Total No. of Questions: Total No. of Pages: 02

Roll No. _____

B.Tech IV sem (Main/Back) Exam April-May 2026
Agricultural Engg.
4AG2-01 Advance Engineering Mathematics-II
Paper Code : 4E1313
AG, CE, MI

Time: 3 Hours **Maximum Marks: 70**

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1._____ 2._____

Part A (Answer should be given up to 25 words only)
All questions are compulsory

Q.1 If n persons sit around a table, find the probability that two specified persons not to be sit together.

Q.2 State Baye's Theorem.

Q.3 Define discrete random variable.

Q.4 If random variable X and Y have the joint probability density function given by

$$f(x,y)=\frac{1}{2}x^2y,\ 0\le x\le 2,\ 0\le y\le 1$$

determine whether X and Y are independent.

Q.5 If $Mo(t)$ denoting moment generating function about origin and $Ma(t)$ denoting moment generating function about 'a' then prove that

$$Ma(t)=e^{-at}Mo(t)$$

Q.6 State Chebyshev's inequality.

Q.7 Define Variance.

Q.8 Write formula for rank correlation coefficient.

Q.9 State principle of least squares.

Q.10 Define null hypothesis. **10 x 2 = 20**

Part B (Analytical/Problem solving questions)
Attempt any Five questions

Q.1 A bag contains $(2n+1)$ coins. It is known that n of these coins have a head on both sides, whereas the remaining $(n+1)$ coins are fair. A coin is picked up from the bag at random and tossed. Find the probability of getting head.

Q.2 The joint probability mass function of (X, Y) is given by $P(X=x, Y=y)=K(2x+3y)$, $X=0, 1, 2$ $Y=1, 2, 3$. Find K, Marginal probability distributions of X and Y. Also find conditional probability distribution of X for $Y=1$

Q.3 If the random variable X assume the value r with probability mass function $P(X=r)=q^{r-1}p$ $r=1, 2, 3...$ Find moments generating function and hence find mean and variance

---

Free RTU papers at ersahilrajyan.com

Q 4 For a Normal distribution $N(\mu, \sigma)$ prove that Mean = Mode = Median

Q.5 Obtain the coefficient of rank correlation for the following data

x	68	64	75	50	64	80	75	40	55	64
y	62	58	68	45	81	60	68	48	50	74

Q 6 Find the best fit of line from following data

x	20	60	100	140	180	220	260	300	340	380
y	0.18	0.37	0.35	0.78	0.56	0.75	1.18	1.36	1.17	1.65

Q.7 In a sample of 1000 people, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular at 1% level of significance? Given critical value at 1% level of significance for two tailed test is 2.58. **5x 4 = 20**

Part C (Descriptive/Analytical/Problem Solving/Design question)
Attempt any three questions

Q 1 If a computer Centre owner want to purchase 3 Computers from a sale in which there are 3 new Computers, 4 used but still working and 5 defective but can be brought in working condition after minor repair. If X and Y denote new and used but still working Computers in the lot of used but still working computers in the lot of 3 purchased computers. Find :

i) The joint probability mass function of X and Y.

ii) The marginal probability of X and Y.

iii) The conditional probability of X given $Y = 1$

Q.2 a) A bag contains a coin of value M and a number of other coins whose aggregate value is m. A person draws coins one by one till the coin of value M is drawn. Find the value of his expectation.

b) The first four moments of a distribution about the value 5 of a variate are 2, 20, 40 and 50. Find mean, variance, β_1 and β_2. Comment upon the nature of the distribution.

Q.3 a) The sum of mean and variance of binomial distribution is 15 and sum of their squares is 117. Determine the distribution.

b) Determine first four moments about origin of Poisson's distribution.

Q.4 Explain the method of least squares for fitting of a second degree parabola and use it to fit a parabola to the following data :

x	1	1.5	2	2.5	3	3.5	4.0
y	1.1	1.3	1.6	2.6	2.7	3.4	4.1

Q 5 a) Obtain the lines of Regression for given data

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

b) Random Samples of 400 men and 600 women were asked whether they would like to have fly over near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal, are same against. That they are not, at 5% level. Given at 5% level of significance the significant value is 1.96. **3 x 10= 30**

Free RTU papers at rtusailkagarwal.com