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CBCS/ SEMESTER SYSTEM

(w.e.f. 2022-23)

B.A./B.Sc. MATHEMATICS

SKILL ENHANCEMENT COURSE-VI - A

NUMERICAL METHODS

MODEL PAPER

Time:3Hrs **Max.Marks:75M**

SECTION - A

Answer any FIVE questions 5x5=25M
Each question carries 5 marks

1. If $u_0 = 3$, $u_1 = 12$, $u_2 = 81$, $u_3 = 200$, $u_4 = 100$, $u_5 = 8$ then find the value of $\Delta^5 u_0$

2. Using the inverse Lagrange's Interpolation formula find the value of x if $y_1 = 4, y_3 = 12, y_4 = 19, y_x = 7$.

3. Apply Guass forward formula to find the value of $f'(10)$ if $f(0) = 14, f(4) = 24, f(8) = 32, f(12) = 35, f(16) = 40$

4. Evaluate $\int_0^1 x^3 dx$ with five sub-intervals by Trapezoidal rule.

5. Using Euler's method solve for y at x=2 from $\frac{dy}{dx} = 3x^2 + 1$, y(1)=2 with step size h=0.5

6. Using R-K method of second order compute y(2.5) from $\frac{dy}{dx} = \frac{x+y}{x}$, y(2)=2 taking h=0.5.

7. Find u_3, using the data $u_0 = 8$, $u_1 = 11$, $u_4 = 68$, $u_5 = 123$.

8. Solve $\frac{dy}{dx} - 1 = xy$ and y(0)=1 find y(0.1) using Taylor Series Method.

SECTION B

Answer any FIVE questions. Each question carries 10 marks. 5x10=50M

9. (a) Prove the following

i) $\Delta = \frac{1}{2}\delta^2 + \delta\left(1 + \frac{\delta^2}{4}\right)^{1/2}$

ii) $\mu^2 = 1 + \delta^2/4$

Or

b) Find the missing value from the following data

x:	0	5	10	15	20	25
$f(x)$	6	10	-	17	-	31

10. (a) Given sin 45° =0.7071, sin 50° =0.7660 , sin 55° =0.8192, and sin 60°=0.8660 then find the value of sin 48°

OR

(b) By means of Newton divided difference formula find the value of f(8) and f(15) from the following data.

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

11. a) Find f'(1.1) and f''(1.1) from the following table :

X	1.1	1.2	1.3	1.4	1.5
f(x)	2.0091	2.0333	2.0692	2.1143	2.1667

or

b) Find the value of $f'(1.5)\, for f(x) = \frac{1}{1+x^2}$ using the following data

X	1.0	1.1	1.2	1.3	1.4
f(x)	0.5000	0.4524	0.4098	0.3719	0.3378

12 a) State and prove Simpson's One-Third Rule

OR

b) Integrate numerically $\int_0^{\frac{\pi}{2}} \sqrt{Sinx}$ by Weddle's rule