

18U609

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Name:

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2021

(CUCBCSS-UG)

(Regular/Supplementary/Improvement)

CC15U PH6 E01 - COMPUTATIONAL PHYSICS

(Physics - Elective Course)

(2015 Admission onwards)

Time: Three Hours

Maximum: 80 Marks

Section A

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

1. translate high level language to machine level language.
a) Assembler b) Compiler c) CPU d) Operating system
2. The index of first element in a list
3. The loop is the alternate name of construct.
4. Extracting a part from string is known as
5. Which of the following is valid statement in python program?
a) Include math b) import math c) insert math d) call math
6. First order Runge kutta method is also known as
a) Euler's method b) Newton Raphson method
c) Bisection method d) simpson's method
7. What will be output of the statement >>>type(5+8j)?
8. Newton's forward interpolation formula is more useful in the case of finding
a) Value of function near the beginning of table
b) Value of function near to the end of table
c) Value of function in the middle of table
d) Value of function outside the range in the table
9. The angle of projection which gives maximum range is
10. When step size increases, Truncation error

(10 × 1 = 10 Marks)

Section B

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

11. Write a short note on Dictionaries.
12. Distinguish between compiler and interpreter.

(1)

Turn Over

- 13. Explain precedence of operators.
- 14. Compare Numerical method and analog method.
- 15. Explain the term ‘curve fitting’.
- 16. Give the Taylor series expansion of cos x about the point $\pi/2$.
- 17. Explain Discretisation.

(7 × 2 = 14 Marks)

Section C

Answer any **five** questions. Each question carries 4 marks.

- 18. Illustrate how the break and continue statements can be used in python.
- 19. Explain the use of range function in python.
- 20. Use the Newton Raphson method to find the root of the equation $x^3-2x-5=0$.
- 21. Find the value of Y for X=4.2 from the following table by using Newton’s forward interpolation formula.

x	4	4.5	5	5.5	6	6.5
y	18	22.25	27	32.25	39	44

- 22. Evaluate $\int_1^2 \frac{x^3+2x}{x^2+2x}$ using simpsons1/3 rule with step size 0.1

X	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
Y	1.000	1.035	1.075	1.118	1.165	1.214	1.267	1.322	1.379	1.438	1.500

- 23. Solve the differential equation $\frac{dy}{dx} = x^2 + y^2$ at y(0.8). Given that y(0)=1.
- 24. What is meant by air drag? How it can be calculated?

(5 × 4 = 20 Marks)

Section D

Answer any **four** questions. Each question carries 4 marks.

- 25. Write a python code to find the largest number of three input variables.
- 26. Write a python code to check whether the year 2020 is leap year or not.
- 27. Write a python code to find $\sqrt[3]{14}$.
- 28. Develop a python code to evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal method.
- 29. Write a python code to print the multiplication table of required number which is given as input.
- 30. Write the python code for fitting a straight line.
- 31. Write a python code for projectile motion under the attractive inverse square law.

(4 × 4 = 16 Marks)

Section E

Answer any **two** questions. Each question carries 10 marks.

- 32. a) Explain the control structures in python with suitable examples.
b) Elucidate the difference between if...else and if...elif statements. Write a python code to find a given number is odd or even.
- 33. Explain different types of list methods in python.
- 34. Solve the differential equation $\frac{dy}{dx} = xy$ using RK2 method. Write a python code, Read the initial values from the key board and display the output in Tabular format.
- 35. Explain Two body problem using Euler method, write a python code to obtain numerical solution.

(2 × 10 = 20 Marks)
