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D.K.M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1

SEMESTER EXAMINATIONS

 NOVEMBER – 2018 15CAST1A

# ALLIED : MATHEMATICAL STATISTICS - I

Time : 3 Hrs Max. Marks : 75

SECTION-A (10 x 2 = 20)

Answer ALL the questions.

1. *If two dice are thrown, what is the probability that the sum is greater than 8?*
2. *For three non-mutually exclusive events A,B and C , *
3. *Define Distribution function.*
4. *Define Moment Generating function.*
5. *Define Characteristic function.*
6. *State Uniqueness Theorem.*
7. *Prove that Two independent variable are uncorrelated.*
8. *Write Spearman’s formula for rank correlation coefficient.*
9. *Define Regression.*
10. *If one of the regression coefficient is greater than unity, Prove that other must be less than unity.*

SECTION-B (5 x 5 = 25)

Answer any FIVE of the following questions.

1. *Two dice are tossed. Find the probability of getting ‘an even number on the first dice or a total 8’.*
2. *State and prove Additional Theorem of Probability.*
3. *A continuous R.V X has a p.d.f .Find a and b such that*
4. *and*
5. **
6. *Let X be R.V with the following probability distribution:*

*x: -3 6 9*

*P(X=x): 1/6 ½ 1/3.*

 *Find *

1. *Find the characteristic function for the probability mass function* $P\left(x\right)=nc\_{x}p^{x}q^{n-x}, x=0,1,2,\cdots n.$
2. *Prove that Correlation coefficient is independent of change of origin and scale.*
3. *Prove that Correlation coefficient is the geometric mean between the regression coefficients.*
4. *The following are the ranks obtained by 10 students in statistics and mathematics:*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Statistics* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
| *Mathematics* | *1* | *4* | *2* | *5* | *3* | *9* | *7* | *10* | *6* | *8* |

*To what extent is the knowledge of students of students in the two subjects related?*

SECTION-C (3 x 10 = 30)

Answer ALL the questions.

1. *(a) There are 3 boxes containing respectively 1 white, 2 red, 3 black balls, 2 white, 3 red, 1 black balls; 3*

 *white, 1 red and 2 black balls. A box is chosen at random and from it two balls are drawn at random and*

 *from it two balls are drawn at random. The two balls are 1 red and 1 white. What is the probability that*

 *they come from*

1. *the first box*
2. *second box*
3. *third box?*

*(Or)*

*(b) Let X be R.V with the following probability distribution:*

*x: 0 1 2 3 4 5 6 7*

 *P(X=x): 0 k 2k 2k 3k k2 2k2 7k2+k*

1. *Find k (b) Evaluate(c) ,find the minimum*

*value of a.*

1. *(a) A continuous R.V X has a p.d.f* *.*
2. *Obtain an expression for the c.d.f of X*
3. *Compute* *and*
4. *Determine the number k such that* *.*

*(Or)*

 *(b) Find the density function f(x) corresponding to the characteristic function defined as follows*

 **

1. *(a) Find Karl Pearson’ s coefficient of correlation from the following data between height of*

 *father (x) and son (y).*

*X 64 65 66 67 68 69 70*

*Y 66 67 65 68 70 68 72*

*Comment on the result.*

*(Or)*

 *(b) In a partially destroyed laboratory, record of an analysis of correlation data, the following results*

 *only are legible: Variance of* $X= 9$*, Regression equations:* $8X-10Y+66=0, 40X-18Y=214$*.*

 *What are*

1. *the mean values X and Y,*
2. *the correlation coefficient between X and Y, and*
3. *the standard deviation of Y?*

\* \* \* \* \* \* \*