

S6S-710-B-23
B.Sc. VI Semester (CBCS) Degree Examination
MATHEMATICS
(Numerical Analysis - II)
Paper - BMDSE 6CT
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

Answer All the sections.

SECTION - A**L Answer any TEN of the following.****(10×2=20)**

1. Define numerical differentiation. ✓
2. Write the formula to get the value of y' and y'' at initial point $x_r = x_0$ by using NFIF. ✓
3. Write the formula to get the value of y'' at near the end of the given data by using NBIF. ✓
4. Define numerical Integration. ✓
5. Define Trapezoidal rule. ✓
6. Define Simpson's 1/3 rule. ✓
7. Define Picard's method of successive approximation to solve IVP. ✓
8. Write the formula of Euler's method to solve an IVP.
9. Write the formula of R-k 4th order method to solve an IVP. ✓
10. Write Milen's predictor - corrected formula. ✓
11. Write the Adam's Bashforth predictor - corrector formula. ✓
12. Define boundary value problem.

SECTION - B**II. Answer any THREE of the following****(3×5=15)**

1. Evaluate
- $y'(0)$
- and
- $y''(0)$
- from the data

x	0	1	2	3	4	5
y	4	8	15	7	6	2

2. Find $\cos(10^\circ)$ given that $\sin(0^\circ) = 0$, $\sin(10^\circ) = 0.1736$, $\sin(20^\circ) = 0.3420$, $\sin(30^\circ) = 0.5000$, $\sin(40^\circ) = 0.6428$.
3. Find y' and y'' at $x = 54$ given

x	50	51	52	53	54
y	3.6840	3.7084	3.7325	3.7563	3.7798

4. Find
- $f'(2.2)$
- given

x	1.4	1.6	1.8	2.0	2.2
f(x)	4.0552	4.9530	6.0496	7.3891	9.0250

SECTION - C**III. Answer any THREE of the following.****(3×5=15)**

1. Evaluate $\int_{-3}^3 x^4 dx$ by trapezoidal rule by choosing $h = 1$.
2. Evaluate $\int_0^5 \frac{1}{4x+5} dx$ by using Simpson's 1/3rd rule. ✓
3. Evaluate $\int_0^1 \frac{x}{x^2+1} dx$ by using Weddle's rule. ✓
4. Evaluate $\int_0^6 \frac{1}{x^2+1}$ by using
- Trapezoidal rule.
 - Simpson's 1/3rd rule.
 - Weddle's rule.

SECTION - D

IV. Answer any **THREE** of the following.

(3×5=15)

1. Solve $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 0$ at $x = 0.4$ by Picards method.
2. Solve $\frac{dy}{dx} = x - y^2$, $y(0) = 1$ at $x = 0.2$ by Taylor's series method.
3. Solve $\frac{dy}{dx} = x + y$, $y(0) = 1$ at $x = 0.1$ by choosing $h = 0.05$ by Eulers modified method.
4. Solve $\frac{dy}{dx} = xy$, $y(1) = 2$ at $x = 1.2$ by R-k 4th order method.

SECTION - E

V. Answer any **THREE** of the following.

(3×5=15)

1. Using Adam's bashforth method find $y(0.4)$ given $\frac{dy}{dx} = x^2 - y$ and

x	0	0.1	0.2	0.3
y	1	0.90516	0.82127	0.74918

2. Given $y' = x^3 + y$, $y(0) = 2$, $y(0.2) = 2.073$, $y(0.4) = 2.452$ and $y(0.6) = 3.023$ find $y(0.8)$ using milne's P-C method.
3. Solve $y'' - y = 1$, $y(0) = 0$, $y(1) = 1.72$ choosing $h = 0.25$ by shooting method.
4. Solve BVP $y'' - y = 0$, $y(0) = 0$, $y(2) = 3.62686$ using finite difference method choose $h = 1/2$.

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