Enroll. No. ________

END SEMESTER EXAMINATION: MARCH – 2019

MATH242 **APPLIED MATHEMATICS-IV**

[ST]

Time: 3 Hrs Max Marks: 70

Note: Attempt questions from all sections as directed. Use of Scientific Calculator or Normal Distrbution table is allowed.

Section - A : Attempt any Five questions out of Six . Each question carries 06 marks. [30 Marks]

Q1. Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position correct to three decimal places. (6)

Q2. Solve the following system of equations, correct to two places of decimals,by Jacobi's iteration method: (6)

30x-2y+3z=75

x+17y-2z=48

x+y+9z=15

Q3. Find the cubic Lagrange's interpolation polynomial from the following data: (6)

x	0	1	2	5
f(x)	2	3	12	147

Q4. Given $log_{10}654 = 2.8156$, $log_{10}658 = 2.8182$, $log_{10}659 = 2.8189$ and $log_{10}661 = 2.8202$, find by divided difference formula the value of $log_{10}656$. (6)

Q5. Find $f'(5)$ from the following table: (6)

x	1	2	4	8	10
f(x)	0	1	5	21	27

Q6. An insurance company finds that 0.005% of the population dies from a certain kind of accident each year. What is the probability that the company must pay off no more than 3 of 10,000 insured risks against such accident in a given year? (6)

Section – B : Attempt any two questions out of three. Each question carries 10marks. [20 Marks]

Q7. (a)

Fit the straight line to the following data: (4)

x	0	1	2	3	4
y	1.0	1.8	3.3	4.5	6.3

(b) Find out the skewness and kurtosis from the following data:

Class Interval	0-10	10-20	20-30	30-40
Frequency	1	4	3	2

(6)

Q8. (a)

If X is a Poisson variate such that P(X=2)=9P(X=4)+90P(X=6),find mean and variance of the distribution.

(4)

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b). The table below gives the result of an observation θ is the observed temperature in degree centigrade of a vessel of cooling water; t is the time in minutes from the beginning of observations. (6)

t	1	3	5	7	9
θ	85.3	74.5	67.0	60.5	54.3

Find the approximate rate of cooling at t = 3 and t = 3.5.

Q9. (a)

Using R-K method of fourth order, find y(1.1) given that $\frac{dy}{dx} = xy + y^2$, y(1)=1, taking h=0.05.

(b) Prove that (i) $hD = \log(1+\Delta) = -\log(1-\nabla) = \sinh^{-1}(\mu\delta)$

(ii) $1 + \frac{\delta^2}{2} = \sqrt{1+\delta^2\mu^2}$

Section - C : Compulsory question **[20 Marks]**

Q10. (a)

Interpolate by means of Gauss backward formula, the population of town for the year 1975, given that (6)

Year:	1940	1950	1960	1970	1980	1990
Population: (in thousands)	12	15	20	27	39	52

(b) Calculate $\int_0^{\pi/2} e^{\sin x}\, dx$, correct to four decimal places using Simpson's 3/8 rule. (7)

(c) In a distribution exactly normal, 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution? (7)

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