UNIVERSITY OF CALICUT

SCHOOL OF DISTANCE EDUCATION

B Sc. Mathematics (2011 Admission Onwards)

II SEMESTER

Complementary Course

PROBABILITY DISTRIBUTIONS (STATISTICS)

QUESTION BANK

1. The joint cumulative distribution function F(x,y) lies within the values
   a). -1 and +1 c). $-\infty$ and 0
   b). -1 and 0 d). 0 and 1
2. If x and y are two independent random variables then f(x,y) = ...
   a). f(x)+f(y) c). f(x).f(y)
   b). f(x)-f(y) d). f(x)/f(y)
3. The value of F $(-\infty + \infty)$ = ...
   a). 0 b). 1 c).$+\infty$ d). $-\infty$
4. If X and Y are two independent r.v.'s the cumulative distribution function F(x,y) is equal to
   a).$F_1(x).F_2(y)$
   b).$P(X \leq x , Y \leq y)$
   c).both a and b
   d).neither a nor b
5. If X and Y are two independent r.v's then
   a).E(XY)=1
   b).E(XY) = 0
   c).E(XY)=E(X).E(Y)
   d).E(XY) = a constant
6. If X and Y are two random variables such that their expectations exist and $P(x \leq y)=1$ then
   a).$E(X) \leq E(Y)$ c).E(X)=E(Y)
   b). $E(X) \geq E(Y)$ d).None of the above
7. If X is a random variable then $E(X-E(X))^2$ = …..
   a).μ_1 b) .μ_2 c) .μ_3 d).μ_4
8. If X and Y are two random variables then
   a).$E(XY)^2 = E(X^2).E(Y^2)$
   b). $E(XY)^2 = E(X^2Y^2)$
   c). $E(XY)^2 \geq E(X^2)E(Y^2)$
   d). $E(XY)^2 \leq E(X^2)E(Y^2)$
9. If X and Y are two random variables then the expressionE(X-E(X))(Y- E(Y)) is called:
   a).V(X) c).Cov(X,Y)
   b).V(Y) d).Correlation of X and Y
10. If X is a random variable with mean μ then $E(X-\mu)^r$ is called :
    a).variance c) .r^{th} central moment
    b).r^{th} raw moment d). none of the above

11. If X is a r.v having pdf $f(x)$,then E(X) is called …….
    a).Arithmetic mean
    b).Geometric mean
    c).Harmonic mean
    d)First Quartile
12. If X is a r.v. and r is an integer, then E (X^r) represents
    a) .r^{th} central moment
    b).r^{th} raw moment
    c) .r^{th} factorial moment
    d). none of these
13. For Bernoulli distribution with probability p of a success and q of a failure, the relation between mean and variance that holds is
    a).mean <variance
    b). mean =variance
    c).mean $\geq$ *variance*
    d).None of these
14. The mean and variance of a binomial distribution are 8 and 4 respectively. Then P(X=1) is equal to
    a)$2^{\frac{1}{12}}$ b) $2^{\frac{1}{4}}$ c) $2^{\frac{1}{6}}$ d) $2^{\frac{1}{8}}$
15. If X $\sim$ B (n, p),n = 4 and also P (X = 2) = 3P (X = 3),the value of p is
    a).1 b).$\frac{1}{3}$ c).$\frac{9}{11}$ d).none of the above
16. If $f(x, y) = 4xy$; 0 < x < 1, 0 < y < 1,then E(y/x) = ...
    a).4 b).2 c).$\frac{4}{3}$ d.)$\frac{2}{3}$
18. E(Y /X = x) is called ......
    a).regression curve of x on y
    b).regression curve of y on x
    c).both a and b
    d).neither a nor b
19. If $f(x, y) = 4xy$; 0 < x < 1, 0 < y < 1, the covariance between x and y is....
    a).$\frac{1}{48}$ b).$\frac{1}{144}$ c).$\frac{1}{4}$ d). None of these.
20. If X and Y are two independent r.v.s then E(XY)= ......
    a).E(X) + E(Y)
    b).E(X) – E(Y)
    c).E(X).E(Y)
    d). None of these.
21. If X and Y are two r.v.s, the correlation coefficient between X and Y lies between …..
    a). 0 and 1 c).-1 and 1
    b).-1 and 0 d). None of these.
22. If X ~B (n, p) , mean = 4, variance = 4/3, then P (X = 5)=......
    a).$\left(\frac{2}{3}\right)^6$ c). $\left(\frac{1}{3}\right)^6$
    b). $\left(\frac{2}{3}\right)^5 \left(\frac{1}{3}\right)$ d).$4\left(\frac{2}{3}\right)^6$

23. If X ~B (3, 1/2) and Y~B(5, 1/2), the probability of P(X+Y=3) is ....
   a).7/16 c).11/16
   b).7/32 d).None of the above.
24. If X B (n, p), the distribution of Y = n - X is ....
   a).B(n,1) c).B(n,p)
   b).B(n,x) d).B(n,q)
25. A family of parametric distribution in which mean =variance is
   a).Binomial distribution
   b).Gamma distribution
   c).Normal distribution
   d).Poisson distribution
26. The distribution possessing the memoryless property is
   a).Gamma distribution
   b).Geometric distribution
   c).Hypergeometric distribution
   d).All the above
27. If X ~N (μ, σ^2) ,the points of in enflexion of normal distribution curve are
   a). $\pm\mu$ c). $\sigma \pm \mu$
   b). $\mu \pm\sigma$ d). $\pm\sigma$
28. An approximate relation between QD and SD of normal distribution is
   a).5QD = 4SD c).2QD = 3SD
   b).4QD = 5SD d).3QD = 2SD
29. An approximate relation between MD about mean and SD of a normal distribution is
   a).5MD = 4SD c).3MD = 3SD
   b).4MD = 5SD d).3MD = 2SD
30. The area under the standard normal curve beyond the lines $z = \pm 1.96$ is
   a).95% b).90% c).5% d).10%
31. Let X is a binomial variate with parameters n and p. If n=1, the distribution of X reduces to
   a).Poisson distribution
   b).Binomial distribution
   c).Bernoulli distribution
   d).Discrete Uniform distribution
32. If a random variable X has the following probability distribution x : -1 -2 1 2
   p(x) : 1/3 1/6 1/6 1/3 then the expected value of X is
   a).3/2 c).1/2
   b).1/6 d).None of these
33. A box contains 12 items out of which 4 are defective. A person selects 6 items from the box. The expected number of defective items out of his selected item is
   a).2 c).3/2
   b).3 d).None of these.
34. If X is a normal variate with mean 20 and variance 64, the probability that X lies between 12 and 32 is
   a).0.4332 c).0.7475
   b).0.1189 d).0.5

35. If Z is a standard normal variate, the proportion of items lying between Z=-0.5 and Z=-3.0 is
    a).0.4987 c).0.3072
    b).0.1915 d).0.3098
36. If X is a normal variate representing the income in Rs.per day with mean =50 and SD=10. If the number of workers in a factory is 1200,then the number of workers having income more than Rs.62 per day is
    a).462 c).738
    b).138 d).None of these
37. Assuming that the height of students is distributed as N(μ, σ^2).Out of a large number of students, 5 % are above 72 inches and 10% are below 60 inches. The mean and SD of the normal distribution are
    a).μ = 0, σ = 1 c).μ = 66, σ = 4
    b).μ = 65, σ = 5 d).μ = 65, σ = 4
38. Probability mass function of a binomial distribution with usual notation is
    a). ${}^nC_x p^n q^{n-x}$
    b). ${}^nC_x p^n q^x$
    c). ${}^nC_x p^{n-x} q^x$
    d).None of these.
39. If X~ N (8, 64), the standard normal variate Z will be
    a).Z $=\frac{X-64}{8}$ c).Z $=\frac{X-8}{8}$
    b).Z $=\frac{X-8}{64}$ d).Z $=\frac{8-X}{8}$
40. The mgf of binomial distribution is
    a).$(q + pe^t)^n$ c).$(p + qe^t)^n$
    b).$(q + p)^n$ d).$(q + e^t)^n$
41. Binomial distribution with parameters n and p is said to be symmetric if
    a).q < p c).q > p
    b).q = p d).q ≠ p
42. Let X follows a poisson distribution with parameter , then mgf of X is
    a).$e^{\lambda t-1}$ c). $e^{\lambda(e^{it}-1)}$
    b).$e^{\lambda(e^t-1)}$ d). $e^{i\lambda(e^t-1)}$
43. The distribution function of a continuous uniform distribution of a variable X lying in the interval (a,b) is
    a).$\frac{1}{b-a}$ c). $\frac{b-a}{X-a}$
    b). $\frac{X-a}{b-a}$ d). $\frac{X-b}{b-a}$
44. If X ~P (1) and Y ~P (2), then the probability P (X + Y < 3) is
    a).e^{-3} c).$4e^{-3}$
    b).$3e^{-3}$ d).$8.5e^{-3}$
45. Which of the following real life situations follow Poisson distribution
    a).The number of printing mistakes per page of a book
    b).The number of defects per item produced
    c).The number of persons arriving in a queue
    d).All the above.

46. Normal distribution was invented by
    a).Laplace c).Gauss
    b).De-Moivre d).All the above.
47. If X_1 and X_2 are two independent Poisson variates with parameters $\lambda_1$and $\lambda_2$respectively, then the variable $(X_1 + X_2)$ follows.
    a).Binomial distribution with parameters (λ_1+λ_2)
    b).Poisson distribution with parameter (λ_1+λ_2)
    c).Either of a and b
    d).Neither of a and b
48. The skewness of a binomial distribution will be zero if
    a).p < $\frac{1}{2}$ c).p = $\frac{1}{2}$
    b).p > $\frac{1}{2}$ d).p < q
49. Binomial distribution tends to Poisson distribution when
    a).n→∞ , p →0 and *np* = λ(finite)
    b). n→∞ , p →$\frac{1}{2}$ and λ = λ(finite)
    c). n→0 , p → 0 and *np* → 0
    d). n→0 , p → 0 and *np* → -∞
50. A discrete random variable has pmf p(x) = kq^xp; p +q = 1; x = 2, 3, 4, ...
    The value of k is
    a).$\frac{1}{q^2}$ c).$\frac{1}{q}$
    b).$\frac{1}{p}$ d).$\frac{1}{pq}$
51. If a discrete random variable takes on four values -1,0,3,4 with probabilities 1/6,k,1/4 and 1-6k, where k is a constant. The value of k is
    a).1/3 c).1/12
    b).2/9 d).5/24
52. Let X be a continuous random variable with probability density function is
    $f(x) = kx$; $0 \le x \le 1$ = k; $1 \le x \le 2$
    = 0; *otherwise.*
    The value of k is equal to
    a).1/4 c).2/5 b).2/3 d).5/4
53. For the distribution function of a random variable X, F (5) F (2) is equal to
    a).P (2 < x < 5) c).P (2 ≤ x ≤ 5)
    b).P (2 ≤ x < 5) d). P (2 <x ≤ 5)
54. If a continuous random variable X has probability density function,
    $f(x) = \frac{1}{3}$; $1 \le x \le 0$ = $\frac{2}{3}$; $0 \le x \le 1$ then E(X^2) is equal to
    a). 1/9 b). 2/3 c). 5/12 d). 1/3
55. If binomial random variable has mean=4 and variance = 3, then its third central moment μ_3 is
    a).1/2 b).5/2 c).3/2 d).7/4
56. A poisson random variable has μ_4= 2 the value of its mean is
    a). 1/3 b). 2/3 c). 1/4 d). 3/4
57. A random variable has uniform distribution over the interval [-1,3].
    This distribution has variance equal to
    a). 8/5 b). 4/3 c). 13/4 d). 9/2

58. For an exponential distribution with probability density function ,
$f(x) = \frac{1}{2}e^{-x/2}$; x ≥ 0 its mean and variance are
a). $\left(\frac{1}{2}, 2\right)$ c). $\left(\frac{1}{2}, \frac{1}{4}\right)$
b). $\left(2, \frac{1}{4}\right)$ d). (2,4)
59. A normal random variable has mean=2 and variance = 4. Its fourth central moment μ_4 will be
a). 16 c). 80
b). 64 d). 48
60. If a random variable X has mean 3 and SD 5, then the variance of the variable Y = 2X 5 is,
a). 25 c). 100
b). 45 d). 50
61. Let X ~N(μ, σ^2), then the central moments of odd order are
a). one c). infinite
b). zero d). positive
62. Let X ~U (0, 1), then the variable y = 2logX follows
a). Log-normal distribution
b). Gamma distribution
c). Chi-square distribution
d). Exponential distribution
63. If X is a standard normal variate , the $\frac{1}{2}X^2$ is a gamma variate with parameters
a). 1,1/2 c). 1/2,1/2
b). 1/2,1 d). 1,1
64. If the mgf of a random variable X is ($\frac{1}{3} + \frac{2}{3}e^t$), then X is a
a). Bernoulli variate c). Binomial variate
b). Posisson variate d). Negative binomial variate
65. If (X,Y) is a bivariate discrete random variable, the number of values which (X,Y) can taken in the X-Y plane is
a). Infinite c). Any number of values
b). finite d). none of the above
66. The moment μ_1,1 of the bivariate distribution is called
a). Var(X,Y) c). Cov(X,Y)
b). Var(X), Var(Y) d). Corr(X,Y)
67. Variance of X in a bivariate distribution of X and Y in terms of moments is represented by
a). μ_{20} b). μ_{02} c). μ_{11} d). μ_{00}
68. In rolling of two distinct dice at a time , the variable X is defined as the number greater than 2 and the variable Y as the sum of numbers of two dices is less than 10. These bivariates (X,Y) are
a). continuous type c). both a and b
b). discrete type d). neither a nor b
69. The height of fathers and their sons form bivariate variables which are
a). Continuous variables c). Pseudo variables
b). Discrete variables d). None of the above

70. If a bivariate normal distribution with parameter (μ_x, μ_y,σ_x^2, σ_y^2,ρ)such that σ_x= σ_y, ρ= 0, the distribution is known as
    a). Uniform normal c). Elliptical normal
    b). Rectangular normal d). Circular normal
71. If in a bivariate normal distribution with parameter (μ_x, μ_y,σ_x^2, σ_y^2,ρ) such that $\sigma_x \neq \sigma_y$, ρ= 0 , the distribution is named as
    a). symmetrical normal c). elliptical normal
    b). uniform normal d). circular normal
72. If in a bivariate normal distribution of the variables x and y, ρ_{xy} = 0, it implies that x and y are
    a). Uncorrelated but not independent
    b). Uncorrelated and indepedent
    c). Independent but not uncorrelated
    d). Correlated and dependent
73. Bivariate normal distribution is also named as
    a). Bravais distribution c). Gaussian distribution
    b). Laplace-Gauss distribution d). All the above
74. Joint distribution function of (X,Y) is equivalent to the probability
    a). P (X = x, Y = y) c). P (X ≤x, Y = y)
    b). P (X ≤ x, Y ≤y) d). P (X ≥ x, Y ≥ y)
75. For the joint pdf f(x,y), the marginal distribution of Y given X=x is given as
    a).$\sum_{all\ x} f(x, y)$ c). $\int_{-\infty}^{\infty} f(x, y)dy$
    b). $\int_{-\infty}^{\infty} f(x, y)dx$ d). $\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} f(x, y)dxdy$
76. If X and Y are independent, the cumulative distribution $F_{XY}(x, y)$ is equal to
    a). $F_X(x)F_Y(y)$X c). both a and b
    b). P (X $\leq$ x)P (Y $\leq y$) d). neither a nor b
77. If the joint distribution of the variables X and Y is bivariate normal(BVN) (0,0,1,1,ρ), the correlation coe cient between X^2 and Y^2 is equal to
    a). 1 b). -1 c). ρ^2 d). 0
78. The correlation coefficient ρ between two variables X_1 and X_2 for a bivariate population in terms of moments is
    a). $\frac{\mu22}{\sqrt{\mu20\mu02}}$ c). $\frac{\mu12}{\sqrt{\mu11\mu22}}$
    b). $\frac{\mu11}{\sqrt{\mu20\mu02}}$ d). $\frac{\mu12}{\sqrt{\mu20\mu02}}$
79. The conditional distribution of a discrete variable Y given X=x can be expressed as
    a).$F_{Y/x}(y/x)$ = P(Y≤ y/X = x) c). $F_{Y/x}(y/x) = \frac{P(Y\leq y/X\leq x)}{P(X=x)}$
    b). $F_{Y/x}(y/x)$ = P(Y= y/X = x) d).$F_{Y/x}(y/x) = \frac{P(X=x/Y=y)}{P(X=x)}$
80. The conditional pdf of X given Y=y for a joint density $f_{X,Y}(x, y)$ can be found by the formula
    a).$F_{X/y}(x/y) = \frac{fX,Y(x,y)}{fX(x)}$ c). $F_{X/y}(x/y) = \frac{fX,Y(x,y)}{fY(y)}$
    b). $F_{X/y}(x/y) = F_{Y/x}(y).f_{X,Y}(x,y)$ d). None of the above.

81. The conditional distribution of X given Y for the joint pdf
$f(x,y)$= 3- x –y for 0< x,y ≤ 1 is

a). $f(x/y) = \frac{3-x-y}{3/2-x}$

b). $f(x/y) = \frac{5/2-y}{3-x-y}$

c). $f(x/y) = \frac{3-x-y}{5/2-y}$

d). None of the above

82. The conditional distribution of Y given X for the joint pdf
$f(x, y)$ =3- x –y for $0 \le x,y \le 1$ is

a). $f(y/x) = \frac{3-x-y}{5/2-y}$

b). $f(y/x) = \frac{3-x-y}{5/2-x}$

c). $f(x/y) = \frac{5/2-y}{5/2-x}$

d). All the above.

83. If the density function of bivariates X and Y is given by $f(x, y) = 3xy$ for $0 \le x \le 1; 0 \le y \le 1$,the marginal distribution of X is

a). $f_X(x) = 3x$

b). $f_X(x) = 3/2x$

c). $f_X(x) = 3/4x$

d). None of the above.

84. If the density function of bivariates X and Y is given by
$f(x, y) = 3xy$ for $0 \le x \le 1; 0 \le y \le 1$, the marginal distribution of Y is

a). $f_Y(y) = 3x$

b). $f_Y(y) = \frac{3x}{2}$

c). $f_Y(y) = \frac{3xy}{2}$

d). $f_Y(y) = \frac{3}{2}y$

85. If the density function of bivariates X and Y is given by
$f(x, y) = 3xy$ for $0 \le x \le 1; 0 \le y \le 1$, the mean of X is

a). $\mu'_{1,0}=\frac{3}{4}$

b). $\mu'_{1,0}=\frac{1}{2}$

c). $\mu'_{1,0}=1$

d). $\mu'_{1,0}=0$

86. If the density function of bivariates X and Y is given by
$f(x, y) = 3xy$ for $0 \le x \le 1; 0 \le y \le 1$,the conditional distribution of Y given X =x is,

a). $f(y/x) = \frac{3}{2}y$

b). $f(y/x) = 3y$

c). $f(y/x) = 2y$

d). $f(y/x) = y$

87. If the density function of bivariates X and Y is given by
$f(x, y) = 3xy$ for $0 \le x \le 1; 0 \le y \le 1$, the $(2, 2)^{th}$ moment is

a). $\mu_{2,2}=\frac{1}{48}$

b). $\mu_{2,2}=\frac{1}{144}$

c). $\mu_{2,2}=\frac{1}{4}$

d). None of the above.

88. If the density function of bivariates X and Y is given by
$f(x, y) = 3xy$ for $0 \le x \le 1; 0 \le y \le 1$,
the covariance between X,Y is

a). $\mu_{1,1}=\frac{1}{4}$

b). $\mu_{1,1}=\frac{1}{144}$

c). $\mu_{1,1}=\frac{1}{4}$

d). None of the above.

89. If the density function of bivariates X and Y is given by
$f(x, y) = 3xy$ for $0 \le x \le 1$; $0 \le y \le 1$,the variance of X is

a). $\mu_{2,0} = \frac{1}{4}$ c). $\mu_{2,0} = \frac{1}{8}$

b). $\mu_{2,0} = \frac{1}{16}$ d). None of the above.

90. The correlation coe cient between the variables X and Y having the joint density,
$f(x, y) = 3xy$ for $0 \le x \le 1$; $0 \le y \le 1$, is

a). $\rho_{X,Y} = \frac{1}{3}$ c). $\rho_{X,Y} = \frac{2}{6}$

b). $\rho_{X,Y} = \frac{16}{48}$ d). All the above.

91. Given the joint probability mass function of X and Y be $f(x, y) = \frac{x+y}{21}$,X 1,2,3;y = 1,2, then P(x=3) is equal to

a). 3/7 c). 4/9

b). 1/9 d). 4/7

92. Let (X,Y) be jointly distributed with density function,
$f(x, y) = e^{-x-y}$; $0 < x < \infty$, $0 < y < \infty$ = 0 ; otherwise Then X and Y are

a). Independent

b). Both having the mean unity

c). Both having the variance unity

d). All of the above.

93. Let $f(x, y) = 1$; x < y < x, 0 < x < 1 then the marginal density function of X is

a). 2x c). $\frac{1}{2}x$

b). 1 d). 2y

94. Let X be a random variable.Then $f(x) = ke^{-2x}$, x ≥ 0 to be density function, k must be equal to

a). 2 c).0

b). 1/2 d).1

95. Let X be a random variable. Then F $(x) = k(1 - e^{-x})^2$, x >0 is a distribution function,provided k is

a).-1 c).1

b).1/2 d).2

96. Let X and Y be two random variables.Then for $f(x, y) = c(2x + y)$, $0 < x < 1$, $0 < y < 2$ to be a joint density function, c must be equal to

a).1/3 c).1/5

b).1/4 d).1

97. Let X and Y be two random variables. Then for $f(x, y) = kxy$, 0 < x < 4, 1 < y < 5 to be a joint density function, k must be equal to

a).1/100 c).1/48

b).1/96 d).None of these.

98. Let the distribution function of a random variable X be F $(x) = 1 - e^{-2x}$, x ≥ 0. Then the density function is

a).$1 - e^{-2x}$, $x > 0$ c).1-2e^{-2x}, x≥ 0

b). 2e^{-2x}, $x > 0$ d). e^{-2x}, x > 0

99. If $Var(x) = 1$, then Var(2X $\pm$3)is
   a).5 b).13 c).4 d).2

100. E$(X-k)^2$ is minimum when
   a).k < E(X) c).k = E (X)
   b).k > E(X) d).k = 0

101. Let X and Y be two bivariate continuous random variables and f(x,y) be its probability density function. Then random variables x and y are independent if *f(x,y) = f(x). f(y).* Here *f(x)* denote
   a) Values of function 'f' at 'x' c) $\int_x$ f(x, y)dx
   b) $\int_y$ f(x, y)dy d) $\int_x \int_y$ f(x, y)dx dy

102. Two fair dice are tossed. Let x denote the difference (absolute) of 2 face numbers and y their sum. Then P(x=2, y=7) is
   a) $\frac{1}{36}$ c) 0
   b) $\frac{2}{36}$ d) $\frac{5}{36}$

103. Two perfect dice are thrown simultaneously, If x = face number of the first dice and y that on the 2nd dice, which of the following is zero?
   a) P(x=1, y=1) c) P (x=2, y>3)
   b) P (x+y =1) d) P (x=y)

104. Following table gives the joint probability distribution of (x, y)

y \ x	1	2	3	4	P(y)
1	$1/30$	$1/30$	$2/30$	$1/30$	$5/30$
2	$2/30$	$2/30$	$4/30$	$2/30$	$10/30$
3	$3/30$	$3/30$	$6/30$	$3/30$	$15/30$
P(x)	$6/30$	$6/30$	$12/30$	$6/30$	1

Then the marginal probability distribution at y = 3 is
   a) $6/30$ c) $12/30$
   b) $10/30$ d) $15/30$

105. If f(x,y) = $\frac{1}{8}$ (6-x-y), 0 < x < 2, 2 < y < 4= 0, other wise
   Then marginal probability of x is
   a) $\frac{1}{4}$(5-y) c) $\frac{1}{4}$(3-x)
   b) $\frac{1}{3}$(4-x) d) $\frac{1}{5}$(4-y)

106. If f(x,y)= 2, 0 < x < y<1= 0, otherwise, then the marginal probability density function of y is.
   a) 2, 0 < x < y c) 0
   b) 2y; 0 < y < 1 d) 1

107. If f(x, y) = $\frac{2}{3}$(x + 1) e^{-y}, 0 < x < 1, y > 0 =0, otherwise, determine f(x/y)

a) e^{-y} c) 0

b) $\frac{2}{3}$ (x+1) d) 1

108. Suppose F(x, y) be the joint distribution function for a continuous bivariate random variable x, y. Then, which of the following is incorrect?

a) F (∞, ∞) = 1

b) F (∞, -∞) = 0

c) F(∞_1, -∞) = 0

d) F (-∞, ∞) =1

109. Given the joint distribution function

F(x,y) = 1 – e^{-x} – e^{-y} – $e^{-(x+y)}$, x > 0, y > 0

= 0, otherwise

What is f(x)?

a) $-e^{-x}$ c) e^{-x}. e^{-y}

b) e^{-y} d) e^{y}

110. If F(x_1, x_2) = k. $X_1^2 . X_2^2$, 0<$x_1$1 <x2 < 1 is a joint probability distribution function in 2 variables x_1 and x_2, then k =

a)9 c) 18

b) 12 d) 10

111. If f(x,y) = $e^{-(x+y)}$, x > 0, y > 0

= 0, otherwise,

then P (0 < x < 2, 1<y<3) is

a) e^{-y} c) e^{-3} –e^{-1}

b) e^{-x} d) e^{-5} – 2e^{-3} + e^{-1}

112. The joint probability function of x & y is given by

f(x,y) = 4 xy.$e^{-(x^2+y^2)}$; x ≥ 0, y ≥ 0 Then f(x/y) is

a)$2xe^{-x^2}$ c) ye^{-y^2}

b) $2ye^{-y^2}$ d) xe^{-x^2}

113. The joint probabilities mass function of variable x_1& x_2 is

P(x_1, x_2) = = 0, otherwise

Then marginal distribution functions P(x_1= 3) is

a)$\frac{5}{21}$ c) 9/21

b) 7/21 d) 12/21

114. If x & y are two random variables, then E(x+y) =

a) E(x). E(y) c) E(x) + E(y) – E(x, y)

b) E(x) + E(y) d) E(x) + E(y) – E(x).E(y)

115. Given μ_{rs} = E (x^r, y^s) –$[E(x)]^{r}$ $[E(y)]^{s}$,Then which of the following is true?

a) $\mu_{1,0}$= 0 c) $\mu_{2,0}$= E(x^2) – E(x)

b) $\mu_{0,1}$=E(y) d) $\mu_{0,2}$= E(y^2) – E(y)

116. If x and y are independent random variables, then which of the following in incorrect?

a) V(x+y) = V(x) + v(y) c) $\rho_{xy} \neq 0$

b) V (x – y) = V(x) + v(y) d) Cov (x, y) = 0

117. Consider the following table

Y \ X	0	1
-1	$1/8$	$2/8$
1	$3/8$	$2/8$

a) $4/8$ b) $2/8$ c) $-3/8$ d) $5/8$

118. Variance of x is given by

a) E(x – E(x))
b) E (x^2) – E(x)
c) E(x^2) – [E(x)]^2
d) E(x^2)

119. The distribution of a random variable x which takes 2 values 0 and 1 with respective probabilities q and p such that (p+q)=1 is called.

a) Bernoulli Distribution
b) Binomial distribution
c) All of these
d) None of these

120. For a binomial distribution P(x) = $nC_x.P^x.q^{n-x}$, x= 0, 1, 2… n., which of the following is incorrect?

a) $\mu_1^1 = np$
b) $\mu_2^1 = n(n-1)\,p^2 + np$
c) $\mu_2 + np$
d) $\mu_1 = 0$

121. The measure of skewness β_1 is related to the central moments as

a) $\beta_1 = \frac{\mu_3}{\mu_2}$
b) $\beta_1 = \frac{\mu_2}{\mu 3}$
c) $\beta_1 = \frac{\mu_3{}^2}{\mu_2{}^3}$
d) $\beta_1 = \frac{\mu_2{}^3}{\mu 3^2}$

122. A curve is said to be lipokurtic if

a) $\frac{\mu_4}{(\mu_2)^2} - 3 > 0$
b) $\frac{\mu_4}{(\mu_2)^2} - 3 < 0$
c) $\frac{\mu_4}{(\mu_2)^2} - 3 = 0$
d) None of these

123. Given mean and variance of binomial distribution is 4 & 3 respectively. Then its mode is

a) 3
b) 4
c) None of these
d) Cannot be found

124. The Poisson's distribution is a limiting case of the binomial distribution under the following conditions, except one. Which one?

a)Number of trials is indefinitely large.
b)Probability of success is indefinitely large
c)np = λ
d)Probability of failure is indefinitely large

125. A random variable is said to be Poisson variate if it assumes non-negative values and its probability mass function is given by P (x) =

a) $\frac{e^{\lambda}.\lambda^x}{x!}, x = 0,1,2,\ldots\infty$
b) $\frac{e^{-\lambda}.\lambda^x}{x!}, x = 0,1,2,\ldots\infty$
c) $\frac{e^{-\lambda}\lambda^{-x}}{x!}, x = 0,1,2,\ldots\infty$
d) $\frac{e^{-\lambda}.}{\lambda^{-x}x!}, x = 0,1,2,\ldots\infty$

126. If x is a Poisson variate with P (x=2) = 9 × P(x=4) + 90 × P(x=6), then mean=

a) 1 b) 2 c) 3 d) –1

127. For a Poisson distribution having a double mode at x=1 and x = 2, what is P (x=3)?

a) $\frac{4e^{-2}}{3}$ b) $\frac{4e^{2}}{3}$ c) $\frac{3e^{2}}{4}$ d) $\frac{3e^{-2}}{4}$

128. x and y be independent Poisson variate such that P(x=0) = P(x=2) & P (y=1) = P(y=2). Then V(x – y) =

a) $\sqrt{2}$ - 2 b) 2- $\sqrt{2}$ c) $\sqrt{2}$ - 2 d) $\sqrt{2}+2$

129. A continuous random variable follows a standard normal distribution if its pdf is given by

a) f(z) = $\frac{1}{\sqrt{2\pi}}e^{z^2/2}, -\infty < z < \infty$ b) f(z) = $\frac{1}{\sqrt{2\pi}}e^{-z^2/2}, -\infty < z < \infty$

c) $\frac{1}{2\pi}e^{z^2/2}, -\infty < z < \infty$ d) $\frac{1}{\sqrt{2\pi}}e^{-z/2}, -\infty < z < \infty$

130. The binomial distribution has number of parameters equal to _______

a) two b) one c) four d) three

131. The binomial distribution have mean equal to

a) $\mu = p$ b) $\mu = npq$ c) $\mu = np$ d) None of these

132. In Binomial distribution the variance σ^2 and mean μ are related by

a) $\sigma^2 = q\mu$ b) $\sigma^2 = \frac{\mu}{q}$ c) $q^2\sigma^2 = \mu$ d) None of these

133.The range of the Bernoulli random variable is the set

a) Set of real members b) (0, 1)

c) Set of integers d) None of these

134. Let ϕ (x) be a standard normal distribution function. Then the following relation holds.

a) $\phi(-x) = \phi(x)$ b) $\phi(-x) = \phi(x) - 1$

c) $\phi(-x) = 1 - \phi(x)$ d) $\phi(-x) = \phi(x) + 1$

135. The variance of the uniform (discrete) probability distribution is given by

a) $\sum\frac{(x-\mu)^2}{k^2}$ b) $\sum\frac{xi}{k}$ c) $\sum xi$ d) k

136. We get standard normal distribution from normal distribution if

a) $\mu = 1, \sigma = 0$ c) $\mu = \sigma = 0$

b) $\mu = 0, \sigma = 1$ d) $\mu = \sigma = 1$

137. Let F(x) be a distribution function of normal distribution and ϕ(x) be a standard distribution function. Then the following relation holds……

a) F(x) = $\phi\left(\frac{x}{\sigma}\right)$ b) F(x) = $\phi(x)$

c) F(x)= $\phi(\sigma)$ d) F(x) = $\phi\left(\frac{x-\mu}{\sigma}\right)$

138. Repeated trials are normally referred to ______
a) Gamma distribution
b) Uniform distribution
c) Bernoulli distribution
d) None of these

139. The mean and variance of Poisson distribution are same
a) Always true
b) Always false
c) Partially true
d) Partially false

140. When each term of the given series may assume the values of two or more than two variables, the distribution is called
a) Variate
b) Non variate
c) Univariate
d) Bivariate

141. If x is a random variable with E(x) = μ and V(x) = σ^2 then Chebyshev's inequality is given by
a) $P\left[|x-\mu| \geq k\sigma\right] \leq \frac{1}{k^2}, k > 0$
b) $P\left[|k-\mu| \leq k\sigma\right] \geq 1-\frac{1}{k^2}, k > 0$
c) Both a and b
d) None of these

ANSWERS

1.d	37.d	73.d	109. a
2. c	38.d	74.b	110. c
3.b	39.c	75.b	111.d
4.b	40.a	76.c	112.a
5.c	41.b	77.c	113.c
6.a	42.b	78.c	114. b
7.b	43.b	79.c	115.a
8.d	44.d	80.c	116.c
9.c	45.d	81.c	117.a
10.c	46.c	82.b	118.c
11.a	47.b	83.b	119.a
12.b	48.c	84.d	120. c
13.a	49.a	85.b	121. c
14.a	50.a	86.c	122.a
15.c	51.c	87.d	123. b
16.d	52.b	88.a	124. b
17.c	53.c	89.b	125.d
18.b	54.d	90.d	126. a
19.d	55.c	91.a	127. a
20.c	56.b	92.d	128.d
21.c	57.b	93.a	129.b
22.b	58.d	94.a	130.a
23.b	59.d	95.c	131.c
24.d	60.c	96.c	132. a
25.d	61.b	97.b	133. b
26.d	62.c	98.b	134. c
27.b	63.a	99.c	135. a
28.d	64.c	100.c	136. b
29.a	65.b	101. b	137. d
30.a	66.c	102. c	138. c
31.c	67.a	103. b	139. a
32.b	68.b	104. d	140. d
33.a	69.a	105. c	141. c
34.c	70.d	106.b	
35.c	71.c	107. b	
36.b	72.b	108. d	

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