EXAM CODE : ST13_542012 POST : STATISTICAL COMPILER	
1	If the dual of the problem has infeasible solution, then the value of objective function is : A. Unbounded B. Bounded C. No solution D. None of these
2	If random variable X follows a standard normal distribution, then X^2 follows : A. Normal distribution B. Gamma distribution with parameters (1,1) C. Exponential distribution D. Chisquare distribution with one degree of freedom

3	The Chisquare distribution can be used to test: A. Goodness of fit of distribution B. Independence of attributes C. Single population variance D. All of these
4	If the two lines of regression are perpendicular to each other. the relation between the two regression coefficients is : A. $\beta_{yx} = \beta_{xy}$ B. $\beta_{yx}\,\beta_{xy} = 1$ C. $\beta_{yx} \leq \beta_{xy}$ D. $\beta_{yx} = -\beta_{xy}$

5	If $\rho(x,y) = -1$. the relation between x and y is of the type : A. When y increases. x also increases B. When y decreases. x also decreases C. x is equal to -y D. When y increases. x decreases
6	The A.M of two numbers is 6.5 and their G.M is 6. The two numbers are : A. 9. 6 B. 9. 5 C. 7. 6 D. 4. 9

7	If the two observations are 5 and -5. their Geometric mean is : A. 5 B. -5 C. 0 D. None of these
8	The average which is mostly affected by the smallest values is : A. A.M B. G.M C. H.M D. Mode

9	The relationship between mean deviation (M.D) and Standard deviation is : A. 3 M.D = 2 S.D B. 5 M.D = 4 S.D C. 2 M.D = 3 S.D D. 6 M.D = 5 S.D
10	If each value of a series is divided by 5, its co-efficient of variation is reduced by : A. 0% B. 5% C. 10% D. 20%

11	Harmonic mean in terms of G.M and A.M is : A. $H.M = \sqrt{G.M \times A.M}$ B. $H.M = G.M \times A.M$ C. $H.M = (G.M)^2 / A.M$ D. $H.M = \sqrt{(G.M)^2 / A.M}$
12	The extreme values in a negatively skewed distribution lie in the : A. Middle B. Right tail C. Left tail D. Whole curve

13	Mode is calculated graphically by : A. Ogaive B. Line diagram C. Histogram D. Lorenz curve
14	The value of coefficient of Kurtosis β_2 can be : A. Less than 3 B. Greater than 3 C. Equal to 3 D. All of these

15	For a symmetrical distribution odd moments take values: A. Zero B. Positive C. Negative D. Positive and Negative
16	When there is a pronounced skewness, the desirable scale to plot the frequency distribution is : A. Arithmetic Scale B. Multiple Scale C. Logarithmic Scale D. Any of these

17	What percentage of values lies between 5^{th} and 25^{th} percentiles? A. 15% B. 30% C. 75% D. 20%
18	If the mean deviation of a distribution is 20.20, the standard deviation of the distribution is : A. 15.15 B. 25.25 C. 30.30 D. None of these

19	Which of the following statements is FALSE? A. Pie charts are better than bar graphs for comparing relative sizes B. Data that are nominal scale are presented using frequency tables C. Means and standard deviations of ordinal data are meaningless D. The scatter-plot is the basic graphic tool for investigating relationships between two interval or ratio scaled variables
20	The correct relationship between A.M. G.M and H.M is : A. A.M = G.M = H.M B. G.M ≥ A.M ≥ H.M C. H.M ≥ G.M ≥ A.M D. A.M ≥ G.M ≥ H.M

21	In a randomized block design with 6 treatments and 5 blocks. an observation is missing. The treatment total. the block total corresponding to the missing observation is 25 and 30 respectively. The total of the available observations is 100. Then an estimate for missing observation is : A. 25 B. 15 C. 20 D. 10
22	Randomization is a process in which treatments are allocated to the experimental units : A. At the will of the investigator B. In a sequence C. With equal probability D. By choosing the units alternatively

23	In a Latin square design with 5 treatments, we need : A. 125 observations B. 50 observations C. 25 observations D. 10 observations
24	The distribution for error in ANOUA is assumed to be : A. $N(0, \sigma^2)$ B. $N(0, 1)$ C. $N(\mu, \sigma^2)$ D. $N(\mu, 1)$

25	The contrast representing the linear effect among the 4 treatments is : A. $T_1 - 2T_2 + T_3$ B. $T_1 - T_2 - T_3 + T_4$ C. $-T_1 + 3T_2 - 3T_3 + T_4$ D. None of these
26	The quadratic effect of a factor X at three levels 0, 1 and 2 can be estimated by the contrast : A. $X_0 - X_2$ B. $X_0 + X_2 - 2X_1$ C. $X_1 + X_2 - 2X_0$ D. $X_0 + X_1 - 2X_2$

27	The number of Additional Director Generals assisting the Director General of CSO is : A. 5 B. 4 C. 3 D. 6

28 The probability of selecting 8^{th} population unit in the 6^{th} draw when 10 units are randomly drawn one by one without replacement out of 25 population units is :

A. $\frac{10}{25}$

B. $\frac{1}{10}$

C. $\frac{6}{25}$

D. $\frac{1}{25}$

29	The Government organization whose primary responsibility is organizing socio-economic surveys is : A. Indian Statistical Institute B. CSO C. NSSO D. Ministry of Statistics
30	Given V_1=26, V_2 = 32 and V_3 = 15. Identify the correct choice: A. $V_{ran} = V_1$, $V_{opt} = V_2$, $V_{prop} = V_3$ B. $V_{opt} = V_1$, $V_{ran} = V_2$, $V_{prop} = V_3$ C. $V_{opt} = V_3$, $V_{ran} = V_2$, $V_{prop} = V_1$ D. $V_{opt} = V_3$, $V_{ran} = V_1$, $V_{prop} = V_2$

31	Neyman allocation reduces to proportional allocation when : A. Stratum sizes are equal B. Stratum standard deviations are equal C. Stratum means are equal D. Stratum means are unequal
32	When $Y_i = \alpha + \beta_i$, i=1, 2, ...N, which of the following statement is TRUE? A. $V(\bar{y}_{srs}) - V(\bar{y}_{sys})$ B. $V(\bar{y}_{sys}) - V(\bar{y}_{srs})$ C. $V(\bar{y}_{sys}) = V(\bar{y}_{srs})$ D. $V(\bar{y}_{sys}) = 0$

33	The number of possible systematic samples of size 8 with population size 120 is : A. 8 B. 12 C. 15 D. 10
34	Choose the sequence of labels corresponding to a systematic sample of size 4 when N = 20: A. 5. 10. 15. 20 B. 1. 10. 11. 20 C. 3. 9. 15. 18 D. 2. 6. 10. 14

35	Neyman allocation : A. Minimizes $V(\overline{y}_{st})$ for a given cost B. Maximizes $V(\overline{y}_{st})$ for a given cost C. Minimizes $V(\overline{y}_{st})$ for a given sample size D. Maximizes $V(\overline{y}_{st})$ for a given sample size
36	In a randomized block design with 5 blocks and 6 treatments having one missing value, the error degrees of freedom will be : A. 18 B. 19 C. 20 D. 30

37	Error sum of squares in RBD as compared to CRD using the same material is : A. More B. Less C. Equal D. Not comparable
38	In a Latin square design with 5 treatments. the error degrees of freedom in analysis of variance is equal to: A. 12 B. 16 C. 25 D. 14

39	If from each value of Y, a constant value 15 is subtracted and then divided by 2, the changed regression coefficient b_{xy} through coded values is : A. Half of b_{xy} B. Twice of b_{xy} C. Same as b_{xy} D. None of these
40	A linear combination of treatments is said to be a contrast iff : A. The sum of the treatment effects is 0 B. All the coefficients of the treatments are unity C. The sum of the coefficients of the treatment is 0 D. The sum of the coefficients of the treatment is less than 0

41	In a 2^3 factorial experiment. if the effect ABC is confounded in all the 4 replicates then the error degrees of freedom is : A. 16 B. 18 C. 20 D. 15
42	In a randomized block design, the unbiased estimator for error variance is : A. Mean sum of squares due to error B. Sum of squares due to error C. Sum of squares due to treatment D. Mean sum of squares due to treatment

43	If the treatment ABC is confounded in a replicate. then the other treatment combinations that must occur with abc in the same block is : A. a, b, c B. ab, ac, bc C. bc, ac, c D. a, b, ab
44	If Y = CX, C being a constant. then E(Y)=? A. C B. E(X) C. CE(X) D. C+E(X)

45	If X ~B(n.p). the distribution of Y=n-X is : A. B(n.1) B. B(n.x) C. B(n.p) D. B(n.q)
46	A problem in statistics is given to two students A and B. The odds in favour of A solving the problem are 6 to 9 and against B solving the problem are 12 to 10. If A and B attempt, find the probability of the problem being solved. A. 6/15 B. 5/11 C. 18/55 D. 37/55

47	If X is a normal distribution with mean 8 and variance 4. then $P(X < 8)$ is : A. 0 B. 1 C. 0.5 D. 0.8
48	If f(x) is the probability density function of a continuous random variable x. then $E(x^r)$ is : A. $\int_{-\infty}^{\infty} x^r f(x)dx$ B. $\int_{-\infty}^{\infty} x^{r+1} f(x)dx$ C. $\int_{-\infty}^{\infty} x\ f(x)dx$ D. $\int_{-\infty}^{\infty} f(x)dx$

49	A number is chosen at random from the first 20 natural numbers. The probability that it is a multiple of 3 or 5 is : A. 1/2 B. 9/20 C. 3/10 D. 1/5
50	A coin is tossed 6 times. The probability of obtaining four or more heads is : A. $\frac{7}{2^6}$ B. $\frac{11}{2^6}$ C. $\frac{11}{2^5}$ D. $\frac{7}{2^5}$

51	If X is a Poisson random variable with parameter 9. an upper bound for $P(3 < X < 15)$ using Chebyshev's inequality is : A. 0.075 B. 0.025 C. 0.75 D. 0.25
52	The joint probability mass function of (X,Y) is $f(x,y) = \begin{cases} k(2x+y), x=0,1,2 \text{ and } y=0,1,2,3 \\ 0, \text{ otherwise} \end{cases}$ The value of k is : A. 1/30 B. 1/5 C. 1/3 D. 7/15

53	Mr. A speaks truth in 90% of cases and Mr.B speaks truth in 70% of cases. The percentage of cases they contradict each other in making the same statement is : A. 63 B. 20 C. 27 D. 34
54	The interquartile range of a normal distribution with mean μ and variance $\sigma^2$is approximately : A. $\frac{2}{3}\sigma$ B. $\frac{4}{3}\sigma$ C. σ D. $\frac{4}{5}\sigma$

55	A man and his wife appear for an interview for two posts. The probability of the husband's selection is 1/7 and that of wife's selection is 1/5. What is the probability that only one of them will be selected? A. 6/7 B. 2/7 C. 4/5 D. 4/35
56	The distribution for which the moment generating function is $\frac{1}{2^6}(1+e^t)^6$ is a : A. Hypergeometric distribution B. Negative binomial distribution C. Binomial distribution D. Geometric distribution

57	The recurrence relation for the moments of a Poisson distribution with the parameter λ is: A. $\mu_{r+1} = r\mu_{r-1} + \frac{d\mu_r}{d\lambda}$ B. $\mu_{r+1} = \lambda\left[\mu_{r-1} + \frac{d\mu_r}{d\lambda}\right]$ C. $\mu_{r+1} = \lambda\left[r\mu_r + \frac{d\mu_r}{d\lambda}\right]$ D. $\mu_{r+1} = \lambda\left[r\mu_{r-1} + \frac{d\mu_r}{d\lambda}\right]$
58	Expected value of $\lvert x-k \rvert$ is minimum when: A. $k = E(x)$ B. $k <$ Median C. $k > E(x)$ D. $k =$ Median

59	Performance of an acceptance sampling plan can be analyzed using: A. Single sampling plan B. Operating characteristic curve C. Control chart D. None of these
60	If P = ± 1. the two regression lines are: A. Coincide B. Parallel C. Perpendicular to each other D. None of these

61	The probability of selecting the set {1. 2. 4 } as samples in SRSWOR. when N=10 and n=3 is: A. $\frac{1}{3}$ B. $\frac{3}{10}$ C. $\frac{1}{120}$ D. $\frac{1}{10}$
62	The probability of including the units with label 3 in a SRS with N=10 and n=3 is: A. $\frac{1}{10}$ B. $\frac{3}{10}$ C. $\frac{1}{3}$ D. $\frac{1}{120}$

63	The range for intracluster correlation, when clusters contain exactly M units each is: A. $\frac{1}{(M-1)} \quad \rho \quad 1$ B. $-1 \cdot \rho \cdot 1$ C. $-\frac{1}{(M-1)} \quad \rho \cdot 1$ D. $0 \cdot \rho \quad 1$
64	In which of the following sampling methods, one can have $n > N$ with positive probability? A. SRSWR B. SRSWOR C. Systematic sampling D. Stratified sampling

65	Given N = 36, n = 5 and $S^2 = 2$. The value of $V(\bar{y}_{SRSWOR})$ is: A. $\frac{2}{5}$ B. $\frac{1}{18}$ C. $\frac{31}{90}$ D. $\frac{4}{5}$

66 When N = 24 and n = 6. which of the following statement is TRUE in systematic sampling?

A. The probability of selecting a sample consisting 10^{th} and 14^{th} population unit is $\frac{1}{6}$

B. The probability of selecting a sample consisting 9^{th} and 14^{th} population unit is 0

C. The probability of selecting a sample consisting 9^{th} and 14^{th} population unit is $\frac{1}{4}$

D. The probability of selecting a sample consisting 7^{th} .12^{th} and 15^{th} population unit is $\frac{1}{4}$

67	A life-table constructed for an age interval of 5 to 10 years is specifically known as: A. Grouped life-table B. Interval life-table C. Abridged life-table D. None of these
68	The death rate of women due to delivery of children is termed as: A. Maternal mortality rate B. Neonatal mortality rate C. Infant mortality rate D. Foetal death rate

69	10 LET A = 5.3 20 PRINT A 30 END The output will be: A. 5.3 B. 5.36 C. 3.5 D. 5.03
70	GOTO statement in BASIC is: A. Conditional B. Unconditional C. Branching D. Transfer

71	In BASIC, if within an expression the parenthesis are present, then the calculations within the innermost parenthesis will have: A. First preference B. Second preference C. Third preference D. Fourth preference
72	The child bearing age in India is: A. 20 – 24 years B. 20 – 29 years C. 15 – 49 years D. 15 – 52 years

73	The equation of the Parabola is: A. $y = ax^2 + bx + c$ B. $y = ax^3 + bx^2 + cx + D$ C. $y = ae^{bx}$ D. $y = ax^b$
74	Given the two regression lines as $3x-4y+8 = 0$ and $4x-3y = 1$. The means of x and y are: A. $\bar{x} = 4, \bar{y} = 5$ B. $\bar{x} = 3, \bar{y} = 4$ C. $\bar{x} = \frac{3}{4}, \bar{y} = \frac{5}{4}$ D. None of these

75	Variance of a constant is: A. 1 B. $-\infty$ C. 0 D. ∞
76	In a Normal distribution, skewness is : A. One B. Zero C. Greater than one D. Less than one

77	Given the expected values for two variables x and y as $E(x) = 2$. $E(x^2) = 10$. $E(y) = 3$. $E(y^2) = 20$ and $E(xy) = 16$. We conclude that: A. Correlation coefficient will be positive B. Correlation coefficient will be negative C. Given data are incorrect D. None of these
78	The most popular method of computing consumer price index is: A. Aggregate expenditure method B. Simple average of price relative method C. Family budget method D. Simple aggregate method

79	Pansche's formula for price index is : A. $\frac{\sum P_1 q_1}{\sum P_0 q_0} \cdot 100$ B. $\frac{\sum P_1 q_1}{\sum P_0 q_1} 100$ C. $\frac{\sum P_1 q_0}{\sum P_0 q_0} 100$ D. $\frac{\sum P_0 q_1}{\sum P_1 q_1} 100$
80	Factor reversal test is invented by: A. Walsh B. A.L. Bowley C. John I. Griffin D. Irwin Fisher

81	The gross National product value is deflated through: A. Quantity Index Number B. Price Index Number C. Value Index Number D. All of these
82	Fisher's ideal index number is the ____ of Laspegre's and Pansche's index numbers. A. Arithmetic mean B. Geometric mean C. Harmonic mean D. Weighted Arithmetic mean

83	Geometrically crossed – weight formula was given by: A. Marshall and Edgeworth B. Fisher C. Kelly D. Dorbish and Bowley
84	If 'r' is the correlation coefficient of n pairs of values. then its standard error is: A. $\sqrt{\frac{1-r^2}{n}}$ B. $\frac{1-r}{\sqrt{n}}$ C. $\frac{1+r^2}{\sqrt{n}}$ D. $\frac{1-r^2}{\sqrt{n}}$

85	The Arithmetic mean of the two regression coefficients β_{yx} and β_{xy} is: A. $-r$ B. $-r$ C. $-r^2$ D. $-r^2$
86	The Spearmen's rank correlation coefficient formula is: A. $1-\frac{6\sum d_i^3}{n(n^2-1)}$ B. $1+\frac{6\sum d_i^2}{n(n^2-1)}$ C. $1-\frac{6\sum d_i^2}{n(n^2-1)}$ D. $1+\frac{\sum d_i^2}{n(n-1)}$

87	The skewness of a chi–square distribution will be zero if: A. $n = 0$ B. $n = 1$ C. $n < 0$ D. $n \to \infty$
88	Sampling distribution is defined as: A. Chi square distribution B. Frequency distribution of the statistic C. Frequency distribution of the parameter D. t - distribution

89	If X and Y are two independent chi square variates with γ_1 and γ_2 degrees of freedom respectively, then $W = \frac{X/\gamma_1}{Y/\gamma_2}$ follows: A. Chi square distribution B. t - distribution C. Normal distribution D. F - distribution

90	The maximum height of the students' t- distribution curve at the point t = 0 is: A. $\frac{1}{\beta\left(\frac{1}{2}, \frac{n-1}{2}\right)}$ B. $\frac{1}{\sqrt{n-1}\ \beta\left(\frac{1}{2}, \frac{n-1}{2}\right)}$ C. $\frac{1}{\sqrt{n-1}\ \beta\left(\frac{1}{2}, \frac{n}{2}\right)}$ D. $\sqrt{n-1}\ \beta\left(\frac{1}{2}, \frac{n-1}{2}\right)$
91	For a random sample of size n from $N(\mu, \sigma^2)$, $\bar{x}$ and $(n-1)s^2 = \sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2$ are: A. Identically distributed B. Independently distributed C. Both (A) and (B) D. Neither (A) nor (B)

92	Fertility rates provide an adequate basis for: A. Population growth B. Family planning C. Checking infant mortality D. None of these
93	Given Min $10x_1+5x_2+5x_3$ Subject to $5x_1 - 5x_2 - 3x_3 \_ 1$ $-x_1 + x_2 \_ -3$ $x_1 - x_3 \_ -7$ $-4x_1 + 4x_2 + x_3 \_ 5$ $x_1 \_ 0$ In the dual of this problem we have : A. Max $y_1 - 3y_2 - 7y_3 + 5y_4$ B. Max $10x_1 + 5x_2 + 5x_3$ C. Max $5x_1 - 5x_2 - 3x_3 \_ 1$ D. None of these

94	"Assign a value of 758.33 to the variable "P" – for this corresponding LET statement is: A. 10 LET P = 758.33 B. P = 758.33 C. 10 LET P = 7.33 D. None of these
95	Sequence of instructions in a program that can be executed repetitively until certain specific conditions are satisfied is: A. Fixed loop B. Jump C. Variable loop D. Loop

96 The table of expected frequencies associated with the following contingency table is:

20	10
10	20

A.

20	20
10	10

C.

15	15
15	15

B.

20	10
10	20

D.

10	10
20	20

97 Which method is not suitable to as measured seasonal variation

A. Method of simple average

B. Moving average method

C. Ratio to trend method

D. Link relative method

98 To test the hypothesis $H_0 : \sigma^2 = \sigma_0^2$ against $H_1 : \sigma^2 = \sigma_0^2$ based on a sample size 15 drawn from $N(\theta, \sigma^2)$. θ-unknown. the test statistic has :

A. t distribution with 14 degrees of freedom

B. t distribution with 13 degrees of freedom

C. x^2 distribution with 14 degrees of freedom

D. x^2 distribution with 15 degrees of freedom

99	A statistical test is : A. A statement about the probability distribution of a random variable B. A decision rule which helps us to take a decision regarding the acceptance or rejection of a hypothesis based on sample evidence C. A decision rule that can be used even before sampling. D. All of these
100	Choose the correct statement : A. If the p-value of a test is 1, the null hypothesis must be rejected. B. If the p-value of a test is 0, the null hypothesis must be accepted C. If the p-value of a test is 1, the null hypothesis must be accepted D. p-value of a test has no role in deciding whether to accept or reject a statistical hypothesis

101	Neyman-pearson lemma gives a - A. Most powerful test B. Likelihood ratio test C. Uniformly most powerful test D. All of these
102	A most powerful test is associated with testing - A. Simple null against simple alternative B. Simple null against composite alternative C. Composite null against composite alternative D. Composite null against simple alternative

103 Paired t-test is used for -

A. Testing the equality of means based on 2 independent samples

B. Testing the equality of variance based on 2 independent samples

C. Testing the equality of means of paired observations on same experimental units

D. Testing the equality of means of paired observation on different experimental units

104 The sample correlation based on a sample of size 11 drawn from a bivariate normal distribution is found to be $+\sqrt{0.19}$. The value of the test statistic associated with $H_0:\rho=0$ against $H_1:\rho\neq 0$ is :

A. $\sqrt{\frac{19}{3}}$

B. $\sqrt{\frac{19}{9}}$

C. $\sqrt{\frac{19}{30}}$

D. $\sqrt{\frac{3}{19}}$

105 Based on two independent samples of sizes 12 and 15 drawn from $N(\theta_1,\sigma_1^2)$ and $N(\theta_2,\sigma_2^2)$, it is found that

$$\sum_{i=1}^{12}(x_i^{(1)}-\bar{x}^{(1)})^2 = 80 \text{ and } \sum_{i=1}^{15}(x_i^{(2)}-\bar{x}^{(2)})^2 = 70.$$

The value of the test statistic associated units $|H_0 : \sigma_1^2 = \sigma_2^2 \quad H_1 : \sigma_1^2 \pm \sigma_2^2$ is:

A. $\frac{11}{16}$

B. $\frac{16}{11}$

C. $\frac{10}{7}$

D. $\frac{7}{10}$

106	The likelihood ratio test reduces to MPT if : A. Null and Alternative are simple B. Null is simple, Alternative is composite C. Null is composite, Alternative is simple D. Null and alternative are composite
107	For which of the following testing problems these is no UMPT of level α in the case of Poisson distribution with mean λ - A. $H_0 : \lambda = \lambda_0$ against $H_1 : \lambda < \lambda_0$ B. $H_0 : \lambda = \lambda_0$ against $H_1 : \lambda > \lambda_0$ C. $H_0 : \lambda \leq \lambda_0$ against $H_1 : \lambda > \lambda_0$ D. $H_0 : \lambda = \lambda_0$ against $H_1 : \lambda \neq \lambda_0$

108	It is believed that in Tamil Nadu, students undergoing Science, Arts, Commerce and Engineering branches are in the ratio 2 :1 : 1: 6. Based on a random sample of 1500 students, it is proposed to test the above statement, which of the following tests is an appropriate one? A. F test B. t – test C. Chi-square test D. Normal test
109	Corrected statement for 20 IF B1 >B$ THEN 70 is : A. 20 IF BS > B1 THEN 70 B. 20 IF B1 > B$ THEN 20 C. 20 IF B1 > B2 THEN 70 D. None of these

110	Supply corresponding INPUT statements to ?, 10, 20, 30, 40 A. 10 INPUT A, B, C, D B. 10 INPUT A$, B$, C,D C. 10 INPUT A, B D. None of these
111	Total numbers of live births to the total female population of the child bearing age is : A. Total fertility rate B. Specific fertility rate C. General fertility rate D. Crude birth rate

112	Size of an array is accomplished by means of the statement : A. DIM B. READ C. DATA D. END
113	What is the library function for finding the square root of a variable? A. ABS B. LOG C. SQRT D. SQR

114	The moment generating function of a t-distribution is : A. $(1 - 2t)^{-n/2}$ B. $(n - t)^{-1/2}$ C. $(1 + 2t)^{-n}$ D. Does not exist
115	If X_1 and X_2 are two independent chisquare variates with n_1 and n_2 degrees of freedom respectively, then $\frac{X_1}{X_2}$ follows a A. t distribution with (n_1/n_2) degrees of freedom B. Beta distribution of the second kind with parameters $\left(\frac{n_1}{2}, \frac{n_2}{2}\right)$ C. Gamma distribution with parameters $\left(\frac{n_1}{2}, \frac{n_2}{2}\right)$ D. None of these

116	The standard error is : A. Error of the statistic B. Standard deviation C. Standard deviation of the statistic D. None of these
117	The relation between Snedecor's F and Fisher's Z is : A. $Z=\frac{1}{2}\log_e F$ B. $F = e^{2Z}$ C. Both (A) and (B) D. None of (A) and (B)

118	Value of b in the trend line y = a+bx is: A. Always positive B. Always negative C. Both positive and negative D. None of these
119	The best method for finding out seasonal variation is : A. Simple average method B. Ratio to moving average method C. Ratio to trend method D. None of these
120	Least square method of fitting a trend is : A. Most exact B. Least exact C. Full of subjectivity D. Mathematically unsound

121	If the origin in a trend equation is shifted forward by three years, x in the equation $y = a + bx$ will be replaced by: A. $x - 3$ B. $x + 3$ C. $3x$ D. None of these
122	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 ≤ variance

123	Purchasing power of money can be accessed through - A. Value index B. Quantity index C. Consumer price index D. Price index
124	A good index number is one that Satisfies - A. Time reversal test B. Factor reversal test C. Both time reversal and factor reversal test D. None of these

125	Current year fixed base index is equal to A. $\frac{\text{Current year CBI} \times \text{Previous year FBI}}{100}$ B. $\frac{\text{Current year FBI} \times \text{Previous year CBI}}{100}$ C. $\frac{\text{Current year CBI} \times \text{Current year FBI}}{100}$ D. $\frac{\text{Previous year FBI} \times \text{Previous year CBI}}{100}$
126	For a random sample from N(μ, 1), an unbiased estimator of μ^2+1 is : A. $\bar{x}^2+1$ B. $(\sum xi)^2+1$ C. $\frac{1}{n}(\sum xi)^2+1$ D. $\frac{\sum xi^2}{n}$

127	If $x_1, x_2 \ldots\ldots x_n$ be a random sample from $N(\mu,\sigma^2)$ population, the sufficient Statistic for μ is : A. $\Sigma(x_i - \bar{x})$ B. $\bar{x}/n$ C. Σx_i D. $\Sigma(x_i - \bar{x})^2$
128	An estimates is considered to be the best if its distribution is : A. Continuous B. Discrete C. Concentrated about the true parameter value D. Normal

129	Pick the family which is NOT regular : A. Binomial B. Poisson C. Cauchy D. $U(0,\theta)$
130	The Rao-Blackwell theorem helps to improve the unbiased estimator by using the - A. Estimator with maximum variance B. Unbiased estimator C. Sufficient estimator D. Biased estimator

131	If the variance of an estimator attains the Cramer Rao lower bound the estimator is : A. Most sufficient B. Having 0 variance C. Biased D. Having the maximum variance
132	Least square estimator under linear model set up is : A. Biased B. Unbiased with minimum variance C. Unbiased with maximum variance D. Having variance 0

133	The 95% confidence limits for μ of normal distribution when σ^2 is known is - A. $\bar{x} \pm 1.96\frac{\sigma}{\sqrt{n}}$ B. $\bar{x} \pm 1.96\frac{S}{\sqrt{n}}$ C. $\bar{x} \pm 1.96\frac{S}{\sqrt{n-1}}$ D. $\bar{x} \pm t_{\alpha/2}\frac{S}{\sqrt{n}}$
134	Index numbers help - A. In framing of economic policies B. In accessing the purchasing power or money C. For adjusting national income D. All of these

135	The error (s) involved in the construction or index numbers is : A. Error of sampling B. Formula error C. Error in collected data D. All of these
136	One of the limitations in the construction of index numbers is: A. The choice of the type of average B. Choice or investigators C. Choice or variables to be studied D. All of these

137	Weights which can be expressed with definiteness are called - A. Implicit weights B. Explicit weights C. Fixed weights D. None of these
138	The chisquare distribution with n degrees of freedom, for n < 30 is : A. Positively skewed B. Symmetric C. Negatively skewed D. None of these

139	The credit for deriving the F-distribution goes to - A. R.A. Fisher B. G.W. Snedecor C. W.S. Gossett D. All of these
140	The t distribution is : A. Positively skewed B. Symmetrical about the line t = 0 C. Negatively skewed D. None of these
141	The range of a chi-square variate is : A. $-\infty$ to $+\infty$ B. 0 to 1 C. 0 to ∞ D. $-\infty$ to + 0

142	Which of the following is TRUE? (i) Method of minimum X^2 and m.l.e gives the same estimator for large n (ii) Method of modified minimum X^2 and m.l.e gives the same estimator for large n (iii) m.l.e's are unbiased (iv) Consistent estimator is always unbiased A. (i) only B. (i), (ii) and (iii) only C. (i) and (ii) D. All the statements
143	If $x_1, x_2 \ldots\ldots x_n$ is a random sample from population $N(\mu,\sigma^2)$, the sufficient Statistic For σ^2 , when μ is unknown, is : A. $(\sum xi)^2$ B. $\sum xi^2$ C. $\sum(x_i - \mu)^2$ D. None of these

144 The $100(1-\alpha)\%$ confidence interval for σ_1^2/σ_2^2 based on random samples from two independent normal population of sizes n_1 and n_2 with unknown means, where S_1^2 and S_2^2 are unbiased estimators of σ_1^2 and σ_2^2, is given by:

A. $\left[\frac{S_2^2}{S_1^2}\times\frac{1}{F^{\alpha/2}_{n_2-1,n_1-1}},\frac{S_2^2}{S_1^2}\times F^{\alpha/2}_{n_2-1,n_1-1}\right]$

B. $\left[\frac{S_1^2}{S_2^2}\times\frac{1}{F^{\alpha/2}_{n_1-1,n_2-1}},\frac{S_1^2}{S_2^2}\times F^{\alpha/2}_{n_2-1,n_1-1}\right]$

C. $\left[\frac{S_2^2}{S_1^2}\times\frac{1}{F^{\alpha/2}_{n_2-1,n_1-1}},\frac{S_2^2}{S_1^2}\times F^{\alpha/2}_{n_1-1,n_2-1}\right]$

D. $\left[\frac{S_1^2}{S_2^2}\times\frac{1}{F^{\alpha/2}_{n_2-1,n_1-1}},\frac{S_1^2}{S_2^2}\times F^{\alpha/2}_{n_2-1,n_1-1}\right]$

145	If $X_1, X_2 \ldots\ldots X_n$ constitutes a random sample from $f(x) = e^{-(x-\delta)}$, $x > 8$, which of the following estimators of δ are not biased? A. $\overline{X}$ B. $\overline{X} - 1$ C. $\overline{X} + 1$ D. $2\overline{X}$
146	If $X_1, X_2 \ldots\ldots X_n$ is a random sample from $f(x) = e^{-(x-\delta)}$, $x > 8$, which of the following is a consistent estimators of δ? A. $X_{(1)}$ B. $X_{(n)}$ C. $\overline{X}$ D. $\overline{X} - 1$

147	Cramer- Rao inequality with regard to the variance of an estimator provides: A. Upper bound on the variance B. Lower bound on the variance C. Asymptotic variance of an estimator D. Efficiency of an estimator
148	For a random sample of size 100 from $N(\mu,\sigma^2)$ the two sided, 95% confidence interval for μ when σ^2 is unknown, with $S^2 = \frac{1}{n-1}\sum(x_i - \bar{x})^2$, is: A. $[\bar{X} - 1.96S, \bar{X}+1.96S]$ B. $[\bar{X} - 1.645S, \bar{X}+1.645S]$ C. $[\bar{X} - 0.1645S, \bar{X} - 0.1645S]$ D. $[\bar{X} - 0.196S, \bar{X} + 0.196S]$

149	If μ and σ are the process mean and SD then the limits $\mu \pm 3\sigma$ are called - A. Specification limits B. Standard limits C. Natural tolerance limits D. Warning limits
150	AOQL of a single sampling plan is : A. $\frac{P(N-n)}{N}$ B. $\frac{N-n}{N} P_a$ C. $\frac{P(N-n)(1-P_a)}{N}$ D. $\frac{P(N-n)P_a}{N}$

151	Type A oc curve is based on · A. Binomial distribution B. Poisson distribution C. Hypergeometric distribution D. Normal distribution
152	C – chart is based on · A. Binomial distribution B. Normal distribution C. Poisson distribution D. Hypergeometric distribution
153	Which of the following statement is true? A. AQL and LQL are same B. AQL and LTPD are same C. LQL and LTPD are same D. AQL and RQL are same

154	The oc curve of a single sampling plan gives - A. Probability of accepting the lots B. Probability of finding the specified number of defectives. C. Probability of finding specified number of good items D. Probability of never committing an error
155	In a double sampling plan we reject the lot if - A. $d_1 \leq c_1$ B. $d_1 > c_2$ C. $d_1 + d_2 \leq c_2$ D. $d_1 + d_2 \leq c_1$

156	Lot tolerance percentage defective is also called - A. Acceptance quality level B. Rejectable quality level C. Best quality level D. Medium quality level
157	Given $\overline{R} = .009$ for a process that is in control obtain the estimate of process standard deviation. The sample size n = 6 and $d_2 = 2.534$? A. .05 B. .035 C. .0035 D. .0027

158	Acceptance of a lot of unsatisfactory quality on the basis of sampling inspection is called ___ A. Market Risk B. Bayes Risk C. Consumer's Risk D. Producer's Risk
159	The rejection of a lot which is of acceptable quality is called ___ _ A. Bayes Risk B. Consumer's Risk C. Producer's Risk D. Market Risk

160	Suppose a random sample of 'n' items is drawn from a lot of 'N' items and let 'd' be the number of defectives in the sample. If 'c' be the acceptance number of defectives then we reject the lot if - A. $d > c$ B. $d = c$ C. $d < c$ D. $d \leq c$
161	The double sampling inspection plan was designed by A. Dodge and Roming B. Walter A Shewhart C. Duncan D. A.V. Feigenbaum

162	In a certain sampling inspection, the number of defects found in 10 samples of 100 each are given below: 16, 18, 11, 18, 21, 10, 20, 18, 17 and 21. Find the upper control limit for the C-chart. A. 17 B. 4.631 C. 12.369 D. 29.369

163	The three sigma trial control limits for C-chart for equal size samples are given as - A. $UCL = \bar{C} + 3\sqrt{\bar{c}}; CL = \bar{C},$ $LCL = \bar{C} - 3\sqrt{\bar{c}}$ B. $UCL = \bar{C} + 2\sqrt{\bar{c}}; CL = \bar{C},$ $LCL = \bar{C} - 2\sqrt{\bar{c}}$ C. $UCL = \bar{C} + \sqrt{3\bar{c}}; CL = 3,$ $LCL = \bar{C} - \sqrt{3\bar{c}}$ D. None of the above
164	In variable sampling plan, the distribution of quality characteristic is assumed as – A. Poisson distribution B. Normal distribution C. Binomial distribution D. None of these

165	Control chart for nonconformities is based on ·
	A. Poisson distribution
	B. Exponential distribution
	C. Normal distribution
	D. None of these
166	Which probability density function has a constant hazard rate?
	A. Binomial distribution
	B. Poisson distribution
	C. Gamma distribution
	D. Exponential distribution

167	For an exponential probability density function $F(t) = \lambda e^{-\lambda t}$, t ≥ 0, mean time to failure is : A. λ B. $1/\lambda$ C. $\frac{1}{1+\lambda}$ D. $1+\lambda$
168	Monthly fluctuation observed in a time series data are termed as - A. Cyclical variation B. Irregular variation C. Seasonal variation D. Secular trend

169	Periodic changes in a business time series are called - A. Seasons B. Cycles C. Secular D. None of these
170	The abrupt changes observed in a time series data are attributed to _____ variations A. Secular B. Cyclical C. Irregular D. Seasonal

171	If the slope of the tread line is positive it shows - A. Rising trend B. Declining trend C. Stagnation D. Any of the above
172	A time series is affected by - A. Economic factors B. Non economic factors C. Both (A) and (B) D. Neither (A) nor (B)

173	Variance of the project duration in network is : A. $\sigma^2 = \left[\frac{t_p - t_0}{6}\right]^2$ B. $\sigma^2 = \frac{1}{6}\left[t_p - t_0\right]^2$ C. $\sigma^2 = \left[\frac{t_p - t_0}{6}\right]$ D. $\sigma^2 = 6\left[t_p - t_0\right]^2$
174	Representation of beginning or completion of some activity which consumes no time in network is : A. Event B. PERT C. CPM D. Activity

175	The longest time that an activity could take if everything goes wrong in network is: A. Pessimistic time B. Most likely time C. Optimistic time D. Critical path
176	Given $2x_1 + x_2 - x_3 = 2$ and $3x_1 + 2x_2 + x_3 = 3$ then one of the basis : A. $\begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix}$ B. $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ C. $\begin{pmatrix} 2 & 1 & -1 \\ 3 & 2 & 1 \end{pmatrix}$ D. None of these

177	O.R Models may be classified depending upon - A. Dimensionality B. Function C. Subject D. All of these
178	The component of a time series which is attached to long term fluctuations is : A. Seasonal variation B. Cyclical variation C. Irregular variation D. All of these

179	The general decline in sales of cotton cloths is attached to the component of the time series – A. Secular trend B. Cyclical variation C. Seasonal variation D. All of these
180	The consistent increase in production of cereals constitutes the component of a time series - A. Secular trend B. Seasonal variation C. Cyclical variation D. All of these

181	Cyclic variations in a time series are caused by - A. Lockouts in a factory B. War in a Country C. Floods in the States D. None of these
182	Semi-average method or finding trend is appropriate if the data are available for a – A. Long period B. Short period C. Long and Short period D. None of these

183	Link relatives in a time series remove the influence of - A. The trend B. Cyclic variation C. Irregular variation D. All of these
184	Which of the following component is used for short term forecast? A. Cyclical variation B. Trend C. Seasonal variation D. None of these

185	If either the primal of the dual problem has an unbounded objective function value, then the other problem has - A. Feasible solution B. No feasible solution C. Unbounded solution D. None of these
186	To convert $\sum a_{ij} x_j \geq b_j$ into an equality, we introduce - A. Slack variable B. Surplus variable C. Unrestricted variable D. None of these

187	In an assignment problem. if there are 'n' workers and 'n' jobs there would be - A. n solutions B. n! solutions C. (n-1)! solutions D. $(n!)^n$ solutions
188	An assignment problem can be solved by- A. Transportation method B. Sequencing method C. Row method D. None of these
189	If xj's are feasible solution to linear programming problem then - A. $x_j \geq 0$ B. $x_j \leq 0$ C. $x_j = 0$ D. None of these

190	Given $\begin{pmatrix} 1 & 2 & 1 \\ 2 & 1 & 5 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ The maximum possible basic solution is : A. 3 B. 4 C. 2 D. 6
191	Most commonly used index number is - A. Diffusion index number B. Price index number C. Value index number D. None of these

192	Consumer price index is mostly used for framing - A. Price policy B. Wage policy C. Policy making D. All of these
193	Estimation of quantity index number by applying Fisher method is : A. $Q_{01} = \sqrt{\frac{\sum q_1 p_0}{\sum q_0 p_0} \times \frac{\sum q_1 p_1}{\sum q_0 p_1}} \times 100$ B. $Q_{01} = \sqrt{\frac{\sum q_1 p_1}{\sum q_0 p_0} \times \frac{\sum q_1 p_0}{\sum q_0 p_1}} \times 100$ C. $Q_{01} = \sqrt{\frac{\sum q_0 p_0}{\sum q_1 p_0} \times \frac{\sum q_0 p_1}{\sum q_1 p_1}} \times 100$ D. $Q_{01} = \sqrt{\frac{\sum q_0 p_1}{\sum q_1 p_1} \times \frac{\sum q_0 p_0}{\sum q_1 p_1}} \times 100$

194	Link relative for any month is equal to - A. $\frac{\text{Previous month value}}{\text{current month value}} \times 100$ B. $\frac{\text{Current month value}}{\text{previous month value}} \times 100$ C. $\frac{\text{Current month value}}{\text{Chain relative of preceeding month}} \times 100$ D. All of these
195	In the least square linear trend equation $y = a+bx$, if b is positive if indicates - A. Declining trend B. Rising trend C. No trend at all D. All of these

196 The only way of isolating irregular variations is to remove _____ from the time series.

A. Secular trend and seasonal variation

B. Secular trend, seasonal and cyclical variation

C. Seasonal and cyclical variation

D. Secular Trend and cyclical variation

197 For the given five values 15,24,18,33,42 the three year moving averages are:

A. 19, 22, 33

B. 19, 25, 31

C. 19, 30, 31

D. None of these

198	Quantity index reflects what changes from one period to another? A. Price B. Quantity C. Value D. All of these
199	Index numbers are called - A. Economic barometers B. Good guide C. Both (A) and (B) D. Neither (A) nor (B)
200	The cost matrix in an assignment problem is a – A. Square matrix B. Rectangle matrix C. Diagonal matrix D. None of these