JHARGRAM RAJ COLLEGE
JHARGRAM – 721 507

DEPARTMENT OF MATHEMATICS

ANSWER ANY FIVE OF THE FOLLOWING

1. If $\pi = \frac{22}{7}$ is approximated as 3.14, find the absolute error, relative error and percentage of relative error.

2. Given that $a = 10.00 \pm 0.05, b = 0.0356 \pm 0.0002, c = 15300 \pm 100 \, \& \, d = 62000 \pm 500$. Determine the maximum value of the absolute error in $a + b + c + d$.

3. Is Bisection Method (to approximate the solution of a non – linear or transcendental equation) conditionally convergent or it is certain? Explain your answer with proper justification.

4. Suggest a value of the constant k, so that the iteration formula $x = x + k(x^2 - 3)$ may converge at a good rate, given that $x = \sqrt{3}$ is a root.

5. The equation $x^2 + ax + b = 0$ has two real roots $\alpha \, \& \, \beta$. Show that the iteration formula $x_{n+1} = -\left(\frac{x_n^2 + b}{a}\right)$ is convergent near $x = \alpha$ if $2|\alpha| < |\alpha + \beta|$.

6. Determine p, q and r so that the order of the iterative method $x_{n+1} = px_n + \frac{qa}{x_n^2} + \frac{ra^2}{x_n^5}$ for $a^{1/3}$ becomes as high as possible.

7. Evaluate $\Delta tan^{-1}x$, taking h as the constant step length.

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