KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Agrl. Engg.) 2022 & Previous Admissions
III Semester Final Examination- February 2024

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

I   **Fill in the blanks**   (10x1=10)
1.   Quartile deviation = …. X Standard deviation
2. $L^{-1}(\sqrt{t}) = …$
3.   Bessel's formula is most appropriate when p value lies between …..
4.   The solution of $(E - 1)^3 u_n = 0$ is ….
5.   Size of small test is …
     Answer the following
6.   Define Histogram.
7.   What is median?
8.   •Write the rule to use simson's 3/8th rule.
     State True or False
9. $\Delta = E-1$
10. In F test the value of F is less than one.

II   **Write short notes on ANY FIVE of the following**   (5x2=10)
1.   Evaluate $\int_0^\infty te^{-2t} \sin t \, dt$
2.   Evaluate $\Delta \tan^{-1} x$
3.   Using Trapezoidal rule find $\int_0^6 \frac{dx}{1+x^2}$
4.   Find the difference equation satisfied by $y = \frac{a}{x} + b$
5.   What is the angle between the two regression lines?
6.   Define null hypothesis
7.   State the uses of chi-square test.

III   **Answer ANY FIVE of the following.**   (5x4=20)
1.   Solve by the method of transforms, the equation $y''' + 2y'' - y' - 2y = 0$ given that $y(0) = 0, y''(0) = 6 \& y'(0) = 0$.
2.   From the following table, estimate the number of students who obtained marks between 40 and 45.

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

3.   From $y_n = A2^n + B(-3)^n$, derive a difference equation by eliminating the constants.
4.   Find $f'(0)$ from the following data

X	3	5	11	27	34
f(x)	-13	23	899	17315	35606

5.   The two regression equations of the variables x and y are $x = 19.13 - 0.87y$ and $y = 11.64 - 0.50x$. Find (i) mean of x and y (ii) the correlation coefficient between x and y.
6.   A coin was tossed 400 times and the head turned up 216 times. Test the hypothesis that the coin is unbiased at 5% level of significance
7.   The nine items of a sample have the following values 45, 47, 50, 52, 48, 47, 49, 53, 51. Does the mean of these differ significantly from the assumed mean of 47.5?

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

1.   Using Runge-Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ a $x = 0.2, 0.4$

2.   A completely randomised design experiment with 10 plots and 3 treatments gave the following results:

Plot No	1	2	3	4	5	6	7	8	9	10
Treatment	A	B	C	A	C	C	A	B	A	B
yield	5	4	3	7	5	1	3	4	1	7

Analyse the results for treatment effects

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