(Please write your Exam Roll No.) Exam Roll No.

END TERM EXAMINATION

THIRD SEMESTER [B.TECH] NOVEMBER-DECEMBER 2018

Paper Code: ETMA-203 **Subject: Numerical Analysis and Statistical Technique**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q no.1 which is compulsory. Select one question from each unit.

Q1 (a) A can hit a target 3 times in 5 shots, B 2 times in 5 shots and C 3 times in 4 shots. If they fire a volley. What is the probability that at least two shots hit the target. **(5)**

(b) A coin is tossed up 400 times and the head turns up 216 times. Test the hypothesis that the coin is unbiased at 5% level of significance. **(5)**

(c) Evaluate the value of $\sqrt{5}$ correct to four decimal places by Newton's iteration method. **(5)**

(d) Solve the differential equation by Euler's Method **(5)**

$\frac{dy}{dx} = x + y \quad y(0) = 1$ taking $h = 0.2$

(e) Find a real root of equation $x^3 - 2x - 5 = 0$ by using bisection method up to fourth stage. **(5)**

UNIT-I

Q2 (a) An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probability of accidents is 0.01, 0.03 and 0.15 respectively. One of the insured person meets with an accident. What is the probability that he is a scooter driver? **(6)**

(b) Fit a binomial distribution to the following frequency data **(6.5)**

X	0	1	3	4
F	28	62	10	4

Q3 (a) An insurance company observed that only 0.01% of the population is involved in accidents each year. If its 1000 policy holders are randomly selected from the population what is the probability that not more than two of its clients are involved in accidents next year. **(6)**

(b) Fit a straight line to the data using method of least square. **(6.5)**

x	1	2	3	4
y	0	1	1	2

UNIT-II

Q4 (a) Calculate the Coefficient of correlation from the following data. **(6)**

x	9	8	7	6	5	4	3	2	1
y	15	16	14	13	11	12	10	8	9

(b) The theory predicts the proportion of beans in the four groups G1, G2, G3 and G4 should be in ratio 9: 3: 3: 1. In an experiment with 1600 beans the numbers in the groups were 882, 313, 287 and 118. does the experimental result support the theory. Given that the chi-square has a value 7.815 with degree of freedom 3 and level of significance 5%. **(6.5)**

P.T.O.

Q5 (a) From the data given below find the equation of line of regression of y on x and also find the value of coefficient of correlation. **(6.5)**

x	2	4	6	8	10
y	5	7	9	8	11

(b) Two samples of size 9 and 8 give the sum of squares of deviations from their respective means equal to 160 and 91 respectively. Can these be regarded as taken out from the same population? Given that F has value 3.73 with degree of freedom 8 and 7 at level of significance 5%. **(6)**

UNIT-III

Q6 (a) Solve the following system of equations by Gauss-seidel method. **(6)**
$10x+y-z=11.19 \quad x+10y+z=28.08 \quad -x+y+10z=35.61$ correct up to two decimal places.

(b) From the following table estimate the number of students who obtained marks between 40 and 45: **(6.5)**

Marks	30-40	40-50	50-60	60-70	70-80
No. of Students	31	42	51	35	31

Q7 (a) Find the real root of the equation $\cos x - xe^x = 0$ by using Newton Raphson method. **(6.5)**

(b) Find the value of F(5.5) from the following data: **(6)**

x	0	1	4	5	6
y	1	14	15	6	3

UNIT-IV

Q8 (a) The following data gives the velocity of a particle for 20 seconds at an interval of 5 seconds. Find the initial acceleration using the entire data. https://www.ggsipuonline.com **(6.5)**

Time(sec)	0	5	10	15	20
Velocity(m/sec)	0	3	14	68	228

(b) Evaluate $\int_0^1 \frac{dx}{1+x}$ using Simpson's one third method by taking seven ordinates and compare it with its actual value. **(6)**

Q9 (a) Using Runge-Kutta method of fourth order determine y(0.2) correct up to four decimal places given that $\frac{dy}{dx} = y - x$ where $y(0) = 2$ and h=0.1. **(6)**

(b) Solve for y, the differential equation $\frac{dy}{dx} = x + y$ $y(0) = 1$, using Euler's method by taking h=0.2. **(6.5)**

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