

SEMESTER	V	QP CODE	5201
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P.R. GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
SEM END EXAMINATIONS NOV-2024
III B.SC MATHEMATICS : NUMERICAL METHODS

TIME: 2 HRS

DATE & SESSION	8.11.24 & AN	REG NO								MAX MARKS	50
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SECTION-A

Answer any **THREE** questions. Choosing at least **ONE** questions from the each section.

3X10=30

PART-I

1. Find the missing entries in the following table

x	1	2	3	4	5	6	7	8
$f(x)$	1	8	—	64	—	216	343	512

2. State and prove Gauss's forward difference formula for equal intervals.

3. By Newton's divided difference formula, find the value $f(8)$ and $f(15)$ from the following table.

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

PART-II

4. Find the $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ derivatives of the function tabulated below at the point $x=2.2$.

x	1.0	1.2	1.4	1.6	1.8	2	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

5. Evaluate $\int_1^7 x^2 \log x \, dx$, using Weddle's rule.

6. Use Runge-Kutta method to evaluate $y(0.1)$ and $y(0.2)$ correct to four decimal

places, given $\frac{dy}{dx} = xy + y^2$, $y(0) = 1$.

SECTION-B

Answer any **FOUR** of the following. Each question carries **FIVE** marks. $5 \times 4 = 20$

✓ 11. Find the missing term from following data

x	0	1	2	3	4
f(x)	0	1	8	?	81

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

✓ 13. Find the third divided difference of the function $f(x) = x^3 - 2x$ for the arguments 2, 4, 9, 10

14. Find $f(10)$ by Lagrange's interpolation.

x	1	7	15
f(x)	168	192	336

15. Using the following table, compute $\frac{dy}{dx}$ at $x = 1$

x	1.0	1.1	1.2	1.3	1.4
y	0.5000	0.4524	0.4098	0.3717	0.3378

✓ 16. State and prove Trapezoidal Rule.

17. Using Taylor's series method, solve the equation $\frac{dy}{dx} = x^2 + y^2$ for $x = 0.4$, given that $y = 0$ when $x = 0$.