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**Question Paper Code: 54025**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Agriculture Engineering

15UMA425 - PROBABILITY, STATISTICS AND NUMERICAL METHODS

(Regulation 2015)

(Statistical tables maybe permitted)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

**(Answer any six of the following questions)**

1. If  $X$  is a continuous random variable. Relate  $E(X)=$  CO1- R  
(a)  $\int_{-\infty}^{\infty} xf(x)dx$       (b)  $\int_{-\infty}^{\infty} f(y)dy$       (c)  $\int_{-\infty}^{\infty} f(x, y)dx$       (d)  $\int_{-\infty}^{\infty} f(x, y)dy$
2. If the random variable  $X$  has uniform distribution in  $(-3,3)$ , then its mean is CO1- App  
(a) 2      (b) 1.96      (c) 3      (d) 0
3. When the population parameter is less than a certain value, the test is called CO2-R  
(a) left – tailed test      (b) right tailed test      (c) two tailed test      (d) none of these
4. Choose the correction factor \_\_\_\_\_ CO2- App  
(a)  $T^2N$       (b)  $T/N$       (c)  $T^2/N$       (d) 0
5. The number of factors analysed in Completely Randomised Block Design is CO3- R  
(a) Two      (b) One      (c) Three      (d) Four
6. The number replications of each treatment and the number of treatments in LSD is CO3- R  
(a) Equal      (b) Unequal      (c) Equal to two      (d) Equal to one
7. In Cubic Spline,  $M_0=M_n=$  \_\_\_\_\_ CO4-R  
(a) 1      (b)  $n$       (c) 0      (d) 3

8. The value of any divided difference is \_\_\_\_\_ of the order of the arguments. CO4- R  
 (a) equal (b) dependent (c) unequal (d) independent
9. Degree of  $y(x)$  in Simpson's one third rule is \_\_\_\_\_ CO5- R  
 (a) 1 (b) 2 (c) 3 (d) 4
10. The condition for the point  $x_0$  to be a maximum value is \_\_\_\_\_ CO5- R  
 (a)  $f''(x) < 0$  (b)  $f'(x_0) < 0$  (c)  $f''(x_0) < 0$  (d)  $f'(x) < 0$

PART – B (3 x 8= 24 Marks)

**(Answer any three of the following questions)**

11. A RV X has the following distribution CO1- App (8)

x	0	1	2	3	4	5	6	7
P(X)	0	a	2a	2a	3a	3a	4a	5a

- (i) Find the value of 'a'
- (ii) Find  $P(X < 5)$ ,  $P[2 < X < 5]$
12. The means of two simple large samples of 1000 and 2000 members are 67.5 inches and 68 inches respectively. Can the samples be regarded as drawn from the same population of standard deviation of 2.5 inches? Test at 5% level of significance. CO2- App (8)

13. The following table shows the lives in hours of four batches of electric lamps CO3- Ana (16)

Batches	Lives in hours							
1	1610	1610	1650	1680	1700	1720	1800	
2	1580	1640	1640	1700	1750			
3	1460	1550	1600	1620	1640	1660	1740	1820
4	1510	1520	1530	1570	1600	1680		

- Perform an analysis of variance on these data and show that a significant test does not reject their homogeneity.
14. Find  $f(3)$  by Newton's divided difference formula for the data CO4- App (8)

X	-4	-1	0	2	5
Y	12	33	5	9	35

15. Evaluate  $\int_0^1 \frac{dx}{1+x^2}$  by Trapezoidal rule.

CO5-App (8)