

	ENGINEERING MATHEMATICS III (AAS0301A) UNIT-IV	SESSION: 2022-23
		BRANCH: CSE/CS/IT SEM: III
Assignment Given Date: 12/11/22 Assignment Submission Date: 28/11/22	Maximum Points: 100 Weightage in University Exam: - 30	
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Note: Write solution of each question in clear handwriting.

Q.N.	Question Statement	Pts	CO	BLOOM'S KNOWLEDGE LEVEL														
1	Using Bisection Method- find a positive root of equation $xe^x = \cos x$ correct to 4 decimal places.	6	4	K ₃ , K ₅														
2	Using Regula Falsi Method- find a positive root of equation $x^4 - x - 10 = 0$ correct to 3 decimal places.	6	4	K ₃ , K ₅														
3	Using Newton Raphson Method-find a positive root of equation $x \log_{10} x = 4.77$ correct to 3 decimal places.	6	4	K ₃ , K ₅														
4	Determine the missing values in given table- <table border="1"><tr><td>x</td><td>10</td><td>15</td><td>20</td><td>25</td><td>30</td><td>35</td></tr><tr><td>$f(x)$</td><td>43</td><td>?</td><td>29</td><td>32</td><td>?</td><td>77</td></tr></table>	x	10	15	20	25	30	35	$f(x)$	43	?	29	32	?	77	10	4	K ₅
x	10	15	20	25	30	35												
$f(x)$	43	?	29	32	?	77												
5	Find the number of students from the following data who secured marks not more than 45 <table border="1"><tr><td>Marks</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td><td>70-80</td></tr><tr><td>No. of Students</td><td>35</td><td>48</td><td>70</td><td>40</td><td>22</td></tr></table>	Marks	30-40	40-50	50-60	60-70	70-80	No. of Students	35	48	70	40	22	10	4	K ₅		
Marks	30-40	40-50	50-60	60-70	70-80													
No. of Students	35	48	70	40	22													
6	Obtain Lagrange's interpolation polynomial for the following data- <table border="1"><tr><td>x</td><td>-1</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td>-21</td><td>15</td><td>12</td><td>3</td></tr></table> Also find the value of y at $x = 1.5$	x	-1	1	2	3	y	-21	15	12	3	10	4	K ₃ , K ₅				
x	-1	1	2	3														
y	-21	15	12	3														

7	Using Newton Divided Difference method find the interpolating polynomial and hence compute $f(1)$ from the following table- <table><tr><td>x</td><td>-3</td><td>-1</td><td>0</td><td>3</td><td>5</td></tr><tr><td>$f(x)$</td><td>-30</td><td>-22</td><td>-12</td><td>330</td><td>3458</td></tr></table>	x	-3	-1	0	3	5	$f(x)$	-30	-22	-12	330	3458	10	4	K_5
x	-3	-1	0	3	5											
$f(x)$	-30	-22	-12	330	3458											
8	Solve the following system of equations by Crout's Method: $x + y + z = 1, 3x + y - 3z = 5, x - 2y - 5z = 10$	10	4	K_3, K_5												
9	Solve the following system of equations by Gauss Seidel Method: $7x + 52y + 13z = 104, 83x + 11y - 4z = 95,$ $3x + 8y + 29z = 71$	10	4	K_3, K_5												
10	Evaluate $\int_0^1 \frac{dx}{1+x}$ by dividing the interval of integration into 8 equal parts. Hence find $\log_e 2$ approximately.	6	4	K_5												
11	Given the IVP $\frac{dy}{dx} = \frac{2xy}{x^2 - y^2}, y(1) = 3$. find the numerical solution at $x = 1.2$ with step size $h = 0.1$ by using Fourth order Runge-Kutta method.	10	4	K_3, K_5												
12	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using (i) Simpson's $\frac{1}{3}$ rule taking $h = \frac{1}{4}$ (ii) Simpson's $\frac{3}{8}$ rule taking $h = \frac{1}{6}$	6	4	K_3, K_5												

Solution:

1. **0.5177**
2. **1.855**
3. **6.083**
4. **33.933, 46.733**
5. **51**
6. **$x^3 - 9x^2 + 17x + 6$, 14.625**
7. **$5x^4 + 9x^3 - 27x^2 - 21x - 12$, -46**
8. **$x = 6, y = -7, z = 2$**
9. **$x = 1.057, y = 1.367, z = 1.961$**
10. **0.6931**
11. **2.8233**
12. **0.78539, 0.78539**