1. **The range of t distribution is :**

1) $-\infty < t < \infty$
2) $-1 < t < 1$
3) $0 < t < \infty$
4) $-\infty < t < 0$

2. **The mean of seven observations is 8. A new observation 16 is added. The mean of eight observations is :**

1) 12
2) 9
3) 8
4) 24

3. **For a two tail test when n is large, the value of Z at 0.05 level of significance is :**

1) 1.645
2) 2.58
3) 2.33
4) 1.96

4. **v_1, v_2 distribution curve becomes highly +ve skew, when :**

1) $v_1 < 5$
2) $v_2 < 5$
3) any of v_1, $v_2 < 5$
4) $v_2 > 5$

5. **Measures used to study the peakedness of a given distribution are marked as :**

1) Measures of Kurtosis
2) Measure of skewness
3) Quartiles
4) Mean

6. **Measures used to study shape of the curve of a given distribution are marked as :**

1) Raw moments
2) Measures of skewness
3) Central moments
4) Quartiles

7.

For a given data ($X_1, \ldots, X_n$), the minimum value of $\sum_{i=1}^{n}(X_i - a)^2$ is attained when a is:	
A.	Arithmetic mean
B.	Median
C.	Mode
D.	Standard deviation

8.

For a given data ($X_1, \ldots X_n$), the minimum value of $\sum_{i=1}^{n} \lvert X_i - a \rvert$ is attained when a is:	
A.	Arithmetic mean
B.	Median
C.	Mode
D.	Standard deviation

9. **If 'a' is the actual value and 'e' is the estimated value, the formula for relative error is ______.**

1) $^{a}/_{e}$ 2) $^{(a-e)}/_{e}$
3) $^{|a-e|}/_{e}$ 4) $^{(a-e)}/_{a}$

10. **Frequency of a variable is always -**

1) in percentage 2) a fraction
3) an integer 4) mid value

11.

Quartile deviation is given by the formula –	
A.	$Q.D = \frac{Q_3 + Q_1}{2}$
B.	$Q.D = Q_3 - Q_1$
C.	$Q.D = \frac{Q_3 - Q_1}{2}$
D.	$Q.D = \frac{Q_1 - Q_3}{4}$

12. **The degrees of freedom for student t-based on a random sample of size 'n' is :**

1) (n-1) 2) n
3) (n-2) 4) $^{(n-1)}/_{2}$

13. **The moment generating function of Bernouli distribution is :**

1) $(q + Pe^{t})^{n}$ 2) $(q + Pe^{t})^{-n}$
3) $(q + Pe^{t})$ 4) $(q + Pe^{-t})$

14. **In which distribution the mean and variance are equal?**

1) Binomial distribution
2) Gamma distribution
3) Normal distribution
4) Poisson distribution

15. **If X ~b(n,p), the distribution of y=n-x is :**

1) b(n,1)
2) b(n, x)
3) b(n, p)
4) b(n, q)

16.

If for a binomial distribution b(n, p), mean = 4, variance = 4/3, then 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.	$\frac{2}{10}$

17. **If for a binomial distribution, b(n,p), n = 4 and also P(x=2) = 3 P(x=3), the value of P is :**

1) $\frac{9}{11}$
2) 1
3) $\frac{1}{2}$
4) $\frac{1}{3}$

18.

The mean and variance of binomial distribution are 8 and 4 respectively. Then P(X=1) is equal to -	
A.	$\frac{1}{2^{12}}$
B.	$\frac{1}{2^4}$
C.	$\frac{1}{2^6}$
D.	$\frac{1}{2^8}$

19. **The mean of the binomial distribution is _________ its variance.**

1) greater than
2) less than
3) equal to
4) square of

20. **The relation between the mean and the variance of χ^2 with n.d.f is :**

1) Mean = 2 variance
2) 2 Mean = variance
3) Mean = variance
4) 2 mean = 3 variance

21.

If $X_1, X_2....X_n$ are i.i.d $N(\mu,\sigma^2)$, the variable $\bar{x}$ is distributed as ______.	
A.	$N\left(\mu, \sigma/\sqrt{n}\right)$
B.	$N\left(\mu/n, \sigma\right)$
C.	$N\left(\mu, \sigma/n\right)$
D.	$N\left(\mu/\sqrt{n}, \sigma/\sqrt{n}\right)$

22. **The normal distribution curve is :**

1) Unimodal
2) Not skewed
3) Mesokurtic
4) All of these

23. **If X_1 and X_2 are two independent Poisson variates with parameters λ_1 and λ_2 respectively, the variable $(X_1 + X_2)$ follows :**

1) Binomial distribution with parameters $(\lambda_1+\lambda_2)$
2) Poisson distribution with parameters $(\lambda_1+\lambda_2)$
3) Either (A) or (B)
4) Neither (A) nor (B)

24. **If n, the sample size is larger than 30 and tends to ∞, the student's t distribution tends to :**

1) Normal distribution
2) F-distribution
3) Binomial distribution
4) Chi-square distribution

25. **t - distribution is used to :**

1) test the difference between two means
2) test the difference between two variance
3) test the goodness of fit
4) test the independence of attributes

26. **X is a binomial variate with parameter n and p. If n = 1, the distribution of X reduces to :**

1) Poisson distribution
2) Binomial distribution
3) Bernoulli distribution
4) Discrete probability distribution

27. **Let X be a Poisson variate with parameter λ. If P(X=2) = 9P(X=4)+90P(X=6), then λ must be equal to :**

1) 5
2) 1
3) 1.5
4) 2

28. **The three distributions t, F, χ^2 are called :**

1) Discrete probability distributions
2) Normal distributions
3) Continuous probability distributions
4) Sampling distributions

29. **Mean and variance of a Chi-square variate with n degrees of freedom are :**

1) n, 2n
2) 2n, n
3) n, $\sqrt{2n}$
4) n, $\sqrt{n}$

30. **The test used for testing the independence of attributes is :**

1) t - test
2) F - test
3) χ^2 test
4) Z test

31. **Which of the following tests is based on the area property of Normal Probability Curve?**

1) t - tests
2) F - tests
3) χ^2 - tests
4) Asymptotic tests

32. **The abbreviation i.i.d stands for :**

1) Independent and Identically Distributed
2) Identically and Independently Distributed
3) Both (A) and (B)
4) None of these

33. **The range of Chi square distribution is :**

1) 0 to ∞
2) 0 to 1
3) -∞ to ∞
-1 to 1

34. **Binomial distribution tends to Poisson distribution when :**

1) $n \to \infty$, $p \to 0$ and $np = \lambda$ (finite)
2) $n \to \infty$, $p \to 1/2$ and $np = \lambda$ (finite)
3) $n \to 0$, $p \to 0$ and $np \to 0$
4) $n \to 15$, $p \to 0$ and $np \to 0$

35. **If X_1 and X_2 are two independent χ^2 variates, which of the following has also χ^2 distribution?**

1) $X_1 | (X_1 + X_2)$
2) $X_1 + X_2$
3) $X_1 | X_2$
4) $X_2 | X_1$

36. **Chi-square distribution is useful to test the :**

1) Independence of attributes
2) Equality of several population correlation co-efficients
3) Equality of several population variances
4) All the above

37. **The mean and variance of Binomial distributions are :**

1) np and nq
2) np and npq
3) n and np
4) n and nq

38. **If $X \sim N(\mu, \sigma^2)$, the points of inflexion of normal distribution curve are :**

1) $\pm \mu$
2) $\mu \pm \sigma$
3) $\sigma \pm \mu$
4) $\pm \sigma$

39. **An approximate relation between quartile deviation and standard deviation of normal distribution is :**

1) 5 QD = 4 SD
2) 4 QD = 5 SD
3) 2 QD = 3 SD
4) 3 QD = 2 SD

40. **The approximate relation between mean deviation and standard deviation of normal distribution is :**

1) 5 MD = 4 SD
2) 4 MD = 5 SD
3) 3 MD = 3 SD
4) 3 MD = 2 SD

41. **Pearson's Constants for a normal distribution with mean μ and variance σ^2 are :**

1) $\beta_1 = 3, \beta_2 = 0, \gamma_1 = 0, \gamma_2 = -3$
2) $\beta_1 = 0, \beta_2 = 3, \gamma_1 = 0, \gamma_2 = 0$
3) $\beta_1 = 0, \beta_2 = 0, \gamma_1 = 0, \gamma_2 = 3$
4) $\beta_1 = 0, \beta_2 = 3, \gamma_1 = 0, \gamma_2 = 3$

42. **The area under the standard normal curve beyond the ordinates at the points $Z = \pm 1.96\ \sigma$ is :**

1) 95%
2) 90%
3) 5%
4) 10%

43. **In usual notations, the Moment Generating Function of Binomial distribution is :**

1) $(Pe^t)^n$
2) $(q + Pe^t)^n$
3) $(q - Pe^t)^n$
4) $(q + P)e^t$

44. **If the probability is $\frac{2}{3}$ that an applicant for a driver's license will pass the road test on any given try, what is the probability that an applicant will finally pass the test on the third try?**

1) $\frac{8}{81}$
2) $\frac{8}{27}$
3) $\frac{1}{27}$
4) $\frac{2}{27}$

45. If X and Y are two independent random variables following geometric distribution with same parameter, what is the distribution of X + Y?

1) Geometric distribution
2) Negative binomial distribution
3) Binomial distribution
4) X + Y is not having a distribution

46. Identify a distribution which can have its mean less than variance.

1) Poisson distribution
2) Cauchy distribution
3) Binomial distribution
4) Negative binomial distribution

47.

The probability mass function for a binomial distribution with usual notation is :	
A.	$\binom{n}{x} p^n q^{n-x}$
B.	$\binom{n}{x} p^n q^x$
C.	$\binom{n}{x} p^{n-x} q^x$
D.	$nc_x p^x q^{n-x}$

48.

If $X \sim N(8,64)$ the Standard Normal deviate Z will be -	
A.	$z = \dfrac{X-64}{8}$
B.	$z = \dfrac{X-8}{64}$
C.	$z = \dfrac{X-8}{8}$
D.	$z = \dfrac{8-X}{8}$

49.

If $X \sim N(5, 1)$ the probability density function for the normal variate is :	
A.	$\frac{1}{5\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-1}{5}\right)^2}$
B.	$\frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-1}{5}\right)^2}$
C.	$\frac{1}{5\sqrt{2\pi}} e^{-\frac{1}{2}x^2}$
D.	$\frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(x-5)^2}$

50. For a normal frequency, the odd order moment μ_{2r+1} are equal to :

1) One
2) ∞
3) Zero
4) Two

51.

The m.g.f of the normal distribution $N(\mu, \sigma^2)$ is _____ .	
A.	$e^{\mu t - \frac{1}{2}\sigma^2 t^2}$
B.	$e^{\mu t + \frac{1}{2}\sigma^2 t^2}$
C.	$e^{\mu t + \sigma^{2/2}}$
D.	$e^{\mu t + t^{2/2}}$

52. If $X \sim N(\mu_1, \sigma_1^2)$ and $Y \sim N(\mu_2, \sigma_2^2)$, the variable X + Y is distributed as ______.

1) $N(\mu_1 + \mu_2, \sigma_1^2 + \sigma_2^2)$
2) $N(\mu, \sigma_1^2 + \sigma_2^2)$
3) $N(\mu_1 + \mu_2, \sigma^2)$
4) $N(\mu, \sigma^2)$

53. The mean of the Chi-square distribution is _____ of its variance.

1) half
2) one-third
3) one fourth
4) one fifth

54. The mean of the Chi-square distribution with n.d.f is __________.

1) n + 1
2) n - 1
3) n
4) n(n-1)

55. If $X_1, X_2 \ldots X_n$ is a random sample from a population $N(\mu, \sigma^2)$, the distribution of $\frac{\Sigma(Xi - \overline{X})^2}{\sigma^2}$ is _____ .

A.	Chi-square with n degrees of freedom
B.	Chi-square with (n-1) degrees of freedom
C.	Chi-square with (n+1) degrees of freedom
D.	Chi-square with (n-1) (n-2) degrees of freedom

56. **Equality of two population means can be tested by _____.**

1) F test
2) χ^2 test
3) t test
4) None of the above

57. **Independence of two attributes can be tested by ______.**

1) χ^2 test
2) F test
3) Z test
4) t test

58. **Parameters are those constants which occur in :**

1) Samples
2) Probability Density Function
3) A formula
4) None of the above

59. **The value of Statistics-t to test a hypothetical value 20 of population mean from a sample size 10 having its mean = 18.5 and variance = 1.21 is :**

1) -3.71
2) -11.6
3) 3.71
4) -4.31

60.

The probability density function of the sum of squares of independent n normal variates N(0, 1) is	
A.	$\frac{1}{2^{n/2}\Gamma\left(\frac{n-1}{2}\right)} e^{-\chi^2/2} (\chi^2)^{n-1}$
B.	$\frac{1}{2^{n/2}\Gamma\left(\frac{n}{2}\right)} e^{-\chi^2/2} (\chi^2)^{\frac{n-1}{2}}$
C.	$\frac{1}{2^{n/2}\Gamma\left(\frac{n}{2}\right)} e^{-\chi^2/2} (\chi^2)^{n/2-1}$
D.	$\frac{1}{2^{n}\Gamma\left(\frac{n}{2}\right)} e^{-\chi^2/2} (\chi^2)^{n/2-1}$

61.

If $Z_1, Z_2 \ldots\ldots Z_n$ and n i.i.d Variates the distribution of $\sum_{i=1}^{n} z_i^2$ is:	
A.	Student t
B.	χ^2 with n d.f
C.	χ^2 with (n-1) d.f
D.	All the above

62. Chi-square distribution curve in respect of symmetry is :

1) negatively skew 2) symmetrical
3) postively skew 4) All the above

63

63.

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.	$(1-2t)^{-n/2}$

64. Mode of Chi-square distribution with n.d.f lies at the point :

1) $\chi^2 = m-1$ 2) $\chi^2 = n$

3) $\chi^2 = n-2$ 4) $\chi^2 = 1/(n-2)$

65.

If X~ $\chi^2 n_1$ and Y~ $\chi^2 n_2$ the distribution (X - Y) is:	
A.	$\beta_1(\frac{n_1}{2}, \frac{n_2}{2})$
B.	$\beta_2(\frac{n_1}{2}, \frac{n_2}{2})$
C.	χ^2 with (n_1-n_2) d.f
D.	All the above

66. If $X_i \sim \chi^2 n_i$ for i=1,2,....n, the distribution of ΣX_i is :

1) Normal distribution 2) Chi-distribution

3) χ^2 distribution with Σn_i d.f 4) None of the above

67. Chi-square distribution is used for the test of :

1) Goodness of fit 2) Hypothetical value of population variances

3) Both (A) and (B) 4) Neither (A) nor (B)

68. When d.f K_1 and K_2 are large, the Z-distribution tends to :

1) Normal distribution 2) F-distribution

3) χ^2 distribution 4) None of the above

69. Fisher's Z is closely related to :

1) Helmert χ^2 2) Snedecor's F

3) Fisher's t 4) All of these

70. F-distribution was invented by :

1) R.A. Fisher 2) G.W.Snedecor's F

3) Fisher's t 4) All of these

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

1) $-\infty$ to ∞ | 2) 0 to 1
3) 0 to ∞ | 4) $-\infty$ to 0

72. The mgf of the Normal distribution about origin is given by $M_x(t) = e^{\mu t+t^2\sigma^2/2}$ The mgf of standard normal variate is given by

A.	$e^{\mu t}$
B.	$e^{\mu t+t^2}$
C.	$e^{t^2/2}$
D.	$e^{\mu t+\sigma^2}$

73. If the recurrence relation for the moments of the Poisson distribution is $\mu_{r+1} = r\lambda\mu_{r-1} + \lambda\frac{d\mu_r}{d\lambda}$ then the value of μ_4 is given by

A.	$3\lambda^2 + \lambda$
B.	$3\lambda + \frac{1}{\lambda^2}$
C.	$3\lambda + \lambda^2$
D.	$3(\lambda^2 + \lambda)$

74. **Suppose that a manufactured product has 2 defects per unit of product inspected, the probability of finding a product with 3 defects is :**

1) 0.27 | 2) 0.18
3) 0.30 | 4) 0.05

75. **If the mgf of the Binomial distribution is $(q + pe^t)^n$, then the third moment about mean μ_3 of the binomial distribution is :**

1) $npq(q - p)^2$ | 2) $n^2p^2q^2(q - p)$
3) $npq\,(q - p)$ | 4) $npq\,(p - q)$

76.

In a Binomial distribution, the sum and the product of the mean and the variance are 25/3 and 50/3 respectively. The Binomial distribution is given by :	
A.	$\left(\frac{2}{3}+\frac{1}{3}\right)^{15}$
B.	$\left(\frac{3}{2}+\frac{1}{2}\right)^{15}$
C.	$\left(\frac{2}{3}+\frac{1}{3}\right)^{25}$
D.	$\left(\frac{2}{3}+\frac{1}{3}\right)^{3}$

77.

If X_1 and X_2 are two independent X^2 variates with n_1 and n_2 d.f respectively then $\frac{X_1}{X_2}$ is:	
A.	$\beta_2\left(\frac{n_1}{2}.\frac{n_2}{2}\right)$ Variate
B.	$\beta_1\left(\frac{n_1}{2}.\frac{n_2}{2}\right)$ Variate
C.	$F(n_1,n_2)$ Variate
D.	X^2- Variate with n_1, n_2 d.f

78.

The fourth central moment of the t distribution μ_4. is given by ?	
A.	$\frac{3n}{(n-2)(n-4)}$
B.	$\frac{3n^2}{(n-2)(n-4)}$
C.	$\frac{n^2}{(n-2)(n-4)}$
D.	$\frac{3n}{(n-2)^2}$

79. **The ratio of two independent Gamma variates is :**

1) Gamma variate
2) Beta of first kind
3) Beta of second kind
4) Chi square variate

80.

Moment generating function of F - distribution is ____	
A.	$\left(1+\frac{V_1}{V_2}e^{tF}\right)^{V_1-1}$
B.	$\left(1+\frac{V_2}{V_1}Fe^{t}\right)^{\frac{V+V}{2}-1}$
C.	$\left(1+\frac{V_2}{V_1}e^{tF}\right)^{\frac{V}{V}-1}$
D.	Does not exist

81. **Degrees of freedom for statistic - χ^2 in case of (2 x 2) contingency table is :**

1) 3
2) 4
3) 2
4) 1

82. **If r = 0, the lines of regression :**

1) coincide
2) parallel
3) perpendicular to each other
4) r > 1

83. **If the d.f n is large, the Chi-square distribution tends to :**

1) Log normal distribution
2) Normal distribution
3) Multinomial distribution
4) Polyas distribution

84. **Student t-distribution curve as regards its peak is always :**

1) Lepokurtic
2) Mesokurtic
3) Platykurtic
4) A parabola

85. **If X ~ N(12.5, 3.5^2) and Y ~ N(8.5, 2.5^2), the variate X + Y is distributed as :**

1) N(12.5, 6.0)
2) N(21.0, 18.5)
3) N(12.5, 5.0)
4) N(21.0, 6.0)

86. **When d.f k_1 and k_2 are large, the Z-distribution tends to :**

1) Normal distribution
2) F-distribution
3) χ^2 distribution
4) t - distribution

87. **If X_1 and X_2 are i.i.d N(0,1), write the distribution of X_1 - X_2.**

1) N(0 , 1)
2) N(0, 2)
3) N(0, 3)
4) N(0 , 4)

88. The normal probability curve is :

1) Bell shaped
2) J shaped
3) S Shaped
4) Cone shaped

89. When d.f for χ^2 are 100 or more, Chi-square is approximated to :

1) t - distribution
2) F - distribution
3) Z - distribution
4) Gamma distribution

90. The Binomial distribution for which mean is 4 and variance is 3 is :

1) $(0.5 + 0.5)^{16}$
2) $(0.75 + 0.25)^{16}$
3) $(4 + 3)^{16}$
4) $(0.4 + 0.6)^{20}$

91. In Normal distribution :

1) Skewness $\beta_1 = 0$ and Kurtsis $\beta_2 = 3$
2) Skewness $\beta_1 = 3$ and Kurtsis $\beta_2 = 0$
3) Skewness $\beta_1 = 0$ and Kurtsis $\beta_2 = 0$
4) Skewness $\beta_1 = 3$ and Kurtsis $\beta_2 = 3$

92. For normal distribution, the Quartile Deviation is :

1) $(1/3)\sigma$
2) $(4/5)\sigma$
3) $(2/3)\sigma$
4) σ

93. In a Binomial distribution, mean 6 and standard deviation $\sqrt{2}$ then the value of p is :

1) $1/3$
2) $2/3$
3) 1
4) 0

94. The appropriate distribution for describing the rare event is :

1) Binomial distribution
2) Poisson distribution
3) Normal distribution
4) Rectangular distribution

95. The standard normal distribution is represented by :

1) N(0 , 0)
2) N(1 , 1)
3) N(0 , 1)
4) N(1 , 0)

96. In normal distribution,

1) Mean > Median > Mode
2) Mean < Median < Mode
3) Mean = Median = Mode
4) H.M = G.M = A.M

97. The Chi-square distribution is :

1) positively skewed
2) negatively skewed
3) symmetrical
4) None of these

98. If X ~ N(0, 1), then χ^2 is :

1) t - statistic
2) Chi - square variate

3) F - variate

4) Normal variate

99.

If X and Y are two independent chi-square variates with V_1 and V_2 degrees of freedom respectively, then $W = \frac{X / V_1}{Y / V_2}$ follows.	
A.	t - distribution
B.	F - distribution
C.	Z - distribution
D.	χ^2 - distribution

100. If t ~ t-distribution with (n) d.f, then t^2 follows :

1) χ^2 distribution with (n-1) d.f

2) F-distribution with (1,n) d.f

3) t-distribution with n d.f

4) None of these

101. The probability generating function of Poisson distribution is :

1) $e^{\lambda} X (S-1)$

2) $e^{S(\lambda-1)}$

3) $e^{\lambda(S-1)}$

4) $\lambda(S-1)$

102.

Moment generating function of the χ^2 – distribution is:	
A.	$(1-2it)^{n/2}$
B.	$(1-2t)^{-n/2}$
C.	$(1-2it)^{-n/2}$
D.	$(1-2t)^{n/2}$

103. Given $r_{12} = 0.28$, $r_{23} = 0.49$, $r_{31} = 0.51$, $\sigma_1 = 2.7$, $\sigma_2 = 2.4$, $\sigma_3 = 2.7$ Regression equation of X_3 on X_1 and X_2 is :

1) $0.674\, x_1 + 0.8342\, x_2$

2) $0.042\, x_1 + 0.53\, x_2$

3) $0.405 x_1 + 0.424\, x_2$

4) $0.325\, x_1 + 0.314\, x_2$

104.

	The standard error of the estimate of X_1 on X_2 and X_3 is :
A.	$S_{1.23} = \sum (X_1 - Y_i)^2 / N$
B.	$S_{1.23} = \sqrt{\frac{\sum (X_i - Y_i)^2}{N-3}}$
C.	$S_{1.23} = \frac{\sum (X_i - Y_i)^2}{N-3}$
D.	$S_{1.23} = \frac{\sum (X_i - Y_i)^3}{N-3}$

105. If $r_{12} = 0.77$, $r_{13} = 0.72$ and $r_{23} = 0.52$, multiple correlation coefficient $R_{1.23}$ is :

1) 0.432
2) 0.856
3) 0.245
4) 0.678

106. A function of variates for estimating a parameter is called :

1) an estimate
2) an estimator
3) a frame
4) a statistic

107.

	Which of the following statements is true?
A.	$P\left(\bigcap_{i=1}^{n} A_i\right) \geq \sum_{i=1}^{n} P(A_i) - (n-1)$
B.	$P\left(\bigcup_{i=1}^{n} A_i\right) \geq \sum_{i=1}^{n} P(A_i)$
C.	$P\left(\bigcap_{i=1}^{n} A_i\right) \leq \prod_{i=1}^{n} P(A_i)$
D.	$P\left(\bigcup_{i=1}^{n} A_i\right) = \sum_{i=1}^{n} P(A_i)$

108.

Given that the p.d.f of a continuous random variable "X" follows $f(x)=\begin{cases}kx(1-x) & \text{for } 0<x<1\\ 0 & \text{otherwise}\end{cases}$ The value "k" is :	
A.	2
B.	4
C.	5
D.	6

109.

Given the frequency function $f(x,\theta)=\begin{cases}\frac{1}{\theta}, & 0\le x\le\theta\\ 0 & \text{elsewhere}\end{cases}$ and that you are testing the null hypothesis $H_0: \theta = 1$ against $H_1: \theta = 2$ by means of single observed value of x what would be size of type II error if $x \geq 0.5$?	
A.	0.5
B.	0.25
C.	0.75
D.	0.05

110.

Where r = 0, the lines of regression intersect at the point –	
A.	(X, Y)
B.	$(\overline{X}, \overline{Y})$
C.	(0, 0)
D.	(1, 1)

111. **In one sample of 8 observations, the sum of squares of deviations of the sample values from the sample mean was 84.4 and in the other sample of 10 observations it was 102.6, the value of statistic F is :**

1) 1.2
2) 1.057
3) 1.8
4) 2

112. **If X and Y are independent, the value of correlation coefficient is equal to :**

1) 0
2) 1
3) ∞
4) any positive value

113. **The co-efficient correlation will have positive, when**

1) X is increasing Y is decreasing
2) X is decreasing Y is increasing
3) Both X and Y are increasing
4) There is no change in X and Y

114. **For a symmetric distribution β_2 is :**

1) 0
2) 1
3) 5
4) 3

115. **If the co-efficient of skewness of the distribution is zero, the frequency curve is :**

1) J shaped
2) U shaped
3) Bell shaped
4) Z shaped

116. **The hypothesis for a specified known value of ρ can be tested by :**

1) t - test
2) Fisher - Z - test
3) χ^2 - test
4) F - test

117. **Neyman - Pearson lemma provides :**

1) an unbiased test
2) a most powerful test
3) minimax test
4) an admissible test

118. **To test $H_0 : \mu=\mu_0$ vs $H_1 : \mu \neq \mu_0$, the population S.D is known, the approximate test is:**

1) t - test
2) Z - test
3) χ^2 - test
4) F - test

119. **Stratified sampling comes under the category of :**

1) unrestricted sampling
2) subjective sampling
3) purposive sampling
4) restricted sampling

120. If X ~ N(5, 1) the probability density function for the normal variable X is :

A.	$\frac{1}{5\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-1}{5}\right)^2}$
B.	$\frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-1}{5}\right)^2}$
C.	$\frac{1}{5\sqrt{2\pi}} e^{-\frac{1}{2}x^2}$
D.	$\frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(x-5)^2}$

121. The test statistic to be used to test $H_0: \sigma^2 = \sigma_0^2$ against $H_1: \sigma^2 \neq \sigma_0^2$

A.	$\chi^2 = \frac{(n-1)\sigma_o^2}{s^2}$
B.	$\chi^2 = \frac{(n-1)s^2}{\sigma_o^2}$
C.	$\chi^2 = \frac{ns^2}{\sigma_o^2}$
D.	$\chi^2 = \frac{n\sigma_o^2}{s^2}$

122. Second central moment of F. v_1, v_2 distribution is given by the formula –

A.	$\frac{2v_2^2(v_1+v_2-2)}{v_2(v_2-2)^2(v_2-4)}$
B.	$\frac{2(v_1+v_2-2)v_2^2}{v_2(v_2-2)(v_2-4)}$
C.	$\frac{2v_2(v_1+v_2-2)}{v_2(v_2-2)(v_2-4)}$
D.	$\frac{2v_2^2(v_1+v_2-2)}{v_1(v_2-2)^2(v_2-4)}$

123. Standard deviation of sampling distribution :

1) Sampling error
2) Non sampling error
3) Type I error
4) Standard error

124.

The p.d.f of F – distribution is:	
A.	$\frac{1}{2^{n/2}\Gamma\left(\frac{n}{2}\right)} e^{-x/2} x^{n/2-1}$
B.	$\frac{1}{\sqrt{2}B\left(\frac{1}{2},\frac{v}{2}\right)} \frac{1}{\left(1+\frac{t^2}{v}\right)^{\frac{v+1}{2}}}$
C.	$\frac{\left(\frac{v_1}{v_2}\right)^{v_1/2}}{B\left(\frac{v_1}{2},\frac{v_2}{2}\right)} \frac{F^{\frac{v_1}{2}-1}}{\left(1+\frac{v_1}{v_2}F\right)^{\frac{v_1+v_2}{2}}}$
D.	$\frac{1}{B\left(\frac{v_1}{2},\frac{v_2}{2}\right)} \frac{F^{v_1/2}}{\left(1+\frac{v_1}{v_2}F\right)^{\frac{v_1+v_2}{2}}}$

125. A problem in statistics is given to five students A, B, C, D and E whose chances of solving it one $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$ and $\frac{1}{6}$ respectively, then probabilitity that the problem will be solved if all of them try independently

1) $\frac{3}{4}$
2) $\frac{1}{2}$
3) $\frac{5}{6}$
4) $\frac{2}{3}$

126. A random sample of 11 pairs of observations gave a correlation coefficient 0.5, then the value of t-statistic is :

1) 3.75
2) 1.732
3) 2.45
4) 1.23

127. Which of the following statement is true?

1) χ^2 - test is a two tailed test
2) The value of χ^2 can be negative
3) χ^2 - test was devised by Laplace
4) The d.f for rxs contingency is (r-1)(s-1)

128. For calculating Karl Pearson's coefficient of correlation, the data input is to be filled up in which of the following in MS Excel?

1) Two columns in Excel sheet
2) Array 1 and Array 2
3) Two rows in Excel sheet
4) Two different Excel sheets

129. List down the various steps to be followed while using MS Excel for statistical data analysis.

1) Excel Sheet→Formulas→More information→Statistical
2) Functions → Mathematical → Statistical
3) Excel Sheet → Mathematical → Statistical
4) Excel Sheet → Functions → Statistical

130. **How many built in functions begin on the first page of guide to Excel statistical functions?**

1) 60
2) 70
3) 50
4) 80

131. **If X is a random variable, $E(e^{tx})$ is known as :**

1) Expectation
2) Moment generating function
3) Probability generating function
4) Variance

132. **The conditional probability $p(^A/_B)$ is not defined if p(B) =**

1) 1
2) 0
3) $^1/_2$
4) -1

133. **In Bayes' theorem, the probabilities $P(E_i / A)$; i=1,2,....n are called posterior probabilities because :**

1) They are determined after results of the experiment
2) They are determined before the result of the experiment
3) They are determined before and after the results of the experiment
4) They are determined and fixed

134. **A box contains 5 red, 3 white and 6 blue balls. Three balls are drawn at random. What is the probability that they are of each colour?**

1) 1.0
2) 0.9 (approximately)
3) 0.5 (approximately)
4) 0.247 (approximately)

135. **For a symmetrical distribution, the coefficient of skewness is :**

1) 1
2) 3
3) 0
4) -1

136. **The probability 'P' always lies between :**

1) $0 \leq P < \infty$
2) $-1 < P < 1$
3) $0 \leq P \leq 1$
4) $-\infty < P < \infty$

137. **The probability that a student passes a Physics test is $^2/_3$ and the probability that he passes both a Physics and Chemistry test is $^{14}/_{45}$. The probability that he passes at least one test is $^4/_5$. What is the probability that he passes the Chemistry test?**

1) $^1/_4$
2) $^2/_5$
3) $^4/_9$
4) 0

138. **If the events A and B are independent, then $p(A \cap B)$ is :**

1) p (A) + p (B)
2) p(A) - p(B)
3) p(A).p(B)
4) p(A)/p(B)

139. **If $\beta_2 > 3$, the distribution is called as :**

1) Meso kurtic
2) Platy kurtic
3) Lepto kurtic
4) Skewness

140. **Baye's probability is also known as :**

1) Inverse probability
2) Subjective probability
3) Classical probability
4) Laplace's probability

141. **Classical probability is measured in terms of :**

1) An absolute value
2) A ratio
3) Both absolute value and ratio
4) A constant value

142. **The probability of throwing an odd sum with two fair dice is :**

1) $\frac{1}{4}$
2) $\frac{1}{6}$
3) 1
4) $\frac{1}{2}$

143. **For any two events A and B, then p(A-B) is equal to :**

1) p(A)-p(B)
2) p(B)-p(A)
3) p(B)-p(AB)
4) p(A)-p(AB)

144. **Given that $p(A)=\frac{1}{3}$, $p(B)=\frac{3}{4}$ and $p(AUB)=\frac{11}{12}$, the probability p(B/A) is :**

1) $\frac{1}{6}$
2) $\frac{4}{9}$
3) $\frac{1}{2}$
4) $\frac{1}{8}$

145.

Probability generating function (p.g.f) is $G_x(t)$ is equal to -	
A.	$\sum_{all\,x} e^{tx} p(x)$
B.	$\sum_{all\,x} p(x) t^x$
C.	$\sum_{all\,x_i} p_i x_i$
D.	$\sum_{all\,x_i} p_i (x_i)$

146. **If X is a random variable, the $E(t^x)$ is known as :**

1) Characteristic function
2) Moment generating function
3) Probability Generating function
4) Xth moment

147. Two dice are rolled by two players A and B. A throws 10, the probability that B throws more than A is ________.

1) $\frac{1}{12}$ 2) $\frac{1}{6}$

3) $\frac{1}{18}$ 4) $\frac{2}{18}$

148. The probability that a leap year will have 53 Sundays is :

1) $\frac{1}{7}$ 2) $\frac{2}{7}$

3) $\frac{2}{53}$ 4) $\frac{52}{53}$

149. Three boxes of same appearance have the following proportions of white and black balls. Box I contains 1 white and 2 black; Box II contains 2 white and 1 black and Box III contains 2 white and 2 black balls. One of the boxes is selected at random and one ball is drawn randomly from it. It turns out to be white. The probability that the ball is chosen from the third box is :

1) $\frac{2}{3}$ 2) $\frac{1}{2}$

3) $\frac{3}{4}$ 4) $\frac{1}{3}$

150.

Moment generating function of rectangular distribution defined over the interval [a,b] is :	
A.	$M_x(t) = \dfrac{e^{tb} - e^{ta}}{t(b-a)}$
B.	$M_x(t) = \dfrac{e^{t(b-a)}}{t(b-a)}$
C.	$M_x(t) = \dfrac{e^{(tb-ta)}}{b-a}$
D.	$M_x(t) = \dfrac{e^{t(b-a)}}{t_x(b-a)}$

151.

If the m.g.f of a random variable X is $\left(\frac{2}{3}+\frac{1}{3}e^t\right)^9$ then $p(\mu - 2\sigma < x < \mu + 2\sigma)$ is :	
A.	$\sum_{x=1}^{5}\binom{9}{x}\left(\frac{1}{3}\right)^x\left(\frac{2}{3}\right)^{9-x}$
B.	$\sum_{x=0}^{6}\binom{9}{x}\left(\frac{2}{3}\right)^x\left(\frac{1}{3}\right)^{9-x}$
C.	$\sum_{x=0}^{9}\binom{9}{x}\left(\frac{2}{3}\right)^x\left(\frac{1}{3}\right)^{9-x}$
D.	$\sum_{x=1}^{9}\binom{9}{x}\left(\frac{2}{3}\right)^x\left(\frac{1}{3}\right)^{9-x}$

152. **If the mode of a frequency distribution is 16 and its mean =16, then the median of the distribution is :**

1) 0   2) 16
3) 32   4) 10

153.

95% confidence interval for the mean of a normal $N(\mu, \sigma^2)$, population is (σ known).	
A.	$\bar{x} \pm 2.58\, \sigma/\sqrt{n}$
B.	$\bar{x} \pm 1.96\, \sigma/\sqrt{n}$
C.	$\bar{x} \pm 1.64\, \sigma/\sqrt{n}$
D.	None of these

154. **A certain stimulus administered to 12 patients resulted in the following increase of blood pressure : 5, 2, 8, -1, 3, 0, -2, 1, 5, 0, 4 and 6 For testing, the null hypothesis is that, there is no significant difference in the blood pressure before and after the drug, the value of t is given by :**

1) 3.49   2) 5.49
3) 0.89   4) 2.89

155. The demand for a particular spare part in a factory was found to vary from day to day. In a sample study the following information was obtained :

Days	Mon	Tue	Wed	Thur	Fri	Sat
No.of Parts demanded	1124	1125	1110	1120	1126	1115

The value of χ^2 for testing the hypothesis that the number of parts demanded does not depend on the day of the week :

A.	10.5
B.	11.07
C.	9.05
D.	7.85

156. From a sample survey conducted by an office to find the average sales of two sales men A and B the following results were obtained.

	A	B
No. of sales	10	18
Average Sales (Rs)	170	205
S.D. (Rs)	20	25

To test the difference between means the value of t is calculated as :

A.	4.89
B.	5.39
C.	1.28
D.	3.79

157. The correlation coefficients 0.89 and 0.85 were computed from two independent samples of sizes 12 and 16 respectively. The test statistic for testing the hypothesis that the two samples have come from two bivariate populations with different correlation coefficient is :

1) 1.369
2) 2.369
3) 0.369
4) 3.169

158. For testing the significance of correlation $\gamma = 0.5$ from a sample of size 18 against the hypothesis that correlation $\rho = 0.7$, the value of test statistic Z is :

1) 1.354
2) 1.236
3) 1.736
4) 1.455

159. The standard deviations of two random samples of size 9 and 13 are 2.1 and 1.8 respectively. The calculated value of F for testing the difference in variances is given by:

1) 2.41
2) 1.41
3) 3.415
4) 2.55

160. The ratio S_1^2/S_2^2 of two sample variances follows ______ under the hypothesis $\sigma_1^2 = \sigma_2^2$

1) Z - distribution
2) F - distribution
3) t distribution
4) Normal distribution

161. Equality of several normal populations' means can be tested by ______.

1) Z-test
2) F-test
3) t-test
4) χ^2 - test

162. Testing of H_0:μ=100 against μ > 100 leads to _____.

1) Two tailed test
2) One sided upper tailed test
3) One sided lower tailed test
4) Power of test

163. The validity of a hypothetical value of proportion in a class of dichotomous population can be tested by ______.

1) χ^2 - test
2) t-test
3) Z-test
4) F-test

164. Statistic -χ^2 - test to test H_0:σ^2=σ_0^2 is based on a sample of size 'n' has degrees of freedom equal to :

1) n-1
2) n
3) n+1
4) 1

165. Analysis of variance technique originated in :

1) Agrarian research
2) Industrial research
3) Biological research
4) Baysian research

166. The maximum number of observations required for t-test in a sample size is :

1) n=30
2) n < 30
3) 2
4) 5

167. Type I error is ______.

1) Reject H_0 when H_0 is true
2) Reject H_1 when H_1 is true
3) Accept H_0 when H_0 is false
4) Accept H_1 when H_1 is false

168. Testing H_0 :μ=1100 against H_1 :$\mu\neq$1100 leads to :

1) Left tailed test
2) Right tailed test
3) Two tailed test
4) Optimum test

169.

$\overline{X}$ is the sample mean based on a sample size n from a population with variance σ^2. Then standard error of $\overline{X}$ is:	
A.	$\sigma^{2/n}$
B.	σ/n
C.	$\sigma/\sqrt{n}$
D.	$\sigma^2/\sqrt{n}$

170. **The hypothesis tested using normal distribution is :**

1) $H_0:\rho=0$
2) $H_0:P_1 = P_2$
3) $H_0:\sigma^2 = \sigma_0^2$
4) $H_0:\sigma_1^2 = \sigma_2^2$

171. **Paired t-test is used for :**

1) Testing the equality of variances
2) Testing the equality of means of two independent samples
3) Testing the equality of means of paired observations of dependent samples
4) Testing the single mean

172. **To test the equality of population variances, the test statistic is :**

1) t -test
2) F - test
3) χ^2 - test
4) Normal test

173. **To test the hypothesis $H_0:\sigma^2 = \sigma_0^2$ based on a sample size 10 drawn from $N(\mu,\sigma^2)$, the test statistic has :**

1) χ_9^2
2) t_9
3) χ_{10}^2
4) t_{10}

174.

If $X_1, X_2 \ldots X_n$ is a random sample from normal population. The p.d.f of λ is $f(x) = \frac{1}{\theta\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x^2}{\theta^2}\right)}$ The MLE for θ is :	
A.	$\Sigma x_i / n$
B.	$\Sigma x_i^2 / n$
C.	$\frac{\sqrt{\Sigma x_i^2}}{n}$
D.	$\sqrt{\frac{\Sigma x_i^2}{n}}$

175. If an estimator T_n of population parameter θ converges in probability to θ as n tends to infinity is said to be :

1) Sufficient
2) Efficient
3) Consistent
4) Unbiased

176.

The maximum likelihood estimate of the parameter α of a population having density function $f(x) = \frac{2}{\alpha^2}(\alpha - x),\ 0 < x < \alpha$ For a sample of unit size is:	
A.	2α
B.	α^2
C.	2x
D.	αx

177. If $E(T_n) > \theta$, the estimator T_n is said to be:

1) Biased
2) Unbiased
3) Sufficient
4) Consistent

178. If an unbiased estimator T_n is such that for any other unbiased estimator T^*_n, $V(T_n) \leq V(T^*_n)$, T_n is a ________.

1) UMVUE
2) MVB
3) MLE
4) BAN

179. **If t is a consistent estimator of θ, then t^2 is a ______ estimator of θ^2.**

1) consistent
2) efficient
3) sufficient
4) unbiased

180.

An estimator $T_1 = t_1(x_1, x_2, \ldots x_n)$ for θ is said to be admissible if for any other estimator $T_2 = t_2(x_1, x_2 \ldots x_n)$ for θ, the relation is of the type -	
A.	$R(t_1, \theta) \geq R(t_2, \theta)$
B.	$R(t_1, \theta) = R(t_2, \theta)$
C.	$R(t_1, \theta) \leq R(t_2, \theta)$
D.	$R(t_1, \theta) + R(t_2, \theta)$

181. **If T_n and T_n^* are two estimates such that $V(T_n) = V(T^*_n)$, then ______.**

1) T_n/T^*_n
2) T^*_n/T_n
3) $T_n=T^*_n$
4) $T^*_n+T_n$

182. **Least square method is a device to obtain the estimate of a :**

1) BLUE
2) UMVUE
3) CANE
4) MLE

183.

If $x_1, x_2, \ldots x_n$ is a random sample from $N(\mu, 1)$, then the unbiased estimator of μ^2+1 is :	
A.	$\bar{x}$
B.	$\frac{\sum_{i=1}^{n} x_i^2}{n}$
C.	$\frac{\sum_{i=1}^{n} x_i}{n-1}$
D.	$\frac{\sum_{i=1}^{n}(x_i - \bar{x})}{n}$

184. **Efficiency E cannot exceed :**

1) 1
2) 0
3) -1
4) 5

185. The statistical constant which is used to measure the variability of the values of a statistic computed from the samples of the same size drawn from the population is known as :

1) Standard deviation
2) Sample proportion
3) Standard error
4) Sample correlation

186. In simple random sampling technique each unit of the population is selected :

1) according to a predetermined pattern
2) by giving equal and independent chance for selection
3) on the basis of the discretion of the investigator
4) on the basis of auxillary information

187. Stratified sampling comes under the category of :

1) Unrestricted sampling
2) Restricted sampling
3) Subjective sampling
4) Purposive sampling

188. In simple random sampling, the probability of selecting a specified unit in the sample selected out of population units is ______.

1) $1/n$
2) $1/N$
3) n/N
4) N/n

189. In case of sample enquiry :

1) Only part of the population will be studied
2) Whole population will be studied
3) Only one unit is studied
4) It consists of infinite number of units

190. If a constant 50 is subtracted from each of the value of X and Y, then the regression coefficient is :

1) reduced by 50
2) increased by 50
3) not changed
4) $1/50$ of the original regression co-efficient

191.

The two regression lines are
$3x - 4y + 8 = 0$
$4X - 3Y - 1 = 0.$
The means of $\overline{X}$ and $\overline{Y}$ are :

A.	$\overline{X} = 4,\ \overline{Y} = 5$
B.	$\overline{X} = 3,\ \overline{Y} = 4$
C.	$\overline{X} = 4/3,\ \overline{Y} = 5/4$
D.	$\overline{X} = 5,\ \overline{Y} = 6$

192. **In a multivariate analysis, the correlation between any two variables eliminating the effect of all other variables is called :**

1) Simple correlation
2) Multiple correlation
3) Partial correlation
4) Partial regression

193.

In multiple regression analysis the multiple regression coefficient $b_{12.3}$ is given by -	
A.	$\frac{\sigma_1}{\sigma_2}\left(\frac{r_{12} - r_{13}r_{23}}{1 - r_{23}^2}\right)$
B.	$\frac{\sigma_2}{\sigma_1}\left(\frac{r_{12} - r_{13}r_{23}}{1 - r_{23}^2}\right)$
C.	$\frac{\sigma_1}{\sigma_2}\left(\frac{r_{23} - r_{12}r_{13}}{1 - r_{23}^2}\right)$
D.	$\frac{\sigma_2}{\sigma_1}\left(\frac{r_{23} - r_{12}r_{13}}{1 - r_{12}^2}\right)$

194.

From height (X_1) in inches, weight (X_2) in kg. and age (X_3) in years of a group of students the following results were obtained : $\bar{X}_1 = 40$, $\bar{X}_2 = 50$, $\bar{X}_3 = 20$, $S_1 = 3$, $S_2 = 2$ $S_3 = 2$, $r_{12} = 0.4$, $r_{23} = 0.5$, $r_{13} = 0.7$ The value of X_3 given $X_1 = 43$ inches. $X_2 = 54$kg is :	
A.	25 years
B.	18 years
C.	22 years
D.	20 years

195. **The geometric mean of the two regression co-efficient is equal to :**

1) r
2) r^2
3) 1
4) 0

196. **The limits for correlation coefficient is :**

1) $-\infty < r < \infty$
2) $-1 \leq r \leq 1$
3) $0 < r < 1$
4) $0 < r < \infty$

197. The rank correlation coefficient is given by the formula?

A.	$\rho = \frac{6\sum d^2}{n(n^2-1)}$
B.	$\rho = 1 - \frac{6\sum d}{n^2-1}$
C.	$\rho = 1 - \frac{6\sum d^2}{n(n^2-1)}$
D.	$\rho = \frac{6\sum d}{n^2-1}$

198. If $b_{yx} > 1$, then b_{xy} is :

1) less than 1
2) greater than 1
3) equal to 1
4) equal to 0

199. The term 'regression' was introduced by :

1) R.A. Fisher
2) Sir Francis Galton
3) Karl Pearson
4) W.S. Gosset

200. If $b_{xy} = 0.8$ and $b_{yx} = 0.46$, then correlation coefficient is :

1) 0.134
2) 0.606
3) 0.254
4) 0.312