KERALA AGRICULTURAL UNIVERSITY
B. Tech. (Agrl. Engg.)
III Semester Final Re - Examination – February 2026
2023 & Previous Admission

Sacs.2110 **Engineering Mathematics – III (2+1)** **Marks: 50**
Time: 2 hours

I **Fill in the blanks** **(10x1=10)**

1. The mean of the following numbers 23, 45, 87, 40, 50 is .....
2. The Laplace transformation of a function $f(t)$ is defined as .....
3. If (correlation coefficient) $r = 1$, then the angle between two regression line is .....
4. The Euler's formula for solving ODE is .....
5. The Laplace transform of e^{at} is .....

State True or False

6. Percentiles divide a series into ten equal parts.
7. Goodness of fit of a distribution is tested by F-test.
8. Normal Distribution is symmetric about mean.
9. Newton's divided difference formula is used for interpolation of unequal intervals.
10. ANOVA is used to compare the means of more than two groups.

II **Write short notes on ANY FIVE of the following** **(5x2=10)**

1. Find the Laplace transform of $tsinat$.
2. If $\bar{x} = 970, \bar{y} = 18,\ \sigma_x = 38, \sigma_y = 2, \gamma = 0.6$, then find the regression equation of x on y.
3. Define Type 1 and Type 2 error in testing of hypothesis.
4. Find the variance of the following data: 3, 5, 6, 10, 9, 10, 1, 3
5. Write down the uses of χ^2 distribution.
6. Using Modified Euler's method find $y(0.1)$ if $\frac{dy}{dx} = x^2 + y^2, y(0) = 1.$
7. Estimate the value of y at $x = 2$ given the data points $y(0) = 0,\ y(1) = 1$ and $y(3) = 0$.

III **Answer ANY FIVE of the following** **(5x4=20)**

1. The weekly wages of 1000 workmen are normally distributed around a mean of Rs. 70 with a SD of Rs. 5. Estimate the number of workers whose weekly wages will be between Rs. 69 and Rs. 72.
2. In a sample of 400 parts manufactured by a factory, the number of defective parts was found to be 30. The company claimed that only 5% of their product is defective. Is the claim tenable?
3. The mean height and standard deviation of 8 randomly chosen soldiers are 166.9cm and 8.29cm respectively. The corresponding values of 6 randomly chosen sailors are 170.3cm and 8.50cm respectively. Based on this data, can we conclude that soldiers in general are shorter than sailors?
4. Using Lagrange Interpolation formula, find the value of $f(1)$ from the following table

x	-1	0	2	3
y	-8	3	1	12

5. Find $y(4)$ from following table.

x	0	1	2	3
y	1	2	1	10

6. Using Taylor method find y at $x = 1$ if $\frac{dy}{dx} = x^3 + y, y(1) = 1$
7. If $y = 2x - 3$ and $y = 5x + 7$ are the two regression lines, find the correlation coefficient between x and y.

IV **Write an essay on ANY ONE of the following** **(1x10=10)**

1. Compute $y(0.2)$ given that $\frac{dy}{dx} = y - x,\ y(0) = 2,$ by Runge-Kutta method of fourth order, taking $h = 0.1$.
2. The following data represents the monthly sales (in Rs.) of a certain retail stores in a leap year. Examine if there is any seasonality in the sales. 6100, 5600, 6350, 6050, 6250, 6200, 6300, 6250, 5800, 6000, 6150, and 6150.

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