks.

25. Write a python code to find $\sqrt[3]{14}$
26. Construct a difference table with following data.

X	-2	-1	0	1	2
Y	-3.150	-1.3	0.620	2.880	5.378

27. Develop a python code to evaluate $\int_0^1 \frac{2dx}{x+x^2}$ using trapezoidal rule.
28. Solve the differential equation $\frac{dy}{dx} = x + y$ at y(1). Given that y(0) = 1 by Euler method.
29. Write a python code for projectile motion under the attractive inverse square law.
30. A body is falling under gravity against the flow of buoyancy. Estimate the velocity and position after 1 second using a time interval 0.25s, Given m = 4kg, r = 1cm, ρ = 2400kg/s
31. Develop a python code for the Taylor series expansion of *sin x* and *cos x*.

(4 x 4 = 16 Marks)

Section E

Essays - Answer in about two pages each.
Answer any ***two*** questions. Each question carries 10 marks.

32. a) Explain different Data types in Python.
    b) Explain different types of list methods in python.
33. a) Explain the control structures in python with suitable examples.
    b) Elucidate the difference between if…else and if….elif statements.
    c) Write a programme to find a given number is odd or even.
34. What is an interpolation? Derive Newton's formula for interpolation. Develop a python programme for it.
35. Explain the concept of discretization. Write a python code to find the terminal velocity of a freely falling body considering the air drag and explain the required theory.

(2 x 10 = 20 Marks)

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