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(21218) Roll No. .....

BCA-V Sem.

18024

B. C. A. Examination, Dec. 2018

Numerical methods

(BCA-504)

(New Course)

Time : Three Hours] *[Maximum Marks : 75*

Note : Attempt questions from all Sections as per instructions. Calculator is allowed.

Section-A

(Very Short Answer Questions)

Attempt all the *five* questions. Each question carries 3 marks. 3×5=15

1. Find $\sqrt{12}$ by applying Newton-Raphson's method.

2. Prepare a divided difference table for the following data :

x	1	2	4	7	12
$f(x)$	22	30	82	106	216

3. Find the first derivative of $f(x)$ at $x = 0.4$ from the following table :

x	0.1	0.2	0.3	0.4
$y = f(x)$	1.1051	1.2214	1.3498	1.4918

4. Solve :

$$5x - y - 2z = 142$$
$$x - 3y - z = -30$$
$$2x - y - 3z = 5$$

by Gauss's elimination method.

5. Given that :

$$\frac{dy}{dx} = \frac{y - x}{y + x}, \quad y(0) = 1,$$

find $y(0.1)$ by Picard's method.

Section-B

(Short Answer Questions)

Attempt any *two* questions out of the following three questions. Each question carries 7½ marks. 7½×2=15

6. Given $f(0)=16.35$, $f(5)=14.88$, $f(10)=13.59$, $f(15)=12.46$ and $f(x) = 14.00$, find x.

7. Estimate the sale for 1966 using the following data :

Year	Sales (in thousand)
1931	12
1941	15
1951	20
1961	27
1971	39
1981	52

8. Find the root of $x^2 - 5x + 2 = 0$ correct to five decimal places by Newton-Raphson's method.

Section-C

(Detailed Answer Questions)

Attempt any *three* questions out of the following five questions. Each question carries 15 marks. $15 \times 3 = 45$

9. Using Runge-Kutta method, find an approximate value of y for $x = 0.2$ if $\frac{dy}{dx} = x + y^2$, given that $y = 1$ when $x = 0$ and $h = 0.1$.

10. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's '3/8' rule. Hence obtain the approximate value of π.

11. Solve by Gauss-Seidel method of iteration, the equations :

$$10x + y + z = 12$$
$$2x + 10y + z = 13$$
$$2x + 2y + 10z = 14.$$

12. Using Stirling formula, find $f(28)$ from the following table :

$f(20) = 49225$, $f(25) = 48316$, $f(30) = 47236$, $f(35) = 45926$, $f(40) = 44306$.

13. Find the real root of the equation $x \log_{10} x - 1.2 = 0$. Correct to five places of decimal.