Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–V (Old) EXAMINATION – WINTER 2019

Subject Code: 151601   **Date:** 27/11/2019

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)**	Explain the concept of significant digits. Also explain the difference between accuracy and precision.	**07**
	(b)	Write an algorithm of Regula False position method.	**07**
Q.2	**(a)**	Find a root of $x^4 – x^3 + 10x + 7 = 0$, correct up to three decimal places between -2 and -1 by the Newton-Raphson method.	**07**
	(b)	Find all roots of the equation $x^3 – 2x^2 – 5x + 6 = 0$ by Graeffe's method, squaring thrice.	**07**

OR

	(b)	Using bisection method, find an approximate root of the equation $\sin x = 1/x$, that lies between $x = 1$ and $x = 1.5$. Carry out computations up to the 7th stage.	**07**
Q.3	**(a)**	The following data gives the melting point of an alloy of lead and zinc, where t is the temperature in ^0C and p is the percentage of lead in the alloy.	**07**

p (%):	60	70	80	90
t:	226	250	276	304

Find the melting point of the alloy containing 84% of lead, using Newton's interpolation formula.

	(b)	Using Lagrange interpolation method find $f(x)$ and hence find y at $x = 4$ from the given data below.	**07**

x:	1.5	3	6
y:	-0.25	2	20

OR

Q.3	**(a)**	If P is the pull required to lift a load W by means of pulley block, find a linear law of the form $P = mW + c$ connecting P and W using following data:	**07**

P:	12	15	21	2
W:	50	70	100	120

Where P and W are taken in kg-wt. Compute P when W = 150kg.

	(b)	Find cos (1.74), from the following data using proper numerical method:	**07**

x:	1.7	1.74	1.78	1.82	1.86
sin x:	0.9916	0.9857	0.9781	0.9691	0.9584

Q.4	**(a)**	What is meaning of diagonally dominant system? Solve the following system of equation using Gauss Jacobi method $20x + y – 2z = 17$, $3x + 20y – z = -18$, $2x – 3y + 20z = 25$	**07**
	(b)	Solve the equation $dy/dx = xy + y^2$ where $y = 0$ when $x = 1$ find $y(0.1)$ using Runge-Kutta method.	**07**

OR

Q.4	**(a)**	Given $dy/dx = 2e^x – y$ with $y(0) = 2$, $y(0.1) = 2.01$, $y(0.2) = 2.04$, $y(0.3) = 2.09$. Find y at $x = 0.4$ with step size of 0.1 by Predictor-Corrector method.	**07**
	(b)	Following table shows speed in km/min and time in minute of a moped	**07**

t:	2	4	6	8	10	12	14	16	18	20

| v: | 10 | 18 | 25 | 29 | 32 | 20 | 11 | 5 | 2 | 0 |

Using Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rule to find the distance travelled by the moped in 20 minutes.

Q.5 (a) Compute Spearman's rank correlation for the following observations. Marks are awarded out of 35. **07**

Candidate:	1	2	3	4	5	6	7	8
Judge X:	20	22	28	23	30	30	23	24
Judge Y:	28	24	24	25	26	27	32	30

(b) Calculate the first four moments about the mean. **07**

Marks:	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students:	8	12	20	30	15	10	5

OR

Q.5 (a) Obtain regression equation of Y on X and estimate Y when X = 55 from the following: **07**

X:	40	50	38	60	65	50	35
Y:	38	60	55	70	60	48	30

(b) Obtain Seasonal fluctuation from the following data using moving average method: **07**

Year	I	II	III	IV
1984	65	58	56	61
1985	68	63	63	67
1986	70	59	56	52
1987	60	55	51	58

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