Chettinad College of Engineering & Technology
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

Department of Electronics and Communication Engineering

MA 8451 – Probability and Random Processes

Unit II - MCQ Bank

1. Let S be the sample space associated with a random experiment E. Let X=X(S) and Y=Y(S) be two functions each assigning a real number to each s∈S. Then (X,Y) is called a---

A. Two Dimensional random Variable

B. Variance

C. Mean

D. Random Variable

Answer: (A)

2. The following table gives the joint probability distribution of X and Y. Find the marginal density functions of X

Y /X	1	2	3
1	0.1	0.1	0.2
2	0.2	0.3	0.1

A.

X	1	2	3
P(X=x)	0.3	0.4	0.3

B.

X	1	2	3
P(X=x)	0.4	0.4	0.2

C.

X	1	2
P(X=x)	0.6	0.4

D.

X	1	2
P(X=x)	0.4	0.6

Answer: (A)

3. If $f\ (x,y) = \ kxye^{-(x^2+y^2)}$ x ≥0 , y ≥ 0 is the joint pdf, find k .

A. 1

B. 2

C. 3

D. 4

Answer: (D)

4. The joint p.m.f of (X,Y) is given by P(x, y) = k(2x + 3y), x =0,1,2 y = 1,2,3.Find the marginal probability distribution of X.

A.

X	0	1	2
P(X=x)	18/72	24/72	30/72

B.

X	1	2	3
P(X=x)	0.4	0.4	0.2

C.

X	1	2
P(X=x)	0.6	0.4

D.

X	1	2
P(X=x)	0.4	0.6

Answer: (A)

5. If X and Y are independent RVs with variances 8 and 5.find the variance of 3X+4Y

A. 151

B. 152

C. 153

D. 154

Answer: (B)

6. Find the value of k if $f(x, y) = k(1-x)(1-y)$ for $0 < x, y < 1$ is to be joint density function.

A. 1

B.2

C.3

D.4

Answer: (D)

7. If X and Y are random variables having the joint p.d.f $f(x,y) = \frac{1}{8}(6-x-y)$, 0<x<2, 2<y<4.
Find P(X<1, Y<3).

A. 3/7

B.3/8

C.2/8

D.4/8

Answer: (B)

8. The Lines of regression in a bivariate distribution are x+9y=7 and y+4x=49/3. Find the Co-efficient of correlation.

A. $b_{yx} = -\frac{1}{9}$

B. $b_{xy} = -\frac{1}{4}$

C. $b_{yx} = -\frac{2}{9}$ & $b_{xy} = -\frac{3}{4}$

D. Both (A) & (B)

Answer: (D)

9. The acute angle between the two lines of regression is

A. $tan\theta = (\frac{1-r^2}{r})(\frac{\sigma_x-\sigma_y}{{\sigma_x}^2+{\sigma_y}^2})$

B. $sin\theta = (\frac{1-r^2}{r})(\frac{\sigma_x-\sigma_y}{{\sigma_x}^2+{\sigma_y}^2})$

C. $tan\theta = (\frac{1+r^2}{r})(\frac{\sigma_x-\sigma_y}{{\sigma_x}^2+{\sigma_y}^2})$

D. $tan\theta = (\frac{1-r^2}{r})(\frac{\sigma_x+\sigma_y}{{\sigma_x}^2+{\sigma_y}^2})$

Answer: (A)

10. The equation of line of regression of y on x is ---

A.$(y-\overline{y)}=b_{yx}(x-\bar{x})$

B.$(y-\overline{y)}=b_{xy}(x-\bar{x})$

C.$(x-\overline{x)}=b_{xy}(y-\bar{y})$

D. $(x-\overline{x)}=b_{yx}(y-\bar{y})$

Answer: (A)

11. What do you mean by correlation between two random variables?

A. Degree of relationship

B. Nature of relationship

C. Both (A) & (B)

D. None of these

Answer: (C)

12. Let (X,Y) be a two dimensional random variable. Define co-variance of (X,Y).

A. Cov(X,Y)=E(XY)-E(X)E(Y)

B. Cov(X,Y)=E(XY)-E(X)

C. Cov(X,Y)=E(XY)- E(Y)

D. Cov(X,Y)=E(X)-E(X)E(Y)

Answer: (A)

13. Let (X,Y) be a two dimensional random variable. If X and Y are independent. What will be the co-variance of (X,Y).

A. 1

B.2

C.3

D.0

Answer: (D)

14. A measure of association between two random variables obtained as the expected value of the product of the two random variables around their means is called as

A. Correlation

B. Auto correlation

C. Covariance

D. Auto Covariance

Answer: (C)

15. The regression lines of X on Y and Y on X are 5x-y=22, 64x-45y=24 respectively. Find means of X and Y.

A. $\bar{x} = 6, \bar{y} = 8$

B. $\bar{x} = 7, \bar{y} = 8$

C. $\bar{x} = 6, \bar{y} = 9$

D. $\bar{x} = 7, \bar{y} = 9$

Answer: (A)

16. The minimum and maximum values of the correlation coefficient are --- and ---

A.1,-1

B.1, 2

C.0, 1

D.-1, 1

Answer: (D)

17. When we say the two random variables are said to be orthogonal?

A. Their correlation is zero

B. Their correlation is non-zero

C. Their correlation is one

D. None of these

Answer: (A)

18. The Properties of correlation coefficient are

A. Correlation coefficient does not exceed unity

B. When r=1, the correlation coefficient is perfect and positive

C. Two independent variables are uncorrelated.

D. All the above

Answer: (D)

19. The real life example for positive correlation are

A. The heights and weights of a group of persons, Income and expenditure

B. Price and demand of a commodity, correlation between volume and pressure of a perfect gas

C. Both (a) and (b)

Answer: (A)

20. Let X and Y be Continuous Random variable with joint PDF

$f_{XY}(x,y) = \frac{x(x-y)}{8}, 0 < x < 2 \; and \; -x < y < x$ And $f_{XY}(x,y) = 0$ elsewhere. Find $f_{y/x}(y/x)$

A. $\frac{x(x-y)}{2x^3}$

B. $\frac{x(x+y)}{2x^3}$

C. $\frac{x(x+y)}{x^3}$

D. $\frac{x(x-y)}{2x^3}$

Answer: (A)

21. Given the RV X with density function $f(x) = \begin{cases} 2x, 0 < x < 1 \\ 0, elsewhere \end{cases}$ Find PDF of $y = 8x^3$

A. $\frac{1}{9}y^{-\frac{1}{3}}$

B. $\frac{1}{6}y^{-\frac{1}{3}}$

C. $y^{-\frac{1}{3}}$

D. $\frac{1}{6}y^{-\frac{2}{3}}$

Answer: (B)

22. If two RV deviate in the same direction, then the correlation said to be

A. Positive

B. Negative

C. Neither positive nor negative

Answer: (A)

23. .Method of studying Correlation are

A. Scatter diagram method and Graphical method

B. Rank method and Concurrent deviation method

C. Karl Pearson's coefficient of correlation and Method of least squares.

D. All the above

Answer: (D)

24. The real life example for negative correlation are

A. The heights and weights of a group of persons, Income and expenditure

B. Price and demand of a commodity, correlation between volume and pressure of a perfect gas

C. Both (a) and (b)

Answer: (B)

25. The lifetime of a certain brand of an electric bulb may be considered as a RV with mean 1200h and standard deviation 250h.Find the probability, using central limit theorem, that the average lifetime of 60 bulbs exceeds 1250h.

A. 6.006

B. 0.606

C.0606.

D. 6.666

Answer: (C)