Question Paper Code: 94025

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2021

Fourth Semester

Agriculture Engineering

19UMA425 - Probability, Statistics and Numerical Methods

(Regulation 2019)

Duration: 1:45hrs Maximum: 50 Marks

PART A 10*2 =20 Marks

Answer any ten of the following questions

1. Using the probability mass function, compute the constant k CO1- AP

X	-2	-1	0	1	2	3
P(X)	0.1	K	0.2	2k	0.3	3k

2. is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. CO1- AP

a) Project management

b) Program management

c) Project portfolio management

d) Requirements managemen

A continuous random variable has the probability density function is given by $f(x) = Kx(1-x), 0 < x < 1$, calculate the value of the constant K.

3. A random variable X follows an exponential distribution with parameter $\lambda = 1/5$ then find the mean value . CO6- U

4. Write the degrees of freedom for the sample size n= 20. CO6- U

5. If $S_1^2 = 13.333$ and $S_2^2 = 28.545$ then calculate the value of F- ratio. CO2- AP

6. If A,B are two independent attributes and if (A) = 36, (B) = 25 and N = 100 then find (AB). CO6- U

7. Write the degrees of freedom for the variation due to error term in an 3×3 Latin square design. CO6- U

8. For a one way classification on 12 observations involving 3 treatments the sum of squares of treatment and sum of squares of total are 8 and 36 respectively, calculate the value of the F – ratio. CO3- AP

9 Write the degrees of freedom for the variation due to error term in one way classification. CO6- U

10 Calculate the second divided difference for the following data. CO4- AP

x	5	15	22
y	7	36	160

11 If f(0) = 14, f(5) = 379, f(10) =1444 and f(15) = 3584 then compute the third difference. CO4- AP

12 In Cubic Spline, what is the value of M_0 & M_n ? CO6- R

13 Why is Trapezoidal rule is so called? CO6- R

14 Write the error in Simpson's rule and its order. CO6- U

15 Using Simpson's 1/3 rule calculate $\int_0^4 e^x\,dx$ given $e^0=1, e^1=2.72,\ e^2=7.39$ CO5- AP

$e^3=20.09$ and $e^4=54.6$

PART B (Answer Any Three) 3*10 = 30 Marks

16. If the probability density function of a continuous random variable X is given by CO1 Apply (10)

$$f(x) = \begin{cases} ax & ;\ 0 \le x \le 1 \\ a & ;\ 1 \le x \le 2 \\ 3a - ax & ;\ 2 \le x \le 3 \\ 0 & otherwise \end{cases}$$

Calculate (i) the value of "a" (ii) the distribution function of X .

17 A group of 10 rats fed on diet A and another group of 8 rats fed on diet B, recorded the following increase in weight. CO2- Analyze (10)

Diet A	5	6	8	1	12	4	3	9	6	10
Diet B	2	3	6	8	10	1	2	8		

Analyze the given data find the variances are significantly different.

Table value is F(9,7) = 3.68

18 Analyze the variance in the Latin square of yields(in kgs) paddy where P,Q,R,S denote the different methods of cultivation. CO3-Analyze (10)

S122	P121	R123	Q122
Q124	R123	P122	S125
P120	Q119	S120	R121
R122	S123	Q121	P122

Table value is F(3,6) = 4.76

19 Using Newton's interpolation formula determine the polynomial function f(x) and f(x)at x = 5 & 9 CO4-Apply (10)

x	4	6	8	10
y	1	3	8	10

20 Evaluate $\int_{1}^{1.4}\int_{2}^{2.4}\frac{1}{xy}dxdy$ by using Trapezoidal & Simpson's Rule with CO5-Apply (10)

h = 0. 1 & k = 0. 1