Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (OLD) EXAMINATION – WINTER 2018

Subject Code:151601 **Date: 30/11/2018**

Subject Name: Computer Oriented Statistical Methods

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Define absolute error, relative error, truncation error and round off error. Evaluate the sum s = √3 + √5 + √7 to four significant digits and find its absolute and relative error. **07**

(b) Using Newton's divided difference interpolation, compute the value of f(6) from the table given below: **07**

x	1	2	7	8
f(x)	1	5	5	4

Q.2 **(a)** Perform three steps of False Position method to find a real root of $f(x) = x^3 - 2x - 5$. **07**

(b) Show that the Newton-Raphson method is 2nd order convergent. **07**

OR

(b) State Budan's theorem. Solve $x^4 - 4x^3 + 3x^2 - 10x + 8 = 0$ by Budan method, in the interval [-1, 0] and [0, 1]. **07**

Q.3 **(a)** Solve the following system of equations by Gauss Seidel method : **07**
x+y+54z = 110, 27x+6y-z = 85, 6x+15y+2z = 72.

(b) Use Lagrange's interpolation to find the value of when x = 10 if the following values of and are given: **07**

x	5	6	9	11
y	12	13	14	16

OR

Q.3 **(a)** Write Gauss Elimination algorithm. Also include pivotal condensation. **07**

(b) Derive the Recurrence relation for Chebyshev polynomials and using it define $T_2(x)$,$T_3(x)$ and $T_4(x)$. **07**

Q.4 **(a)** Write an algorithm for cubic spline interpolation. **07**

(b) Fit a second degree polynomial to the following data using least squares method. **07**

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

OR

Q.4 **(a)** Use Runge kutta method of order 4 to compute y(0.2) given that y(0) = 1, and $dy/dx = x + y^2$. Take h= 0.1 **07**

(b) Fit a curve of type $y = ax^b$ for the following data: **07**

x	1	2	3	4
y	2.50	8.00	19.00	50.00

Q.5 **(a)** Calculate 5-yearly moving averages for the following data **07**

Year	Production	Year	Production
2009	464	2014	540
2010	515	2015	557
2011	518	2016	571
2012	467	2017	586
2013	502	2018	612

(b) Derive trapezoidal rule. Evaluate **07**

$$\int_0^6 (1/(1+x))\,dx$$

Taking n = 6, correct to four significant digits by Simpson's 1/3rd rule.

OR

Q.5 **(a)** Calculate seasonal indices by the ratio-to-moving average method from the following data: **07**

Year	Quarter I	Quarter II	Quarter III	Quarter IV
2016	68	62	61	63
2017	65	58	66	61
2018	68	63	63	67

(b) The sale of a company rose from Rs.60000 in the month of October to Rs.69000 in the month of November. The seasonal indices for these two months are 105 and 140 respectively. The owner of the company was not at all satisfied with the rise of sales in the month of November by Rs.9000. He expected much more because of the seasonal index for that month. What was his estimate of sales for the month of November? **07**

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