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Assignment-1

Subject: Mathematics-III

(BT-401)

(Common to CS/IT/EX/EE)

Topic: Numerical Methods-1

1. Find a real root of equation by Bisection method correct to three decimal places.
 - (i) $f(x) = x \log_{10} x = 1.2$
 - (ii) $f(x) = x^3 - 4x - 9$
 - (iii) $f(x) = x^3 - x - 4$ which lies between 2 and 3 (up to three iteration only)
2. Find a real root of equation by False Position method correct to three decimal places.
 - (i) $f(x) = x \log_{10} x = 1.2$
 - (ii) $f(x) = x^3 - 4x - 9$
 - (iii) $f(x) = xe^x - 2$
 - (iv) $f(x) = xe^x - \cos x$
3. Find a real root of equation by Newton's Raphson method correct to three decimal places.
 - (i) $f(x) = 3x - \cos x - 1$
 - (ii) $f(x) = x^3 - 3x + 1$
 - (iii) $f(x) = x^3 - 2x + 0.5$
4. Evaluate $\sqrt{12}$ correct to four decimal places by Newton's Raphson method.

5. Determine the Newton's Raphson iterative formula to find the K^{th} root of N.
6. Prove that

(i) $E = e^{hD}$ (ii) $\log(1 + \Delta) = -\log(1 - \nabla) = hD$

(iii) $\Delta \cdot \nabla = \Delta - \nabla = \delta^2$ (iii) $\left(E^{\frac{1}{2}} + E^{-\frac{1}{2}}\right)(1 + \Delta)^{\frac{1}{2}} = 2 + \Delta$ (iv) $\left(\frac{\Delta^2}{E}\right)e^x \frac{E(e^x)}{\Delta^2 e^x} = e^x$

7. Evaluate $\Delta^2 \left\{ \frac{5x + 12}{x^2 + 5x + 6} \right\}$ interval of differencing being unity.

8. Express $y = 2x^3 - 3x^2 + 3x - 10$ in factorial notation form.

9. Find the function whose first difference is $9x^2 + 11x + 5$

10. Interpolate $f(2.1)$ and $f(2.4)$ from the following data:

x	2.0	2.1	2.2	2.3	2.4	2.5	2.6
f(x)	0.135	-	0.111	0.100	-	0.082	0.074

11. The area 'A' of a circle of diameter 'd' is given for the following values:

d:	80	85	90	95	100
A:	5026	5674	6362	7088	7854

By using approximate interpolation formula, find approximate values for the areas of circles of diameter 82 and 91 respectively.

12. Find the cubic polynomial in x for the following data:

x	0	1	2	3	4	5
y:	-3	3	11	27	57	107

13. By using Lagrange's and Newton dividing difference formula. Find the value of $f(9)$.

x:	5	7	11	13	17
f(x):	150	392	1452	2366	5202

14. By using Newton dividing difference formula. Find the value of $f(8)$, $f(9)$, & $f(15)$.

x:	4	5	7	10	11	13
f(x):	48	100	294	900	1210	2028

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