Faculty of Science

B.Sc (Mathematics) III-Year, CBCS-VI Semester Examinations, May/June 2019

PAPER: NUMERICAL ANALYSIS

Time: 3 Hours

Max Marks: 60

Section-A

I. Answer any Three of the following questions. (3x5=15 Marks)

1. Determine the fixed point of the function $g(x) = x^2 - 2$
2. Write the procedure to find the root of an equation using false position method.
3. Derive Newton's Forward Interpolation Formula
4. Construct divided difference table
5. Write the formulae for three point midpoint and end point along with error bounds

6. Approximate $\int_0^{0.35} \frac{2}{x^2-4} dx$ using Trapezoidal rule.

Section-B

II. Answer the following questions. (3x15=45 Marks)

7. (a) Use a fixed point iteration method to determine a solution accurate to within 10^{-2} to $x^4 - 3x^2 - 3 = 0$ on $[1,2]$ using $P_0 = 1$

(OR)

(b) Use Newton's Method to find the solution accurate to within 10^{-4} for the function $x^3 - 2x^2 - 5 = 0$ in $[1,4]$

8. (a) For the function $f(x) = \sin \pi x$, let $x_0 = 1, x_1 = 1.25$ and $x_2 = 1.6$ construct interpolation polynomials of degree at most one and at most two to approximate $f(1.4)$ and find the absolute error.

(OR)

(b) Use Hermite Interpolation to construct an approximating polynomial for the following

(x)	$f(x)$	$f^1(x)$
0.8	0.22363362	2.1691753
1.0	0.65809197	2.0466965

9. (a) Let $f(x) = 3xe^x - \cos x$. Use the following data to approximate $f''(1.3)$ with h=0.1 and h=0.01 and compare with actual values.

(x)	1.20	1.29	1.30	1.31	1.40
$f(x)$	11.59006	13.78176	14.04276	14.30741	16.86187

(OR)

(b) Use Romberg Integration to compute $R_{3,3}$ for the integral $\left(\int_1^{1.5} x^2 \log x \, dx \right)$

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