Assignment (STATISTICS - 2)

1. Two random variables X and Y are independent if :
   a. $E(XY)=1$
   b. $E(XY)=0$
   c. $E(XY)=E(X)E(Y)$
   d. None of the above
2. If X and Y are two random variables such that their expectations exist and $P(x \le y)=1$, then
   a. $E(X) \le E(Y)$
   b. $E(X) \ge E(Y)$
   c. $E(X)=E(Y)$
   d. None of the abvoe
3. If X and Y two independent variables and their expected values are $\overline{X}$ and $\overline{Y}$ respectively, then
   a. $E\left\{\left(X-\overline{X}\right)\left(Y-\overline{Y}\right)\right\}=0$
   b. $E\left\{\left(X-\overline{X}\right)\left(Y-\overline{Y}\right)\right\}=1$
   c. $E\left\{\left(X-\overline{X}\right)\left(Y-\overline{Y}\right)\right\}=C$ (constant)
   d. All of the above
4. If X is a random variable with its mean $\overline{X}$, the expression $E\left(X-\overline{X}\right)^2$ represents:
   a. the variance of X
   b. second central moment
   c. both (a) and (b)
   d. none of (a) and (b)
5. If X and Y are two random variables, then
   a. $E\left\{(XY)^2\right\}=E\left(X^2\right)E\left(Y^2\right)$
   b. $E\left\{(XY)^2\right\}=E\left(X^2Y^2\right)$
   c. $E\left\{(XY)^2\right\} \ge E\left(X^2\right)E\left(Y^2\right)$
   d. $E\left\{(XY)^2\right\} \le E\left(X^2\right)E\left(Y^2\right)$
6. The outcomes of tossing a coin three times are a variable of the type:
   a. continuous random variable
   b. discrete random variable
   c. neither discrete nor continuous random variable
   d. discrete as will as continuous random variable
7. The height of persons in a country is a random variable of the type:
   a. continuous r.v.
   b. discrete r.v.
   c. neither discrete nor continuous r.v.
   d. continuous as well as discrete r.v.
8. If X and Y are two random variables with means $\overline{X}$ and $\overline{Y}$ respectivley, then the expression $E\left[\left(X-\overline{X}\right)\left(Y-\overline{Y}\right)\right]$ is called:
   a. variance of X
   b. variance of Y
   c. cov (X, Y)
   d. moments of X and Y
9. If X is a random variable, $E\left(e^{tx}\right)$ is known as:
   a. characteristic function
   b. moment generating function
   c. probability generating function
   d. all the above
10. If X is a random variable, the $E\left(e^{x}\right)$ is known as:
    a. characteristic function
    b. moment generating function
    c. probability generating function
    d. The x^{th} moment
11. If X is a random variable with mean μ, the $E(X-\mu)^r$ is called:
    a. variance
    b. r^{th} raw moment
    c. r^{th} central moment
    d. none of the above
12. If $X_1, X_2, \ldots\ldots\ldots, X_n$ be a sequence of nutually

independent random variables where X_i can take only positive integral values and $S_m = \sum_{i=1}^{m} X_i (m \le n), S_n = \sum_{i=1}^{n} X_i E(X) = \mu > 0$ then

a. $E\left(\frac{S_m}{s_n}\right) = 1$

b. $E\left(\frac{S_m}{s_n}\right) = 0$

c. $E\left(\frac{S_m}{s_n}\right) = \frac{m}{n}$

d. $E\left(\frac{S_m}{s_n}\right) = \infty$

13. If X is a random variable which can take only non-negative values, then

a. $E(X^2) = [E(X)]^2$

b. $E(X^2) \ge [E(X)]^2$

c. $E(X^2) \le [E(X)]^2$

d. none of the above

14. If X is a random variable having its p.d.f. $f(x)$, the $E(X)$ is called:

a. arithmetic mean

b. geometric mean

c. harmonic

d. first quartile

15. If X is a random variable and $f(x)$ is its p.d.f., $E\left(\frac{1}{X}\right)$ is used to find:

a. arithmetic mean

b. harmonic mean

c. geometic mean

d. first central moment

16. If X and Y are two random variables, the covariance between the variables $aX + b$ and $cY + d$ in terms of COV(X, Y) is:

a. COV $(aX + b, cY + d)$ = COV (X, Y)

b. COV $(aX + b, cY + d) = abcd \times$ COV (X, Y)

c. COV $(aX + b, cY + d) = ac$ COV $(X, Y) + bd$

d. COV $(aX + b, cY + d) = ac$ COV (X, Y)

17. If X, Y and Z are three random variables, then

a. COV $(X + Y, Z)$ = COV (X, Z) + COV (Y, Z)

b. COV $(X + Y, Z)$ = COV $(X + Z, Y Z)$

c. COV $(X + Y, Z)$ = COV $(X + Y, Z) =$

d. COV $(X + Y, Z) = 0$

18. If X is a random variable and r is an integer, then $E(X^r)$ represents:

a. r^{th} central moment

b. r^{th} factorial moment

c. r^{th} raws moment

d. none of the above

19. 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 = variance

d. Mean $\le$ variance

20. The outcomes of an experiment classified as success A or $\overline{A}$ failure will follow a Bernoulli distribution iff:

a. $P(A) = \frac{1}{2}$

b. $P(A) = 0$

c. $P(A) = 1$

d. $P(A)$ remains constant in all trials

21. The mean and varialnce of a binomial distribution are 8 and 4, respectivley. Then, $P(X - 1) = 1$ is equal to:

a. $\frac{1}{2^{12}}$ b. $\frac{1}{2^4}$

c. $\frac{1}{2^6}$ d. $\frac{1}{2^8}$

22. If for a binomial distribution, $b(n, p), n = 4$ and also $P(X = 2) = 3P(X = 3)$, the value of

a. $\frac{9}{11}$ b. 1

c. $\frac{1}{3}$ d. None of the above

23. If for a binomial distribution $b(n, p)$, mean = 4, variance $= \frac{4}{3}$, the probability, $P(x \geq 5)$ is equal to:

a. $\left(\frac{2}{3}\right)^6$ b. $\left(\frac{2}{3}\right)^5\left(\frac{1}{3}\right)$

c. $\left(\frac{1}{3}\right)^6$ d. $4\left(\frac{2}{3}\right)^6$

24. If $X - b\left(3, \frac{1}{2}\right)$ and $-b\left(5, \frac{1}{2}\right)$, the probability of $P(X + Y = 3)$ is:

a. 7/16 b. 7/32

c. 11/16 d. None of the above

25. If X and Y are two Poisson variates such $X \sim P(1)$ and $Y \sim P(2)$, the probability, $P(X + Y < 3)$ is:

a. e^{-3} b. $3e^{-3}$

c. $4e^{-3}$ d. $8.5e^{-3}$

26. If $X \sim b(n, p)$, the distribution $Y = (n - X)$ is:

a. $b(n,1)$ b. $b(n, x)$

c. $b(n,\text{p})$ d. $b(n, q)$

27. A family of parametric distribution in which mean is equal to variance is:

a. binomial distribution
b. gamma distribution
c. normal distribution
d. Poisson distribution

28. A family of parametric distribution in which mean is always greater than its variance is:

a. binomial distribution
b. geometric distribution
c. both (a) and (b)
d. neither (a) nor (b)

29. A family of parametric distributions having mean <, =, > variance is:

a. gamma distribution
b. exponential distribution
c. logistic distribution
d. all the above

30. The family of parametric distributions, for which the mean and variance does not exist, is:

a. Polya's distribution
b. Cauchy distribution
c. negative binomial distributions
d. hypergeometric distribution

31. The distribution possessing the memoryless property is:

a. gamma distribution
b. geometric distribution
c. hypergeometic distribution
d. all the above

32. The distribution in which the probability as each successive draw varies is:

a. hypergeometric distribution
b. geometric distribution
c. binomial distribution
d. discrete uniform distribution

33. In hypergeometric distribution, H.G. (N, k, n), and $N \to \infty, \frac{k}{N} \to p$, the hypergeometric distribution reduces to:

a. binomial distribution
b. geometric distribution
c. normal distribution
d. none of the above

34. Negative binomial distribution, $nb(x; r, p)$ for $r = 1$ reduces to:

a. binomial distribution
b. Poisson distribution

c. hypergeometric distribution
d. geometric distribution

35. The distribution for which the mode does not exist is:
a. normal distribution
b. *t*-distribution
c. continuous rectangualr distribution
d. *F*-distribution

36. If $X \sim N(\mu, \sigma^2)$, the points of inflexion of normal distribution curve are:
a. $\pm\mu$ b. $\mu \pm \sigma$
c. $\sigma \pm \mu$ d. $\pm\sigma$

37. If $X \sim N(\mu, \sigma^2)$, the maximum probability at the point of inflexion of normal distribution is:
a. $\frac{1}{\sqrt{2\pi}} e^{1/2}$
b. $\frac{1}{\sqrt{2\pi}} e^{-1/2}$
c. $\frac{1}{\sigma\sqrt{2\pi}} e^{-1/2}$
d. $\frac{1}{\sqrt{2\pi}}$

38. Pearson's constants for a normal distribution with mean μ and variance σ^2 are:
a. $\beta_1 = 3, \beta_2 = 0, \gamma_1 = 0, \gamma_2 = -3$
b. $\beta_1 = 0, \beta_2 = 3, \gamma_1 = 0, \gamma_2 = 0$
c. $\beta_1 = 0, \beta_2 = 0, \gamma_1 = 0, \gamma_2 = 3$
d. $\beta_1 = 0, \beta_2 = 3, \gamma_1 = 0, \gamma_2 = 3$

39. The area under the standard normal curve beyond the lines $z = \pm 1.96$ is:
a. 95 per cent
b. 90 per cent
c. 5 per cent
d. 10 per cent

40. The probability mass function for the negative binomial distribution with parameters *r* and *p* is:
a. $\binom{X+r-1}{r-1} p^r q^x$
b. $\binom{-r}{X}(-1)^x p^r q^x$
c. $\binom{-r}{X} p^r (-q)^x$
d. all the above

41. The probability density function for beta type II distribution with parameters $\alpha, \beta > 0$ is:
a. $\frac{X^{\alpha-1}}{(1+x)^{\alpha+\beta}}$ for $X > 0$
b. $\frac{X^{\alpha-1}}{B(\alpha+\beta)} \cdot \frac{X^{\beta-1}}{(1+X)^{\alpha+\beta}}$ for $0 \le X \le 1$
c. $\frac{1}{B(\alpha,\beta)} \cdot \frac{X^{\alpha-1}}{(1+X)^{\alpha+\beta}}$ for $0 \le X \le \infty$
d. $\frac{1}{B(\alpha,\beta)} \cdot \frac{X^{\alpha-1}}{(1-X)^{\alpha+\beta}}$ for $0 < X < \infty$

42. The probability density function for beta distribution of first kind with parameters
a. $\frac{1}{B(m,n)} X^{m-1}(1-X)^{n-1}; 0 < X < 1$
b. $\frac{1}{B(n,m)} X^{m-1}(1+X)^{n-1}; 0 < X < 1$
c. $\frac{1}{B(n,m)} X^{m-1} x^{n}; 0 < X < 1$
d. $\frac{1}{B(m,n)} X^{m-1}(1-X)^{n-1}; 0 < X < 1$

43. If *X* is a Poisson variate with parameter μ, the moment generating function of Poisson variate is:
a. $e^{\mu t} - 1$ b. $e^{\mu(e^t - 1)}$
c. $e^{\mu(e^{it} - 1)}$ d. $e^{i\mu(e^t - 1)}$

44. The moment generating function for geometric distribution with parameter *p* is:
a. $P(1 - qe^t)$
b. $P(1 - qe^{it})$
c. $P/(1 - qe^{it})$

d. $P/(1-qe^t)$

45. The distribution funciton of a continuous uniform distribution of a variable X lying in the interval (a,b) is:

a. $\frac{1}{b-a}$ b. $\frac{X-a}{b-a}$

c. $\frac{b-a}{X-a}$ d. $\frac{X-b}{b-a}$

46. The probability density function of a random variable X distributed as $\gamma(n)$ is:

a. $\frac{1}{\Gamma n}X^{n-1}e^{-x}$

b. $\frac{1}{\Gamma n}X^{n-1}e^{x}$

c. $\frac{1}{\Gamma n}(1-X)^{n-1}e^{-x}$

d. $\frac{1}{\Gamma n}X^{n-1}e^{-1/x}$

47. If X and Y are two gamma variate $\gamma(n_1)$ and $\gamma(n_2)$, the distribution of $\frac{X}{Y}$ is:

a. $\beta_1(n_1,n_2)$ b. F_{n_1,n_2}

c. $\beta_{II}(n_1,n_2)$ d. $\gamma(n_1+n_2)$

48. If X is a.r.v., the probability density function of the variable $\log_e x \sim N(\mu,\sigma^2)$ is:

a. $\frac{1}{\sigma\sqrt{2\pi}}e^{-\frac{1}{2\sigma^2}(\log_e x-\mu)^2}$

b. $\frac{1}{X\sqrt{2\pi}}e^{-\frac{1}{2\sigma^2}(\log_e x-\mu)^2}$

c. $\frac{1}{\sigma X\sqrt{2\pi}}e^{-\frac{1}{2\sigma^2}(\log_e x-\mu)^2}$

d. any of the above

49. If $\log_e x \sim N(\mu_1,\sigma_1^2)$ and $\log_e y \sim N(\mu_2,\sigma_2^2)$, the variable $(\log_e x-\log_e y)$ is distributed as:

a. $N\left(\mu_1-\mu_2,\sigma_1^2-\sigma_2^2\right)$

b. $N\left(\mu_1-\mu_2,\sigma_1^2+\sigma_2^2\right)$

c. $N\left(\mu_1,\sigma_1^2\right)-n\left(\mu_2,,\sigma_2^2\right)$

d. none of the above

50. Student's t-distribution was given by:

a. G.W. Snedecor
b. R.a. Fisher
c. W.S. Gosset
d. None of the above

51. Students's t-distribution curve is symmetrical about mean, it means that:

a. odd order moment are zero
b. even order moments are zero
c. both (a) and (b)
d. none of (a) and (b)

52. If $X \sim N(0,1)$ and $Y \sim \chi^{2/n}$, the distribution of the variate $X/\sqrt{Y}$ follows:

a. Caushy's distribution
b. Fisher's t-distribution
c. Students' $t$distribution
d. none of the above

53. The p.d.f. of student's t-distribution based on the random sample $X_1, X_2,.....,X_n$ from a population $N\left(\mu,\sigma^2\right)$ is:

a. $\frac{1}{B\left(\frac{1}{2},\frac{n-1}{2}\right)}\left(1+\frac{t^2}{n}\right)^{-n/2}$

b. $\frac{1}{\sqrt{n-1}B\left(\frac{1}{2},\frac{n-1}{2}\right)}\left(1+\frac{t^2}{n}\right)^{-\frac{n+1}{2}}$

c. $\frac{1}{\sqrt{n-1}B\left(\frac{1}{2},\frac{n}{2}\right)}\left(1+\frac{t^2}{n-1}\right)^{-\frac{n}{2}}$

d. $\frac{1}{\sqrt{n-1}B\left(\frac{1}{2},\frac{n-1}{2}\right)}\left(1+\frac{t^2}{n-1}\right)^{-\frac{n}{2}}$

54. The degrees of freedom for students-*t* based on a random sample of size *n* is:
a. $n-1$ b. n
c. $(n-2)$ d. $\frac{n-1}{2}$

55. If the sample size $n=2$, the student's *t*-distribution reduces to:
a. normal distribution
b. *F*-distribution
c. Cauchy distribution
d. none of the above

56. If *n*, the sample size is larger than 30, the student's *t*-distribution tends to:
a. normal distribution
b. *F*-distribution
c. Cauchy distribution
d. Chi-square distribution

57. The points of inflexion of *t*-distribution are:
a. $\pm\sqrt{\frac{n}{n+1}}$
b. $\pm\left(\frac{n}{n-2}\right)^{1/2}$
c. $\pm\left(\frac{n}{n+2}\right)^{1/2}$
d. $\pm\sqrt{\frac{n+2}{n}}$

58. Maximum height of the student's *t*-distribution curve at the point $t=0$ is:
a. $\frac{1}{B\left(\frac{1}{2},\frac{n-1}{2}\right)}$
b. $\frac{1}{\sqrt{n-1}B\left(\frac{1}{2},\frac{n-1}{2}\right)}$
c. $\frac{1}{\sqrt{n-1}B\left(\frac{1}{2},\frac{n}{2}\right)}$
d. $\sqrt{n-1}B\left(\frac{1}{2},\frac{n-1}{2}\right)$

59. For $n>4$ and $n<30$, the *t*-distribution curve with regard to peakedness is:
a. mesokurtic b. platykurtic
c. leptokurtic d. bimodal

60. If $Z_1, Z_2, ..., Z_n$ are n i.i.d. variates, the distribution of $\sum_{i=1}^{n} Z_i^2$ is:
a. Students - t^2
b. χ^2 with *n* d.f.
c. χ^2 with (*n* - 1) d.f.
d. all the above

61. The probability density function of the sum of squares of independent *n* normal variates $N(0,1)$ is:
a. $\frac{1}{2^{n/2}\Gamma\frac{n-1}{2}}e^{-\chi^2/2}\left(\chi^2\right)^{n-1}$
b. $\frac{1}{2^{n/2}\Gamma\frac{n}{2}}e^{-\chi^2/2}\left(\chi^2\right)^{n-1}$
c. $\frac{1}{2^{n/2}\Gamma\frac{n}{2}}e^{-\chi^2/2}\left(\chi^2\right)^{\frac{n}{2}-1}$
d. $\frac{1}{2^{n}\Gamma\frac{n}{2}}e^{-\chi^2/2}\left(\chi^2\right)^{\frac{n}{2}-1}$

62. The relation between the mean and variance of χ^2 with *n* d.f. is:
a. mean = 2 variance
b. 2 mean = variance
c. mean = variance
d. none of the above

63. Chi-square distribution curve in respect of symmetry is:
 a. negatively skew
 b. symmetrical
 c. positively skew
 d. any of the above

64. Chi-square distribution curve with regard to bulginess is:
 a. mesokurtic b. leptokurtic
 c. platykurtic d. not definite

65. Moment generating function of the Chi-square distribution is:
 a. $(1-2it)^{n/2}$ b. $(1-2t)^{n/2}$
 c. $(1-2it)^{-n/2}$ d. $(1-2t)^{-n/2}$

66. Mode of the Chi-square distribution with n d.f. lies at the point:
 a. $\chi^2 = m-1$
 b. $\chi^2 = n$
 c. $\chi^2 = n-2$
 d. $\chi^2 = 1/(n-2)$

67. The points of iriflexion of the Chi-square distribution curve lie at the points:
 a. $(n-2)\pm(n-2)^{1/2}$
 b. $(n-2)\pm\{2(n-2)\}^{1/2}$
 c. $(n-2)\pm 2(n-2)^{1/2}$
 d. $\left\{\frac{n}{2(n-2)}\right\}^{1/2}$

68. If X and Y are distributed as χ^2 with d.f. n_1 and n_2, respectively, the distribution of the variate X/Y is:
 a. $\beta_I\left(\frac{n_1}{2},\frac{n_2}{2}\right)$
 b. $\beta_{II}\left(\frac{n_1}{2},\frac{n_2}{2}\right)$
 c. χ^2 with d.f. (n_1-n_2)
 d. none of the above

69. If $X \sim X^2_{n_1}$ and $Y \sim X^2_{n_2}$, the distribution of the variate $(X - Y)$ is:
 a. $\beta_I\left(\frac{n_1}{2},\frac{n_2}{2}\right)$
 b. $\beta_{II}\left(\frac{n_1}{2},\frac{n_2}{2}\right)$
 c. χ^2 with $\left(\frac{n_1-n_2}{2}\right)$ d.f.
 d. none of the above

70. The variate $\sqrt{\chi^2_n}$ will be distributed as:
 a. Fisher's t with n d.f.
 b. Gamma distribution
 c. exponential distribution
 d. Chi-distribution

71. If $X_i \sim \chi^2_{n_i}$ for $i = 1, 2, ..., n,$ the distribution of the variatge $\sum_{i=1}^{n} X_i$ is:
 a. normal distribution
 b. Chi-distribution
 c. χ^2 distribution with $\sum n_i$ d.f.
 d. none of the above

72. The shape of Chi-square distribution curve for χ^2 with d.f. 1 or 2 is:
 a. a parabola
 b. a hyperbola
 c. J-shaped curve
 d. bell-shped curve

73. If the d.f. n for the Chi-square distribution tend to infinity, the chi-square distribution tends to:
 a. Fisher's t-distribution with n d.f.
 b. normal distribution with mean n and variance $2n$
 c. both (a) and (b)
 d. none of (a) and (b)

74. The variate F with usual notations is defined as:
 a. $F = \frac{\chi_1^2/v_1}{\chi_2^2/v_2}$

b. $F = \frac{s_1^2}{s_2^2}$

c. e^{2z}

d. all the above

75. The range of *F*-variate is:

a. $-\infty$ to ∞ b. 0 to 1

c. 0 to ∞ d. $-\infty$ to 0

76. *F*-distribution curve in respect to tails is:

a. negative skew

b. positive skew

c. symmetrical

d. any of the above

77. F_{v_1, v_2} distribution curve becomes highly positive skew when:

a. v_1 is less than 5

b. v_2 is less than 5

c. any of v_1 and v_2 is less than 5

d. v_2 is greater than 5

78. The mode of *F*-distribution curve for v_1, v_2 $\geq$ 3 lies at the point:

a. $F = \frac{v_2(v_1 - 2)}{v_1(v_2 + 2)}$

b. $F = \frac{v_1(v_2 - 2)}{v_2(v_1 + 2)}$

c. $F = \frac{v_1(v_2 - 2)}{v_2(v_1 - 2)}$

d. $F = \frac{(v_1 + 2)v_1}{(v_2 + 2)v_2}$

79. Mean of the *F*-distribution with d.f. v_1 and v_2 for $v_2 \geq 3$ is:

a. $\frac{v_2}{v_1 - 2}$ b. $\frac{v_1}{v_2 - 2}$

c. $\frac{v_1}{v_1 - 2}$ d. $\frac{v_2}{v_2 - 2}$

80. The reciprocal property of $F_{v_1, v_2} -$ distribution can be expressed as:

a. $F_{1-\alpha; v_2, v_1} = \frac{1}{F_{1-\alpha; v_2, v_1}}$

b. $P\left(F_{v_2, v_1} \geq C\right) = P\left(F_{v_2, v_1} \leq \frac{1}{C}\right)$

c. both (a) and (b)

d. neither (a) nor (b)

81. If $X \sim F(m, n)$, the variable $\frac{nX}{n + mX}$ follows the distribution:

a. $\beta_{II}(m, n)$

b. $\beta_{II}\left(\frac{m}{2}, \frac{n}{2}\right)$

c. $\beta_{I}\left(\frac{m}{2}, \frac{n}{2}\right)$

d. $\beta_{I}(m, n)$

82. If $X \sim F(m, n)$ the variable $\frac{m}{n}X$ is distributed as:

a. $\beta_{II}(m, n)$

b. $\beta_{II}\left(\frac{m}{2}, \frac{n}{2}\right)$

c. $\beta_{I}\left(\frac{m}{2}, \frac{n}{2}\right)$

d. $\beta_{I}(m, n)$

83. The relation between student's-*t* and *F*-distribution is:

a. $F_{1,1}t_n^2$ b. $F_{n,1}t_1^2$

c. $t_\infty^2 = F_{1.n}$ d. none of the above

84. The distribution having the m.g.f. $\frac{1}{\left(3 - 2e^t\right)}$ can be identified as:

a. negative binomial distribution

b. geometric distribution

c. exponential distribution

d. none of the above

85. The given probability function, $f(X)=\frac{1}{2^x}$ for $X=1,2,3....$ represent

a. Bernoulli distribution
b. Posson distribution
c. Geometric distribution
d. All the above

86. If a variate $X \sim \beta_I(m,n)$ where $m<1$ and $n<1$, the beta distribution is:

a. bimodal with its mode at the points X = 0 and X = 1
b. unimodal with its mode at the points X = 1.
c. unimodal with its mode at the point X = 0
d. mode does not exist

87. If a variate $X \sim \beta_I(m,n)$ where $m>1, n>1$, the mode lies at the point:

a. $\frac{m}{m+n-2}$ b. $\frac{m-1}{m+n-1}$
c. $\frac{m-1}{m+n-2}$ d. $\frac{m}{m+n}$

88. If a variate $X \sim \gamma(\alpha,1)$, the .d.f. of X is same as that of:

a. Chi-square distribution
b. exponential distribution
c. normal distribution
d. Weibull distribution

89. If the moment generating function of a distribution is $(q+pe^t)^n$, the variance of the distribution is:

a. 2*n* b. *pq*
c. *npq* d. *pq/n*

90. Binomial distribution tends to Poisson distribution when:

a. $n \to \infty, p \to 0$ and $np=\mu$
b. $n \to \infty, p \to \frac{1}{2}$ and $np \to 0$
c. $n \to 0, p \to 0$ and $np \to 0$
d. $n \to 15, p \to 0$ and $np \to 0$

91. If for a normal distribution, $Q_1 = 54.52$ and $Q_1 = 78.86$, the median of the distribution is:

a. 12.17 b. 39.43
c. 66.69 d. none of the above

92. A discrete random variable has probability mass funciton $p(x)=kq^x p; p+1=1; x=2,3,4......$ The value *k* should be equal to,

a. $1/q^2$ b. $1/p$
c. $1/q$ d. $1/pq$

93. If a discrete random variable takes on four values - 1, 0, 3, 4 with probabilities 1/6, *k* 1/4 and 1 - 6*k*, where *k* is a constant, then the value of *k* is:

a. 1/3 b. 2/9
c. 1/12 d. 5/24

94. Let *X* be a continuous tandom variable with probability density function,

$$f(x)=kx; 0 \le x \le$$
$$=k; 1 \le x \le 2$$
$$=0; \text{ otherwise}$$

The value of *k* is equal to:

a. 1/4 b. 2/3
c. 2/5 d. 3/4

95. For the distribution function of a random variable $X, F(5)-\text{F}(2)$ is equal to:

a. $p(2<x<5)$
b. $p(2 \le x<5)$
c. $p(2 \le x \le 5)$
d. $p(2<x \le 5)$

96. If a continuous random variable *X* has probability density funciton,

$$f(x)=\frac{1}{3}; \quad -1 \le \text{x} \le 0$$
$$=\frac{2}{3}; \quad 0 \le x \le,$$

then $E(X^2)$ is equal to:

a. 1/9 b. 2/3
c. 5/12 d. 1/3

97. 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

98. For an exponential distribution with probability density function.

$$f(x) = \frac{1}{2}e^{-x/2}; x \geq 0,$$

its mean and variance are;

a. $\left(\frac{1}{2}, 2\right)$ b. $\left(2, \frac{1}{4}\right)$
c. $\left(\frac{1}{2}, \frac{1}{4}\right)$ d. (2, 4)

99. If a variable x has probability density function,

$$f(x) = \frac{1}{\Gamma\alpha\beta^{\alpha}} x^{\alpha-1}e^{-x/\beta}; x \geq 0$$

then its variance is;

a. $\alpha\beta^2$ b. $\alpha^2\beta$
c. $\alpha^2\beta^2$ d. α/β^2

100. If a random variable X has mean 3 and standard deviation 5, then, the variance of the variable $Y = 2Y - 5$ is,

a. 25 b. 45
c. 100 d. 50

101. The moment generating function of a random variable X is,

$$M_x(t) = \frac{2}{5} + \frac{1}{3}e^{2t} + \frac{4}{15}e^{3t}.$$

The expected value of X is,

a. 22/15 b. 9/5
c. 17/15 d. 11/5

102. A random variable X is distribution as $F_{(4,7)}$, the mode of the distribution is:

a. 7/6 b. 21/10
c. 7/18 d. 8/21

103. If X_1 and X_2 are two random variables having the same probability density funciton $f(x) = e^{-x}$ where $x > 0$, the variable X_1 / X_2 follows;

a. χ^2-distribution
b. t-distribution
c. F-distribution
d. β_I-distribution

104. The distribution χ_1^2 is equivalent to the distribution:

a. $F_{1,\infty}$ b. $F_{1,0}$
c. $F_{\infty,1}$ d. $F_{1,1}$

105. If X_1 and X_2 are two gamma variates distributed as $\gamma(n_1)$ and $\gamma(n_2)$ respectively, which of the following has $\beta_I(n_1, n_2)$ distribution?

a. $X_1/(X_1 + X_2)$
b. $X_1 + X_2$
c. X_1 / X_2
d. $X_1 - X_2$

106. If X_1 and X_2 have $\gamma(n_1)$ and $\gamma(n_2)$ distributions respectively, then the variable X_1 / X_2 is distributed as:

a. $\beta_I(n_1, n_2)$ b. $\beta_{II}(n_1, n_2)$
c. $F(n_1, n_2)$ d. none of the above

107. Let X has F-distribution with (n_1, n_2) d.f. The distribution of $1/X$ will be:

a. t-distribution with n_2 d.f.
b. F-distribution with $\left(\frac{1}{n_1}, \frac{1}{n_2}\right)$ d.f.
c. F-distribution with (n_1, n_2) d.f.
d. χ^2 distribution with n_1 d.f.

108. Let $X \sim F(n_1, n_2)$ then the variable $Y = 1\Big/\left(1 + \frac{n_1}{n_2}X\right)$ follows the distribution:

a. $\beta_I\left(\frac{n_2}{2},\frac{n_1}{2}\right)$

b. $\beta_{II}\left(\frac{n_2}{2},\frac{n_1}{2}\right)$

c. $F\left(\frac{1}{n_1},\frac{1}{n_2}\right)$

d. $F_{(n_2,n_1)}$

109. Let $X \sim N(\mu,\sigma^2)$, then the central moments of odd order are:
   a. one b. zero
   c. infinite d. positive

110. Let X be a random variable $U(0, 1)$, then the variable y = - 1 log X follows:
   a. Log-normal distribution
   b. Gamma distribution
   c. chi-square distribution
   d. exponential distribution

111. The distribution type of the variable y = - 2 $\sum_{i=1}^{n}\log X_i$ is same as that of the variable:
   a. $-2\log X_i$
   b. $2\log\left(\prod_{i=1}^{n} X_i\right)^{-1}$
   c. both (a) and (b)
   d. neither (a) nor (b)

112. The variable $Y=-2\sum_{i=1}^{n}\log X_i$, where all X_i are i.i.d $U(0, 1)$, follows:
   a. χ^2-distribution with n d.f.
   b. χ^2-distribution with $2n$ d.f.
   c. log-normal distribution
   d. circular distribution

113. A variable X with moment generating function $M_x(t)=\left(\frac{2}{3}+\frac{1}{3}e^t\right)$ id distributed with mean and variance as:
   a. mean $\frac{2}{3}$, variance = $\frac{2}{9}$
   b. mean = $\frac{1}{3}$, variance = $\frac{2}{9}$
   c. mean = $\frac{1}{3}$, varince = $\frac{2}{3}$
   d. mean = $\frac{2}{3}$, variance = $\frac{1}{9}$

114. If X is a standard variate with parameters:
   a. $1,\frac{1}{2}$ b. $\frac{1}{2},1$
   c. $\frac{1}{2},\frac{1}{2}$ d. 1, 1

115. If the moment generating funciton of a random variable X is $\left(\frac{1}{3}+\frac{2}{3}e^t\right)$, then X is a:
   a. Bernoulli variate
   b. Poisson variate
   c. binomial variate
   d. negative binomial variate

116. If a variable X has the p.d.f. $f(x)=\frac{1}{4}\cdot xe^{-x/2}$ for $x>0$, then the variable X is distributed as:
   a. gamma variate
   b. chi-square variate
   c. both (a) and (b)
   d. neither (a) nor (b)

117. If a variable X has the p.d.f. $f(x)=\frac{1}{4}\cdot xe^{-x/2}$ for $0\le x\le\infty$, then the distribution has been and variance as:
   a. mean = 2, variance = 4
   b. mean = 1/2, variance = 1/4
   c. mean = 4, variance = 2
   d. mena = 4, variance = 8