

DIVISION OF COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF ENGINEERING, CUSAT

B. TECH DEGREE FIRST INTERNAL EXAMINATION OCTOBER 2023

Semester V Course Title: 19-200-0501 Numerical and Statistical Methods

Faculty: Ms. Nandini . J

Time: 2 Hrs

Max. Marks: 50

CO1 Solve algebraic and transcendental equations by numerical methods.

CO2 Perform numerical differentiation and integration.

CO3 Find the mean and variance of a probability distribution including the binomial distribution.

CO4 Use statistical tests in testing hypotheses on data.

Bloom's taxonomy levels (L1-Remember, L2-Understand, L3-Apply, L4-Analyze L5-Evaluate L6-Create), PO-Program outcome

PART A (Answer ALL questions)				
I		Marks	BL	CO
a	Find the curve which passes through the points (0,18), (1,10), (3, -18) and (6,90).	5	L2, L3	1
b	Find a positive value of $(17)^{1/3}$ correct to four decimal places using Newton Raphson method.	5	L2, L3	1
c	Prove that (i) $\mu^2 = 1 + \frac{\delta^2}{4}$ (ii) $\Delta = \frac{\delta^2}{2} + \delta \sqrt{1 + \frac{\delta^2}{4}}$	5	L1	1
d	Using Newton's divided difference formula find f(9) from the following data. <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div>x: 5 7 11 13 17</div> <div>y: 150 392 1452 2366 5202</div> </div>	5	L3	1

PART B (Answer ANY THREE questions)			
II a)	Find the real root of the equation $xe^x - 2 = 0$ by the method of false position, correct to 3 decimal places.	5	L3 1
b)	Find the real positive root of $3x - \cos x - 1 = 0$ by Newton Raphson Method correct to 6 decimal places.	5	L3 1

III	<p>Using Gauss Seidal iteration method solve the system of equations correct to 4 decimal places.</p> $6x + 3y + 12z = 35$ $8x - 3y + 2z = 20$ $4x + 11y - z = 33$	10	L3, L4	1																
IV	<p>The following table gives the population of a town. Estimate, using Newton's interpolation formula, the increase in the population during the period 1946 to 1976.</p> <table><tr><td>Year (x)</td><td>1941</td><td>1951</td><td>1961</td><td>1971</td><td>1981</td><td>1991</td></tr><tr><td>Population in Lakhs (y)</td><td>20</td><td>24</td><td>29</td><td>36</td><td>46</td><td>51</td></tr></table>	Year (x)	1941	1951	1961	1971	1981	1991	Population in Lakhs (y)	20	24	29	36	46	51	10	L3, L4	1		
Year (x)	1941	1951	1961	1971	1981	1991														
Population in Lakhs (y)	20	24	29	36	46	51														
V	<p>Using Stirling's formula estimate the value of $\tan 16^\circ$ from the following table.</p> <table><tr><td>x</td><td>0</td><td>5</td><td>10</td><td>15</td><td>20</td><td>25</td><td>30</td></tr><tr><td>y=tan x</td><td>0</td><td>0.0875</td><td>0.1763</td><td>0.2679</td><td>0.3640</td><td>0.4663</td><td>0.5774</td></tr></table>	x	0	5	10	15	20	25	30	y=tan x	0	0.0875	0.1763	0.2679	0.3640	0.4663	0.5774	10	L3,L4	1
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y=tan x	0	0.0875	0.1763	0.2679	0.3640	0.4663	0.5774													

L1=10% L2=10% L3=70% L4=15%