QP CODE: 21101102

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Reg No : ....

Name : ....

B.Sc DEGREE (CBCS) EXAMINATION, APRIL 2021

Sixth Semester

Choice Based Core Course - PH6CBT03 - COMPUTATIONAL PHYSICS

Common for B.Sc Physics Model I, B.Sc Physics Model II Applied Electronics, B.Sc Physics Model II Computer Applications & B.Sc Physics Model III Electronic Equipment Maintenance

2017 Admission Onwards

F1051B3D

Time: 3 Hours   Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Why Newton-Raphson method is called method of tangents?
2. What is coefficient matrix?
3. What is a diagonal matrix?
4. Write down the steps involved in Dolittle method.
5. What do you mean by least square fitting?
6. What is the difference between $\Delta\, y_3$ and $\Delta^2\, y_3$?
7. Obtain the relation between Δ and E operators.
8. If y_1=4, y_3=12, y_4=19 and y_x=7. Find x using Lagrange interpolation formula.
9. Write Trapezoidal rule.
10. When does Simpson's rule give exact result.
11. Whether Picard's method can be applied to any first order differential equation with an initial value?
12. Write down the Euler's algorithm to solve the ordinary differential equation of the first order.

(10×2=20)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Find a root of the equation x^3-3x-5=0 by the method of false position.

14. Use the secant method to estimate the root of the equation x^2-4x-10=0 with the initial estimates of x_1=4 and x_2=2.

15. Check whether the system of equation is a diagonal system. If not make it a diagonal system x+6y-2z=5; 4x+y+z=6; -3x+y+7z=5.

16. Fit the exponential model y=a e^{bx} to the following data

X	0.4	0.8	1.2	1.6	2.0	2.4
Y	75	100	140	200	270	375

17. Form a divided difference table for the function f(x) = e^x for x =1.7, 1.8, 1.9, 2.0, 2.1, 2.2.

18. Derive Newton-Cote's quadratic formula.

19. Evaluate the values of y(0.1) and y(0.2), given $y''-x(y')^2+y^2=0$; y(0)=1, y'(0)=0 by using Taylor series method.

20. Given *y′=x^2-y, y(0)=1*, find correct to four decimal places the value of y(0.1), by using Heun's method.

21. Apply Runge's method to find an approximate value of y when x=0.2, given y'=x+y and y (0)=1.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. Find a real root of the equation x^3-x-11=0 by using bisection method.

23. Solve the following system of equations using Gauss-Seidel iteration method 6x+15y+2z=72; x+y+54z=110; 27x+6y-z=85.

24. Explain Newton's interpolation formula. The population of a town in the census is as given below. Estimate the population for the year 1965 using Newton's forward interpolation formula.

Year	1961	1971	1981	1991	2001
Population	46	66	81	93	101

25. The population of a certain town is given below. Find the rate of growth of the population in 1931, 1941, 1961 and 1971.

Year	1931	1941	1951	1961	1971
Population in thousands	40.62	60.80	79.95	103.56	132.65

(2×15=30)