Sl. No. :

STPG/19

Register Number

2019
STATISTICS
(PG Standard)

Time Allowed : 3 Hours] **[Maximum Marks : 300**

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. The applicant will be supplied with Question Booklet 15 minutes before commencement of the examination.
2. This Question Booklet contains **200** questions. Prior to attempting to answer, the candidates are requested to check whether all the questions are there in series and ensure there are no blank pages in the question booklet. **In case any defect in the Question Paper is noticed, it shall be reported to the Invigilator within first 10 minutes and get it replaced with a complete Question Booklet. If any defect is noticed in the Question Booklet after the commencement of examination, it will not be replaced.**
3. Answer **all** questions. **All** questions carry equal marks.
4. You must write your Register Number in the space provided on the top right side of this page. Do not write anything else on the Question Booklet.
5. An answer sheet will be supplied to you, separately by the Room Invigilator to mark the answers.
6. You will also encode your Question Booklet Number with Blue or Black ink Ball point pen in the space provided on the side 2 of the Answer Sheet. If you do not encode properly or fail to encode the above information, action will be taken as per Commission's notification.
7. Each question comprises *four* responses (A), (B), (C) and (D). You are to select ONLY ONE correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose ONLY ONE response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
8. In the Answer Sheet there are **four** circles Ⓐ, Ⓑ, Ⓒ and Ⓓ against each question. To answer the questions you are to mark with Blue or Black ink Ball point pen ONLY ONE circle of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. *e.g.* If for any item, Ⓑ is the correct answer, you have to mark as follows :

Ⓐ ● Ⓒ Ⓓ

9. You should not remove or tear off any sheet from this Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the time of examination. After the examination is concluded, you must hand over your Answer Sheet to the Invigilator. You are allowed to take the Question Booklet with you only after the Examination is over.
10. **Do not make any marking in the question booklet except in the sheet before the last page of the question booklet, which can be used for rough work. This should be strictly adhered.**
11. Applicants have to write and shade the total number of answer fields left blank on the boxes provided at side 2 of OMR Answer Sheet. An extra time of 5 minutes will be given to specify the number of answer fields left blank.
12. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.

△

SPACE FOR ROUGH WORK

1. If A, B, C are any three events then the theoretical expression for both 'A and B' but not 'C' occurs is

(A) $A \cap \overline{B} \cap \overline{C}$ (B) $A \cup B \cap C$

(C) $A \cap B \cap \overline{C}$ (D) $A \cap B \cup \overline{C}$

2. The definition of empirical probability was originally given by

(A) Pascal (B) Von-Mises

(C) Feller (D) De Moivre

3. A letter of the English alphabet is chosen at random. The probability that the letter so chosen follows the letter m and is a vowel is

(A) 3/26 (B) 5/26

(C) 2/26 (D) 4/26

4. With usual notations, if $P(A \cup B) = 0.7$, $P(A \cap B) = .4$ and $P(A/B) = 2/3$, then $P(\overline{B}) =$

(A) 2/5 (B) 3/5

(C) 4/5 (D) 1/5

5. If $B \subset A$, then $P(A) - P(B) =$

(A) $P(A \cap B)$ (B) $P(A \cup B)$

(C) $P(A \cap \overline{B})$ (D) $P(\overline{A} \cap B)$

6. Let A_1 and A_2 be events in a sample S such that $P(A) = \frac{1}{2} = P(B)$ and $P(A^c \cap B^c) = \frac{1}{3}$. Then $P(A \cup B^c) =$

(A) 5/6 (B) 3/4

(C) 1/3 (D) 2/3

7. If in 8 : 5 against the wife who is 40 years old living till she in 70 and 4 : 3 against her husband now 50 living till he in 80. Which of the following is the probability that at least one will be alive?

(A) 20/91 (B) 24/91

(C) 59/91 (D) 15/91

8. If $P(x)=\begin{cases}\frac{x}{15}, & x=1,2,3,4,5\\ 0, & \text{otherwise}\end{cases}$ then $P\left\{\frac{1}{2}<X<\frac{5}{2}\middle| X>1\right\}=$

(A) $P\left\{\frac{1}{2}<X<\frac{5}{2}\middle|X>1\right\}=\frac{1}{7}$ (B) $P\left\{\frac{1}{2}<X<\frac{5}{2}\middle|X>1\right\}=\frac{2}{7}$

(C) $P\left\{\frac{1}{2}<X<\frac{5}{2}\middle|X>1\right\}=\frac{3}{7}$ (D) $P\left\{\frac{1}{2}<X<\frac{5}{2}\middle|X>1\right\}=\frac{4}{7}$

9. If $X_1, X_2,\ldots$ are i.i.d $B(r,p)$ and $S_n=X_1+X_2+\ldots+X_n$, then $E(S_n)=nrp$, $V(S_n)=nrpq$. Then the distribution of $\frac{S_n-E(S_n)}{\sqrt{V(S_n)}}$ is

(A) $N(\mu,\sigma)$ (B) $N(\mu,\sigma^2)$

(C) $N(0,\sigma^2)$ (D) $N(0,1)$

10. For any real constants a and b with $a\le b$ and $F(x)$ the probability distribution function of random variable X, the following is true

(A) $P(a\le X\le b)=F(b)-F(a)$ (B) $P(a\le X\le b)=F(a)-F(b)$

(C) $P(a\le X\le b)=F(a)$ (D) $P(a\le X\le b)=F(b)$

11. Let $A_1, A_2,\ldots$ be independent events on (S, B, P) and $A=\overline{\lim} A_n$. If $\sum_{n=1}^{\infty}P(A_n)=\infty$. Then

(A) $P(A)=0$ (B) $P(A)=1$

(C) $P(A)=-1$ (D) $P(A)=\infty$

12. Let X and Y have joint probability density function $f(x,y)=2$, $0<x<y<1$. The conditional mean of X given Y is

(A) $\frac{y^2}{2}$ (B) $\frac{y^3}{2}$

(C) $\frac{y}{2}$ (D) $\frac{1}{2}$

13. The recurrence relation for cumulants of binomial distribution is

(A) $K_{r+1} = pq\frac{dK_r}{dp}$ (B) $K_{r+1} = pq\frac{d^2K_r}{dp^2}$

(C) $K_{r+1} = pq\frac{dK_r}{dq}$ (D) $K_{r+1} = pq\frac{d^2K_r}{dq^2}$

14. If X follows a binomial distribution with parameters $n=8$ and $P=\frac{1}{2}$ then $P(|X-4|\leq 2) =$

(A) $\frac{119}{128}$ (B) $\frac{118}{128}$

(C) $\frac{117}{128}$ (D) $\frac{116}{128}$

15. If $X \sim B\left(16, \frac{1}{4}\right)$, then its value of mode is

(A) 8 (B) 6

(C) 4 (D) 2

16. If X and Y are independent Poisson variates such that $P(X=1)=P(X=2)$ and $P(Y=2)=P(Y=3)$. The variance of $(X-2Y)$ is

(A) 11 (B) 12

(C) 13 (D) 14

17. If $X \sim B\left(3, \frac{1}{3}\right)$ and $Y \sim B\left(5, \frac{1}{3}\right)$, then the MGF of the random variable $Z=X+Y$ is

(A) $M_z(t)=\left(\frac{2}{3}+\frac{1}{3}e^t\right)^3$ (B) $M_z(t)=\left(\frac{2}{3}+\frac{1}{3}e^t\right)^5$

(C) $M_z(t)=\left(\frac{2}{3}+\frac{1}{2}e^t\right)^8$ (D) $M_z(t)=\left(\frac{2}{3}+\frac{1}{3}e^t\right)^8$

18. For Binomial distribution $n=10$ and $p=0.6$, $E(X^2)$ is

(A) 30 (B) 38

(C) 8 (D) 38.4

19. The MGF of the random variable with the probability law $p(X=x)=q^{x-1}p$; $x=1,2,3...$ is

(A) $M_X(t)=\frac{pe^t}{1-q^{et}}$ (B) $M_X(t)=\frac{qe^t}{1-p^{et}}$

(C) $M_X(t)=\frac{p}{(1-q)^{et}}$ (D) $M_X(t)=\frac{e^t}{1-q^{et}}$

20. If a beta variate $X \sim B_1(m, n)$ where $m=1$ and $n>1$ the mode lies at the point

(A) $X=1$ (B) $X=0$

(C) $X=0.5$ (D) Both (A) and (B)

21. If $X \sim N(5, 1)$, the probability density function for the normal variate 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) $\frac{1}{\sqrt{2\pi}}e^{-\frac{1}{2}(X-5)^2}$

22. If X has a Uniform distribution in $(0, 1)$, the distribution of $(\text{pdf})-2\log X$ is

(A) $-\frac{1}{2}e^{-\frac{y}{2}}, 0<y<\infty$ (B) $\frac{1}{2}e^{-\frac{y}{2}}, 0<y<\infty$

(C) $-\frac{1}{2}e^{\frac{y}{2}}, 0<y<\infty$ (D) $\frac{1}{2}e^{\frac{y}{2}}, 0<y<\infty$

23. If $X \sim \chi^2_{(2)}$, then its skewness and kurtosis is

(A) $\beta_1=8, \beta_2=15$ (B) $\beta_1=4, \beta_2=9$

(C) $\beta_1=2, \beta_2=6$ (D) $\beta_1=3, \beta_2=12$

24. The Joint probability density function of two-dimensional random variable (X, Y) is given by $f(x, y) = \begin{cases} 2, & 0 < x < 1, \quad 0 < y < x \\ 0, & \text{otherwise} \end{cases}$ then the marginal density of X is

(A) $f_X(x) = 2x,\ 0 < x < y$

(B) $f_X(x) = 2x,\ 0 < x < \infty$

(C) $f_X(x) = 2x,\ 0 < x < 1$

(D) $f_X(x) = 2x,\ 0 < y < x$

25. The Skewness (β_1) and Kurtosis (β_2) of Normal distribution are

(A) $\beta_1 = 3$ and $\beta_2 = 0$

(B) $\beta_1 = 0$ and $\beta_2 = -3$

(C) $\beta_1 = 0$ and $\beta_2 = 3$

(D) $\beta_1 = -3$ and $\beta_2 = 0$

26. The Mean and Variance of geometric distribution are

(A) $\frac{p}{q}$ and $\frac{p^2}{q}$

(B) $\frac{q}{p}$ and $\frac{q}{p^2}$

(C) $\frac{q}{p}$ and $\frac{q}{p}$

(D) $\frac{p}{q}$ and $\frac{p}{q}$

27. In 256 sets of twelve tosses of a fair coin, in how many cases may one expect eight heads and Four tails?

(A) 25

(B) 29

(C) 21

(D) 31

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

(A) Normal distribution

(B) Negative Binomial distribution

(C) Cauchy distribution

(D) Polya's distribution

29. Which of the following is a symmetrical distribution?

(A) t

(B) F

(C) χ^2

(D) Beta

30. Let $x_1, x_2, \ldots x_n$ be a random sample of n observations from Poisson population with parameter λ. The minimum variance bound estimator of λ is

(A) $\sum_{i=1}^{n} x_i$ (B) $\sum_{i=1}^{n} x^2{}_i$

(C) $\bar{x}$ (D) $\frac{1}{\bar{x}}$

31. If T_1 is the most efficient estimators with variance V_1 and T_2 is any other estimator with variance V_2 then the efficiency of T_2 is given by

(A) $\frac{V_2}{V_1}$ (B) $\frac{V_1}{V_2}$

(C) $V_2 - V_1$ (D) $V_1 - V_2$

32. An estimator is said to be sufficient for a parameter, if

(A) it contains parameters

(B) the mathematical expectation of the estimator is equal to the parameter

(C) the variance of the estimator is less

(D) it contains all the information in the sample regarding the parameters

33. Let $x_1, x_2, \ldots, x_n$ be a random sample from a Bernoulli population $p^x(1-p)^{n-x}$. A sufficient statistics for p is

(A) $\sum_{i=1}^{n} x_i$ (B) $\prod_{i=1}^{n} x_i$

(C) Max $(x_1, x_2 \ldots x_n)$ (D) Min $(x_1, x_2 \ldots x_n)$

34. Let $x_1, x_2 \ldots x_n$ be a random sample from a population with p.d.f. $f(x, \theta) = \theta x^{\theta-1}$, $0 < x < 1$, $\theta > 0$. The sufficient estimator for θ is

(A) $\sum x_i$ (B) $\frac{\sum x_i}{n}$

(C) $\prod_{i=1}^{n} x_i$ (D) $\frac{\prod_{i=1}^{n} x_i}{n}$

35. A uniformly most powerful test among the class of unbiased test is termed as:

(A) Minimax test

(B) Minimax unbiased test

(C) Uniformly most powerful unbiased test

(D) Optimum biased test

36. The concept of asymptotic relative efficiency was given by

(A) Jean Gibbons

(B) E.J.G. Pitman

(C) A.M. Mood

(D) F. Wilcoxon

37. $H_0 : \mu = \mu_0$ is an example for

(A) Simple Hypothesis

(B) Composite Hypothesis

(C) Alternate Hypothesis

(D) Direct Hypothesis

38. Level of significance is the probability of

(A) Type I error

(B) Type II error

(C) Not committing error

(D) Any of (B) and (C)

39. In 1933, the theory of testing of Hypothesis was propounded by

(A) R.A. Fisher

(B) J. Neymann

(C) E.L. Lehman

(D) Karl Pearson

40. Ordinary sign test utilises

(A) Poisson distribution

(B) Binomial distribution

(C) Gamma distribution

(D) Weibull distribution

41. The other name of emprical distribution function is

(A) Parent distribution function

(B) Pareto distribution function

(C) Sample distribution function

(D) Continuous distribution function

42. Let p be the probability that a coin will fall head in a single toss in order to test $H_0 : p = \frac{1}{2}$ Vs $H_1 : p = \frac{3}{4}$. The coin is tossed 5 times and H_0 is rejected if more than 3 heads are obtained. Then the probability of type I error is

(A) $\frac{3}{16}$ (B) $\frac{5}{16}$

(C) $\frac{1}{4}$ (D) $\frac{6}{16}$

43. If $x \geq 1$ is the critical region for testing $H_0 : \theta = 2\sqrt{S}\ \theta = 1$, on the basis of the single observation from the population, $f(x, \alpha) = \theta\, e^{-\theta x} (0 \leq x < \alpha)$. The value of α is

(A) $\frac{1}{e}$ (B) e^2

(C) $\frac{1}{e^2}$ (D) e

44. The value of the power function at a parameter point is called the ———— at that point.

(A) Size of the test (B) Power efficiency

(C) Type II error (D) Power of the test

45. The Neyman-Pearson lemma provides the best critical region for testing ———— null hypothesis against ———— alternative hypothesis.

(A) simple, simple (B) simple, composite

(C) composite, composite (D) composite, simple

46. The relation between correlation co-efficient and regression co-efficients is

(A) $r = \frac{b_{xy} + b_{yx}}{2}$ (B) $r = \frac{1 + b_{yx}}{b_{xy}}$

(C) $r = \pm\sqrt{b_{xy} + b_{yx}}$ (D) $r = \pm\sqrt{b_{xy} \times b_{yx}}$

47. If the two lines of regression are coincident, the relation between the two regression co-efficient is

(A) $\beta_{YX} = \beta_{XY}$

(B) $\beta_{YX} \cdot \beta_{XY} = 1$

(C) $\beta_{YX} \leq \beta_{XY}$

(D) $\beta_{YX} = -\beta_{XY}$

48. The assumption that the variable of the residuals about the predicted dependent variable scores should be the same for all predicted scores reflects which assumption?

(A) singularity

(B) homoscedasticity

(C) multicollinearity

(D) homogeneity

49. Given the following data

$\overline{X} = 7.6, \overline{Y} = 14.8, \sigma_x = 3.6, \sigma_y = 2.5$ and $r = 0.99$ the expected value of Y when $X = 12$ is

(A) 17.22

(B) 18.22

(C) 17.79

(D) 18.79

50. The arithmetic mean of two regression co-efficients of a regression line is 0.7 and correlation co-efficient is 0.75. Are the results :

(A) valid

(B) invalid

(C) inconclusive

(D) conclusive

51. The residual variances of X and Y are zero (ie, $S_x^2 = S_y^2 = 0$) then the value of the correlation coefficient 'r' is

(A) 0

(B) -1

(C) $+1$

(D) ± 1

52. If $\overline{X} = 5, \overline{Y} = 4, b_{yx} = 0.8, b_{xy} = 0.55$ and $r = \frac{2}{3}$, then the regression equation of Y on X is

(A) $y = 0.23x + 1.05$

(B) $y = -0.65x + 63.96$

(C) $y = 0.8x$

(D) $y = 0.6x$

53. The ratio estimate of Y, the population total of y_i, is

(A) $\hat{Y}_R = \overline{y} \cdot \overline{x} \cdot X$

(B) $\hat{Y}_R = \frac{\overline{x}}{\overline{y}} \cdot X$

(C) $\hat{Y}_R = \frac{\overline{y}}{\overline{x}} \cdot X$

(D) $\hat{Y}_R = (\overline{y} - \overline{x}) \cdot X$

54. The ratio estimate $\hat{Y}_R$ has a smaller variance than the estimate $\hat{Y} = N\overline{y}$ if

(A) $\rho < \frac{1}{2}\left(\frac{S_x}{\overline{X}}\right) \Big/ \left(\frac{S_y}{\overline{Y}}\right)$

(B) $\rho > \frac{1}{2}\left(\frac{S_x}{\overline{X}}\right) \Big/ \left(\frac{S_y}{\overline{Y}}\right)$

(C) $\rho = \frac{1}{2}\left(\frac{S_x}{\overline{X}}\right) \times \left(\frac{S_y}{\overline{Y}}\right)$

(D) $\rho = \frac{1}{2}\left(\frac{S_x}{\overline{X}}\right) \Big/ \left(\frac{S_y}{\overline{Y}}\right)$

55. 'MOS&PI stands for

(A) Ministry of Statistics and Planning Implementation

(B) Ministry of Sociology and Planning Implementation

(C) Ministry of Statistics and Programme Implementation

(D) Ministry of Scientific and Planning Implementation

56. What sampling design is most appropriate for cluster sampling?

(A) simple random sampling without replacement

(B) simple random sampling with replacement

(C) stratified random sampling

(D) quota sampling

57. Systematic sampling means

(A) Selecting of n units contiguous units

(B) Selection of n units situated at equal distances

(C) Selection of n largest units

(D) Selection of n middle units in a sequence

58. If interaction AB is confounded in a 2^3 factorial experiment, the entries of two blocks in a replicate will be

(A) Bl. 1:b, ac, bc, a
Bl.2:(1), ab, c, abc

(B) Bl. 1:(1), ab, a, b
Bl. 2:abc, c, bc, ac

(C) Bl.1:(1), ab, ac, bc
Bl.2:abc, a, b, c

(D) Bl. 1: abc, bc, ac, c
Bl. 2:ab, a, b, (1)

59. The most powerful test consists in minimising ———— or maximising ———— for fixed ————.

(A) type II error β, power $1-\beta$, α

(B) type I error α, $1-\alpha$, β

(C) type II error β, $1-\alpha$, β

(D) type II error β, α, β

60. In LSD, $\text{var}(\hat{\alpha}_i) =$

(A) $\left(\frac{M-1}{M^2}\right)\sigma_e^2$ (B) $\frac{(M-1)}{M}\sigma_e^2$

(C) $\frac{M}{(m-1)}\cdot\sigma_e^2$ (D) $\left(\frac{M^2}{M-1}\right)\sigma_e^2$

61. Which of the following is the expectation of blocks mean sum of squares in RBD?

(A) $\sigma_e^2/t-1$ (B) σ_e^2+t

(C) σ_e^2+r (D) $\sigma_e^2+t.\sigma_b^2$

62. The treatments are applied at random to relatively homogeneous units with in each strata or block. Then the design is a

(A) Completely Randomised Design

(B) Randomised Block Design

(C) Latin Square Design

(D) Youden Square Design

63. A BIBD is said to be symmetric if

(A) $b = v$ and $r = k$ (B) $b = v$ and $r \neq k$

(C) $b \neq v$ and $r = k$ (D) $b \neq v$ and $r \neq k$

64. Error sum of squares in RBD as compared to CRD using the same material is

(A) More (B) Less

(C) Equal (D) Not-comparable

65. If k effects are confounded in a 2^n factorial to have 2^k blocks of size 2^{n-k} units, the number of automatically confounded effect is

(A) $2^k - k$ (B) $k^2 - k - 1$

(C) $2^k - k - 1$ (D) 2^{k-1}

66. The pairwise contrasts among the three treatment is

(A) $2T_1 + T_2 - 3T_3$ (B) $T_1 + T_2 - 2T_3$

(C) $T_3 - T_1$ (D) $T_1 + T_3 - 2T_2$

67. For any three events A, B and C $P(A \cup B/C)$ is equal to

(A) $P(A/C) + P(B/C) - P(A \cap B/C)$

(B) $P(A/C) + P(B/C) + P(A \cap B/C)$

(C) $P(A/C) - P(B/C) - P(A \cap B/C)$

(D) $P(A/C) - P(B/C) + P(A \cap B/C)$

68. The degrees of freedom for F–ratio in a 6 × 6 Latin square design is

(A) (5, 15) (B) (5, 20)

(C) (6, 15) (D) (6, 20)

69. Suppose the price of a commodity is Rs.20 in 2010 and Rs.30 in 2015. From 2010 to 2015, the price of commodity is increased by

(A) 50%
(B) 66.7%
(C) 100%
(D) 60%

70. Basically, sampling inspection plan provides

(A) adequate protection to producer and consumer very economically
(B) adequate protection to producer only
(C) adequate protection to consumer only
(D) adequate protection to consumer and no protection to consumer

71. An appropriate control chart for number of defectives is

(A) p – chart
(B) u – chart
(C) c – chart
(D) d – chart

72. $3-\sigma$ trial control limits with p' as mean number of defectives based on a sample of size n are

(A) $UCL = n\overline{p} + \sqrt{n\overline{p}(1-\overline{p})}$; $CL = \overline{p}$ and $LCL = n\overline{p} - \sqrt{n\overline{p}(1-\overline{p})}$
(B) $UCL = n\overline{p} + 3\sqrt{n\overline{p}(1-\overline{p})}$; $CL = n\overline{p}$ and $LCL = n\overline{p} - 3\sqrt{n\overline{p}(1-\overline{p})}$
(C) $UCL = \overline{p} + 3\sqrt{n\overline{p}(1-\overline{p})}$; $CL = \overline{p}$ and $LCL = \overline{p} - 3\sqrt{n\overline{p}(1-\overline{p})}$
(D) $UCL = n\overline{p} + \frac{1}{3}\sqrt{n\overline{p}(1-\overline{p})}$; $CL = \overline{p}$ and $LCL = n\overline{p} - \frac{1}{3}\sqrt{n\overline{p}(1-\overline{p})}$

73. If μ and σ are the process mean and standard deviation, then the control limits $\mu \pm 3\sigma$ are known as

(A) modified control limits
(B) natural control limits
(C) specified control limits
(D) unspecified control limits

74. The formula for calculating cost of living index by family budget method is

(A) $\frac{\sum PV}{\sum V} \times 100$

(B) $\frac{\sum p_1 q_0}{\sum p_0 q_0} \times 100$

(C) $\frac{\sum PV}{\sum V}$

(D) $\frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$

75. The forces like floods, earthquakes, famines are classified under the components

(A) Trend

(B) Seasonal variations

(C) Irregular variations

(D) Cyclical variations

76. Moving average method of fitting trend in a time series data removes the effect of

(A) long – term movements

(B) short – term movements

(C) cyclical variation

(D) irregular variation

77. The geometric mean of Laspyre's and Paasche's price indices is also known as

(A) Fisher's Price Index

(B) Marshall – Edgeworth Price Index

(C) Dorbish – Bowley's Price Index

(D) Kelley's Price Index

78. In economics and business the index numbers are classified into ———— types.

(A) Two

(B) Three

(C) Four

(D) Five

79. Quarterly fluctuations observed in a time series represent ———— variation.

(A) cyclic

(B) irregular

(C) seasonal

(D) trend

80. What type of index number can help the government to formulate its price policies and to take appropriate economic measures to control prices

(A) Whole sale price index

(B) Quantity index

(C) Price index

(D) Consumer price index

81. The method used for measuring seasonal variations are

(A) Method of moving averages

(B) Method of semi averages

(C) Ratio-to moving average method

(D) Method of least square

82. Among the following various methods which method is suitable for measuring trend values

(A) Free hand method

(B) Moving average method

(C) Simple average method

(D) Both (A) and (B)

83. Number of periods included in a group for moving averages depend on ———— in a time series data

(A) Period of oscillation

(B) Seasonal fluctuations

(C) Cyclic fluctuations

(D) Curvilinear trend

84. Adjustments practices while editing the time series data for analysis in

(A) Quality variation

(B) Price variation

(C) Locality variation

(D) Quality, price, and locality

85. Geometric mean gives ———— weight to equal ratio of changes

(A) Random

(B) Proportional

(C) Equal

(D) Unequal

86. The condition for the factor reversal test to be satisfied with usual notation is

(A) $P_{01} \times P_{10} = 1$

(B) $P_{01} \times Q_{01} = 1$

(C) $P_{01} \times Q_{01} = \frac{\Sigma p_1 q_1}{\Sigma p_0 q_0}$

(D) $P_{01} \times Q_{01} = \frac{\Sigma p_1 q_1}{\Sigma p_0 q_1}$

87. What function is used to test the missing observation in data frame?

(A) Missing.na( )

(B) na.missing( )

(C) is.nan( )

(D) is.na( )

88. ———— text editor provides more general support mechanisms via ESS for working interactively with '*R*'

(A) Shell
(B) EAC
(C) E macs
(D) Util states

89. What would the following code print?

> *X* < – C ("*a*,", "*b*", "*c*")

> as. logical (*X*)

(A) NA NA NA
(B) W X Y Z
(C) a b c
(D) 1 2 3

90. Attributes of an object (if any) can be accused using the ———— function

(A) attributes( )
(B) obj:attributes( )
(C) attributes.obj( )
(D) obj.stats( )

91. Which of the following will start the R program?

(A) $ R
(B) R
(C) * R
(D) @ R

92. Given the parabolic trend equation in $Y = 25 + 10X + 3X^2$ based on year to year data and 1980 as origin, the equation of the parabola with 1984 as origin will be

(A) $\hat{Y} = 113 + 34X + 3X^2$
(B) $\hat{Y} = 115 + 20X + 2X^2$
(C) $\hat{Y} = 112 + 15X + X^2$
(D) $\hat{Y} = 30 + 10X + 4X^2$

93. The primary '*R*' system is available from the

(A) CRAN
(B) GRWO
(C) GNU
(D) ASCII

94. R supports ———— with function.

(A) procedural programming
(B) object-oriented programming
(C) interpreted language programming
(D) assembly programming

95. Which is the feature of inserting cells by dragging numbers in MS Excel?

(A) Auto fill (B) Auto count

(C) Auto cell (D) Auto text

96. Let the regression equations of Y on X and X on Y are $Y = \alpha X + \beta$ and $X = \theta Y + \delta$ respectively. Then the ratio of the variances of X and Y is

(A) θ / α (B) $\sqrt{\theta / \alpha}$

(C) $\sqrt{\alpha / \theta}$ (D) α / θ

97. For Cauchy population

(A) The sample mean is an unbiased and consistent estimator of the population mean

(B) The sample mean is biased and consistent estimator of the population mean

(C) The sample median is an unbiased and consistent estimator of the population mean

(D) The median is unbiased and not consistent estimator of the population mean

98. Let t_n be an estimator based on a sample $x_1, x_2, ..x_n$ of the parameter θ. Then t_n is a consistent estimator of θ if

(A) $P(t_n - \theta > \theta) = 0 \; \forall \varepsilon > 0$ (B) $P(|t_n - \theta| < \epsilon) = 0$

(C) $\lim_{n \to \infty} P[|\, t_n - \theta| > \epsilon] = 0 \forall \varepsilon > 0$ (D) $\lim_{n \to \infty} P[t_n - \theta > \epsilon] = 0 \; \forall \varepsilon > 0$

99. In Cramer-Rao inequality, the information limit to the variance of the estimator t is given by

(A) $1 / E\left(\frac{\partial \log L}{\partial \theta}\right)$ (B) $1 / E\left(\frac{\partial \log L}{\partial \theta}\right)^2$

(C) $E\left(\frac{\partial \log L}{\partial \theta}\right)$ (D) $E\left(\frac{\partial^2 \log L}{\partial \theta}\right)$

100. For a log normal distribution the r^{th} moment about origin is

(A) $\exp\left(\mu + \frac{r^2 \sigma^2}{2}\right)$ (B) $\exp\left(\mu r + \frac{r^2 \sigma^2}{2}\right)$

(C) $\exp\left(\mu r^2 + \frac{r^2 \sigma^2}{2}\right)$ (D) $\exp\left(\mu^2 r^2 + \frac{r^2 \sigma^2}{2}\right)$

101. If $A \subset B$, the probability, $P(A/B)$ is equal to

(A) Zero
(B) One
(C) $P(B)/P(A)$
(D) $P(A)/P(B)$

102. If an event B has occurred and it is known that $P(B)=1$, the conditional probability $P(A/B)$ is equal to

(A) $P(A)$
(B) $P(B)$
(C) One
(D) Zero

103. From a pack of 52 cards four cards are drawn at random, which of the following is the probability that two black and two red are drawn

(A) $\frac{52C_2 \times 52C_2}{52C_4}$
(B) $\frac{26C_2 \times 26C_2}{52C_4}$
(C) $\frac{26C_4}{52C_4}$
(D) $\frac{13C_2 \times 26C_2}{52C_4}$

104. If four cards are drawn at random from a pack of 52 cards, then the chance of getting two kings and two queens is

(A) $\frac{4C_2 + 4C_2}{52C_4}$
(B) $\frac{4C_2 \times 4C_2}{52C_4}$
(C) $\frac{13C_2 \times 13C_2}{52C_4}$
(D) $\frac{13C_4}{52C_4}$

105. Flip a coin and then independently cast a die. What is the probability of observing heads on the coin and a 2 or 3 on a die?

(A) 1/3
(B) 2/3
(C) 1/4
(D) 1/6

106. If X and Y two independent variables and their expected values are $\overline{X}$ and $\overline{Y}$ respectively, then which of the following is true

(A) $E\{(X-\overline{X})(Y-\overline{Y})\}=0$
(B) $E\{(X-\overline{X})(Y-\overline{Y})\}=1$
(C) $E\{(X-\overline{X})(Y-\overline{Y})\}=-1$
(D) $E\{(X-\overline{X})(Y-\overline{Y})\}=C$ (Constant)

107. With usual notations, if $P(A \cup B) = 7/10$ $P(A \cap B) = 2/5$ and $P(A/B) = 2/3$, then $P(A) =$

(A) $P(A) = 0.65$ (B) $P(A) = 0.55$

(C) $P(A) = 0.50$ (D) $P(A) = 0.60$

108. One ticket is selected at random from 100 tickets numbered from 0, 1, 2,....99. If X and Y denote the sum and product of the digit, on the tickets then $P(X = 9/Y = 0) =$

(A) 3/19 (B) 2/19

(C) 4/19 (D) 5/19

109. If A and B are two independent events such that $P(A) = \frac{1}{2}$ and $P(B) = \frac{1}{5}$ then $P(A/A \cup B) =$

(A) 5/6 (B) 3/5

(C) 1/2 (D) 0

110. A two-dimensional random variable (X, Y) have a bivariate distribution given by

$P(X = x; Y = y) = \frac{x^2 + y}{32}$; $x = 0, 1, 2, 3$; $y = 0, 1$ then the sum of their marginal distributions of X is

(A) 1/32 (B) 9/32

(C) 3/32 (D) 1

111. If the probability density function of the random variable X is

$$f(x) = \begin{cases} (1-p)^{x-1}, p & \text{if } x = 1, 2, \ldots\ldots \infty \\ 0, & \text{otherwise} \end{cases}$$

The expected value of X is

(A) p (B) $\frac{1}{p}$

(C) q (D) $\frac{1}{q}$

112. If $Var(X+Y)=3$, $Var(X-Y)=1$ $E(X)=1$ and $E(Y)=2$, then the value of $E(XY)$ is

(A) $\frac{5}{2}$ (B) $\frac{1}{2}$

(C) $\frac{3}{2}$ (D) 1

113. If $f(x)=\frac{1}{\pi}\cdot\frac{1}{1+x^2}$, $-\infty<x<\infty$ then $E(X)=$

(A) $E(X)=\pi$ (B) $E(X)=\frac{1}{1+x^2}$

(C) $E(X)=1$ (D) $E(X)$ does not exist

114. Given $E(X+C)=8$ and $E(X-C)=12$, then the value of C is

(A) -2 (B) 4

(C) -4 (D) 2

115. Let 'X' be a random variable with the following probability distribution

x	-3	6	9
$P(X=x)$	1/6	1/2	1/3

Then the value of $E(X^2)$ is

(A) $\frac{93}{2}$ (B) $\frac{11}{2}$

(C) $\frac{25}{2}$ (D) $\frac{90}{2}$

116. The probability distribution of two random variable X and Y is given by

$P(X=0,Y=1)=\frac{1}{3}$, $P(X=1,Y=1)=\frac{1}{3}$, $P(X=1,Y=-1)=\frac{1}{3}$. Then the conditional probability of $P(X=1/Y=1)$

(A) $\frac{1}{4}$ (B) 0

(C) $\frac{1}{3}$ (D) $\frac{1}{2}$

117. The skewness in a binomial distribution will be zero if

(A) $p<\frac{1}{2}$ (B) $p=\frac{1}{2}$

(C) $p>\frac{1}{2}$ (D) $p<q$

118. For $n>4$ and $n<30$, the t-distribution curve with regard to peakedness is

(A) Mesokurtic (B) Platykurtic

(C) Leptokurtic (D) Bimodal

119. If $X_1 \sim X^2_{(n_1)}$ and $X_2 \sim X^2_{(n_2)}$ then the pdf of $Z=(X_1/X_2)$ is (Assume X_1 and X_2 are independent)

(A) $\beta_1\left(\frac{n_1}{2}, \frac{n_2}{2}\right)$ (B) $\beta_1(n_1, n_2)$

(C) $\beta_2\left(\frac{n_1}{2}, \frac{n_2}{2}\right)$ (D) $\beta_2(n_1, n_2)$

120. The characteristics function of Cauchy distribution is

(A) $\varphi_X(t)=e^{-|t|}$ (B) $\varphi_X(t)=-e^{-|t|}$

(C) $\varphi_X(t)=e^{-it}$ (D) $\varphi_X(t)=e^{it}$

121. Let $g(X)$ be non-negative function of a random variable X. Then for every $K>0$

(A) $P[g(X)=K]=\frac{E[g(X)]}{K}$ (B) $P[g(X)\geq K]\geq\frac{E[g(X)]}{K}$

(C) $P[g(X)\leq K]\leq\frac{E[g(X)]}{K}$ (D) $P[g(X)\geq K]\leq\frac{E[g(X)]}{K}$

122. If the moments of variate X are defined by $E(X^2)=0.6$, $r=1, 2, 3,....$ The value of $P(X=0)$ is

(A) 0.2 (B) 0.3

(C) 0.4 (D) 0.6

123. The Moment Generating function of a rectangular distribution with parameters 'a' and 'b' is

(A) $M_X(t) = \dfrac{e^{bt} - e^{at}}{t(b-a)}, \; t \neq 0$

(B) $M_X(t) = \dfrac{e^{at} - e^{bt}}{(b-a)}, \; b \neq a$

(C) $M_X(t) = \dfrac{e^{at} - e^{bt}}{(a-b)}, \; a \neq b$

(D) $M_X(t) = \dfrac{e^{-at} + e^{-bt}}{t(b-a)}, \; t \neq 0$

124. The probability that the fifth head is observed on the 10^{th} independent flip of a coin is:

(A) $\dfrac{33}{512}$

(B) $\dfrac{43}{512}$

(C) $\dfrac{53}{512}$

(D) $\dfrac{63}{512}$

125. The Moment generating function of the random variable X whose pdf is given by $f(x) = \begin{cases} e^{-x}, & x > 0 \\ 0, & \text{otherwise} \end{cases}$. The $M(X)$ is

(A) $(1-t)^{-1}$

(B) $(1-t)^{-2}$

(C) $(1-t)$

(D) $(1-t)^2$

126. A rv X has a Poisson distribution with a Mean of 3. The probability that X is bounded by 1 and 3 is, $p(1 \leq X \leq 3)$ is

(A) $12e^3$

(B) $12e^{-3}$

(C) e^3

(D) e^{-3}

127. If $X \sim B(5, p)$ and If $p(X = 1) = 0.4096$ and $p(X = 2) = 0.2048$ then the value of 'p' is

(A) $\dfrac{2}{5}$

(B) $\dfrac{3}{5}$

(C) $\dfrac{4}{5}$

(D) $\dfrac{1}{5}$

128. If $\hat{\theta}$ is the estimator of the parameter θ, then $\hat{\theta}$ is called unbiased if

(A) $E(\hat{\theta}) > \theta$ (B) $E(\hat{\theta}) < \theta$

(C) $E(\hat{\theta}) \neq \theta$ (D) $E(\hat{\theta}) = \theta$

129. Mean squared Error of an estimator T_n of $\tau(\theta)$ is minimum only if

(A) Bias and $Var_\theta(T_n)$ both are zero

(B) Bias is zero and $Var_\theta(T_n)$ is minimum

(C) Bias is minimum and $Var_\theta(T_n)$ is zero

(D) Both bias and variance is minimum

130. If an estimator T_n of a population parameter θ converges in probability to 'θ' as n tends to ∞, then T_n is said to be ———— estimator.

(A) Unbiased (B) Sufficient

(C) Consistent (D) Efficient

131. Let $\{T_n\}$ be a sequence of estimators for all $\theta \in \Theta$. Then T_n is a consistent estimator of $\gamma(\theta)$, iff

(A) $E_\theta(T_n) \to \gamma(\theta)$, $\text{var}_\theta(T_n) \to 0$ as $n \to \infty$

(B) $E_\theta(T_n) \to \gamma(\theta)$ as $n \to \infty$

(C) $\text{var}_\theta[T_n] \to 1$ as $n \to \infty$

(D) $\text{var}_\theta[T_n] \to E_\theta(T_n)$ as $n \to \infty$

132. Identify the name of the theorem stated below $V_{\theta_0}(T) \geq \sup_h \left[\frac{\{\varphi(\theta_0 + h) - \varphi(\theta_0)\}^2}{E_{\theta_0}\left[\left\{\frac{p_{\theta_0 + h}(X)}{p_{\theta_0}(X)} - 1\right\}\right]^2} \right]$.

(A) Cramer Rao Inequality

(B) Lehman – Scheffe theorem

(C) Rao – Blackwell theorem

(D) Chapman – Robbins Inequality

133. Suppose that there are 500 Accounts in a population, a sample 50 of them gives a sample total as 5000. What would be your estimate for the population total?

(A) 50,000 (B) 5,000

(C) 2,50,000 (D) 5,00,000

134. For a random sample from a Poisson population $P(\lambda)$, the maximum likelihood estimate of λ is

(A) Median (B) Mode

(C) Geometric Mean (D) Mean

135. The method of minimum variance approach is based on

(A) Unbiasedness and Minimum variance

(B) Unbiasedness and Consistency

(C) Consistency and Minimum variance

(D) Consistency and Sufficiency

136. Mean square error of estimator obtained by the method of minimum Chi-square is

(A) Less than ML Estimator

(B) Equal to ML Estimators

(C) More than ML Estimators

(D) More than or equal to ML Estimators

137. A random sample of 16 male students has an average body weight of 52 kg and a S.D. of 3.6 kg. The 99% central confidence limits for body weight is _____. Given: $(t_{15,0.01}) = 2.951$

(A) (54.66; 49.345) (B) (52.66; 51.34)

(C) (55.28; 48.72) (D) (56.72; 50.45)

138. The hypothesis is true but the test rejects if means

(A) Correct decision (B) Type I error

(C) Type II error (D) Wrong decision

139. ———— provides a most powerful test of simple null hypothesis against a simple alternative hypothesis

(A) Likelihood Ratio test

(B) Chapman Robbins Inequality

(C) Neymann Pearson lemma

(D) Factorization theorem

140. The maximum likelihood estimate is

(A) minimum of α in the parameter space

(B) maximum of α not necessarily in the parameter space

(C) maximum of α in the parameter space

(D) minimum of α not necessarily in the parameter space

141. If L_0 is the likelihood function of the sample observations under H_0 and L_1 is the likelihood function of the sample observations under H_1, the probability of type II error is given by

(A) $\beta = \int_{w} L_1 dx$ (B) $\beta = \int_{\overline{w}} L_1 dx$

(C) $\beta = \int_{\overline{w}} \frac{L_0}{L_1} dx$ (D) $\beta = \int_{w} L_0 dx$

142. To test a hypothesis involving proportions np and $n(1-p)$ should

(A) be atleast 30

(B) be greater than 5

(C) let in the range of 0 to 1

(D) be greater than 50

143. Sign test is related to testing of ———— or ———— of the sample.

(A) mean, mode (B) mode, median

(C) mean, median (D) mean, S.D.

144. Which of these non-parametric tests is equivalent to the paired-t-test in parametric tests?

(A) Sign test (B) Median test

(C) Kruskal Walli's test (D) Run test

145. If each value of X is multiplied by 10 and of Y by 20, b_{xy}, the regression co-efficients by coded values is

(A) same as b_{xy}
(B) half of b_{xy}
(C) four times of b_{xy}
(D) thirty times of b_{xy}

146. The method of least squares finds the best fit line that the error between observed and estimated points on the line are

(A) approaches to infinity
(B) minimize or maximize
(C) minimize
(D) maximize

147. If generated value of tolerance is equals to 1 it is an indication of

(A) low multicollinearity
(B) perfect multicollinearity
(C) no multicollinearity
(D) high multicollinearity

148. Angle between the two lines of regression is given as

(A) $\tan\theta = r\left[\frac{\sigma_x\ \sigma_y}{\sigma_x + \sigma_y}\right]$
(B) $\tan\theta = r^2\left[\frac{\sigma_{x^2}\ \sigma_{y^2}}{\sigma_{x^2} + \sigma_{y^2}}\right]$
(C) $\tan\theta = \frac{1-r^2}{r}\left[\frac{\sigma_x\ \sigma_y}{\sigma_{x^2} + \sigma_{y^2}}\right]$
(D) $\tan\theta = \frac{1}{r}\left[\frac{\sigma_x\ \sigma_y}{\sigma_x + \sigma_y}\right]$

149. If R^2 is zero, that is no multicollinearity, the variance inflation factor (VIF) will be

(A) one
(B) zero
(C) two
(D) three

150. A regression model of the following form was developed $\hat{y} = \beta_0 + \beta_1 X_1 + \beta_2 X_1^2 + \beta_3 X_1^3 + \varepsilon$ Which of the following best describes the form of this period?

(A) 3rd order polynomial model
(B) Tri-slope regression model
(C) 3rd level regression model
(D) Quadratic model

151. For two variables X and Y the equations of the regression lines are $9y - x - 288 = 0$ and $x - 4y + 38 = 0$. The correlation coefficient between X and Y is

(A) $\frac{2}{3}$ (B) $\frac{1}{9}$

(C) $\frac{3}{2}$ (D) $\frac{1}{36}$

152. If the population consists of a linear trend y_i, $i = 1, 2, ..., k$, then

(A) $\text{var}(\bar{y}_{st}) = \text{var}(\bar{y}_{sys}) = \text{var}(\bar{y}_n)_R$

(B) $\text{var}(\bar{y}_{st}) \geq \text{var}(\bar{y}_{sys}) \geq \text{var}(\bar{y}_n)_R$

(C) $\text{var}(\bar{y}_{st}) \leq \text{var}(\bar{y}_{sys}) \leq \text{var}(\bar{y}_n)_R$

(D) $\text{var}(\bar{y}_{sys}) \leq \text{var}(\bar{y}_{st}) \leq \text{var}(\bar{y}_n)_R$

153. A population is perfectly homogenous in respect of a characteristic. What size of sample would you prefer?

(A) single item (B) whole item

(C) a small sample (D) a large sample

154. In systematic sampling, if $N \neq nk$, then the unbiased estimate of $\bar{y}_n$ is

(A) $\hat{y}_N = \frac{N}{K}\sum_{j=1}^{n'} y_{ij}$ (B) $\hat{y}_N = \frac{K}{N}\sum_{j=1}^{n'} y_{ij}$

(C) $\hat{y}_N = \frac{N-1}{K}\sum_{j=1}^{n'} y_{ij}$ (D) $\hat{y}_N = \frac{N}{K-1}\sum_{j=1}^{n'} y_{ij}$

155. ———— used a regression of leaf area on leaf weight to estimate the average area of the leaves on a plant.

(A) Olkin (B) Keyfitz'

(C) Watson (D) Yates

156. Which one problem out of the four is not related to stratified sampling?

(A) fixing the criterion for stratification

(B) fixing the number of strata

(C) fixing the sample size

(D) fixing the points of demarcation between strata

157. In which of the methods the entire population is divided into a number of homogeneous groups

(A) stratified random sampling

(B) simple random sampling

(C) cluster sampling

(D) two stage sampling

158. What can you say about the efficiency of the multistage sampling, compared to single stage sampling?

(A) less efficient

(B) more efficient

(C) equal efficient

(D) no efficient

159. In simple random sampling from a population of 'N' units, the probability of drawing any unit at the first draw is

(A) N

(B) $\frac{1}{\sqrt{N}}$

(C) $\frac{1}{N}$

(D) $N!$

160. The method of confounding is a device to reduce the size of

(A) replications

(B) experiments

(C) blocks

(D) treatments

161. The degrees of freedom for Error in CRD is

(A) $n-1$ (B) $\nu-1$

(C) $n-4$ (D) $n-\nu$

162. A Latin square design controls

(A) two way variation (B) three way variation

(C) multi way variation (D) one way variation

163. If the entries in rows of a Latin square are same as its columns, the Latin square is called

(A) Conjugate (B) Orthogonal

(C) Symmetric (D) Self conjugate

164. Let $\{X_n\}$ be a sequence of random variables and $\mu_1, \mu_2, \ldots \mu_n$ be their respective expectations and $B_n = V\left(\sum_1^n X_i\right) < \infty$ then $P\left\{\left|\overline{X}_n - \overline{\mu}_n\right| < \in\right\} \geq 1-\eta$ for all $n > n_0$ provided.

(A) $\lim_{n\to\infty} \frac{B_n}{n^2} \to$ constant (B) $\lim_{n\to\infty} \frac{B_n}{n^2} \to 0$

(C) $\lim_{n\to\infty} \frac{B_n}{n^2} \to 1$ (D) $\lim_{n\to\infty} \frac{B_n}{n^2} \to \overline{X}_n$

165. Write the sum of squares due to Error for CRD

(A) $S.S.E = \sum_{j=1}^{r_i} (y_{ij})^2 = (\overline{y}_{i.})^2 = SE^2$

(B) $S.S.E = \sum_i \sum_j y_{ij}^{\ 2} = (y_{..})^2$

(C) $S.S.E = \sum_i \sum_j (y_{ij} - \overline{y}_{i.})^2 = SE^2$

(D) $S.S.E = \sum_i \sum_j (\overline{y}_{i.} - \overline{y}_{..})^2 = SE^2$

166. The cubic effect among five treatments can be estimated by the contrast

(A) $-T_1 + 2T_2 - 2T_4 + T_5$ (B) $2T_1 - T_2 - 2T_3 - T_4 + 2T_5$

(C) $-2T_1 + 3T_2 - 3T_3 + 2T_5$ (D) $T_1 - 2T_2 - 2T_4 - T_5$

167. When there is no defective in the lot, the operating characteristic function for $p = 0$ is

(A) $L(0) = 0$ (B) $L(0) = 1$

(C) $L(0) = \infty$ (D) $L(0) = \pm 1$

168. The sum of independent gamma variate is a

(A) Beta variate

(B) Gamma variate

(C) Normal variate

(D) Cauchy variate

169. A sequential sampling plan is

(A) an infinite process

(B) a process in which sampling terminates with probability one

(C) the process requiring much more sampling units than a fixed size sample

(D) a process in which sampling terminates with probability .5

170. A single sampling plan is a lot sentencing procedure in which one sample of _____ units is selected at random from the lot.

(A) $n - 1$ (B) n

(C) N (D) $\frac{n}{N}$

171. When a lot contains all defectives, the OC function for $p = 1$ is

(A) $L(p) = 0$ (B) $L(p) = 1$

(C) $L(p) = \infty$ (D) $L(p) = 0$ to 1

172. In statistical quality control the symbol 'α' refers

(A) Acceptable Quality Level
(B) Rejectable Quality Level
(C) Consumer's risk
(D) Producer's risk

173. The six sigma quality level means

(A) 3.4 defects per one lakh opportunities
(B) 3.0 defects per one thousand opportunities
(C) 3.4 parts per million defects
(D) 3.4 defects per one million opportunities

174. The chart which is used to show the quality averages of the samples drawn from a given process is known as

(A) R chart
(B) σ chart
(C) P chart
(D) $\overline{X}$ chart

175. The various types of trends are divided under ———— heads.

(A) Three
(B) Five
(C) Two
(D) Four

176. Given the equation $\hat{Y} = 54 + 3.6X$ with 1981 as origin and $X = \frac{1}{2}$ year and Y units in terms of annual production, the monthly trend equation is

(A) $\hat{Y} = 4.5 + 0.5X$
(B) $\hat{Y} = 5.0 + 0.7X$
(C) $\hat{Y} = 5.2 + 0.9X$
(D) $\hat{Y} = 4.8 + 0.3X$

177. A time series consists of data arranged in

(A) Geographically
(B) Chronologically
(C) Qualitatively
(D) Quantitatively

178. The unweighted price index formula is

(A) $P_{01} = \frac{\sum p_1}{\sum p_0} \times 100$
(B) $P_{01} = \frac{\sum p_1}{\sum q_1} \times 100$
(C) $P_{10} = \frac{\sum p_0}{\sum p_1} \times 100$
(D) $P_{01} = \frac{\sum p_1}{\sum q_0} \times 100$

179. When the prices of rice are to be compared we compute

(A) quantity index
(B) price index
(C) constant volume index
(D) value index

180. Marshall and Edgeworth price index utilises the weights as

(A) combined quantities of base and given year
(B) quantities of base year
(C) quantities of given year
(D) combined price of base and given year

181. Most preferred value of homogeneity error '*R*' with reference to index number in

(A) 1
(B) 0
(C) ∞
(D) -1

182. The adjustment factor used to deflate the gross national product is known as

(A) Deflator index numbers
(B) Cost of living index
(C) Consumer index
(D) Recast, index number

183. Trend in a time series means

(A) Long-term regular movement
(B) Short-term regular movement
(C) Both (A) and (B)
(D) Neither (A) nor (B)

184. Simple average method is used to calculate

(A) Trend values
(B) Seasonal indices
(C) Cyclic variations
(D) Irregular variations

185. Wheat crop badly damaged on account of rain in

(A) Cyclic component
(B) Random component
(C) Secular trend
(D) Seasonal component

186. Link relatives in a time series remove the influence of

(A) the trend

(B) cyclic variation

(C) irregular variation

(D) seasonal variation

187. For the function $f <-$ function $(X)\{$

$g <-$ function $(Y)\{$

$Y + Z$

$\}$

$Z <- 4$

$X + g(X)$

$\}$

If you execute : $> Z <- 10$

$> f(4)$, what is the output?

(A) 12

(B) 7

(C) 4

(D) 16

188. In a Poisson distribution with unit mean, the mean deviation about mean is

(A) $2 \times$ standard deviation

(B) $\frac{3}{e} \times$ standard deviation

(C) $\frac{2}{e} \times$ standard deviation

(D) $\frac{1}{e} \times$ standard deviation

189. A key property of vectors in R is that

(A) A vector cannot have attributes like dimensions

(B) Elements of a vector can be different classes

(C) Elements of a vector can only be character or numeric

(D) Elements of a vector all must be of the same class

190. The errors emerging out of faulty planning of surveys are categorised as

(A) Sampling errors

(B) Non-sampling errors

(C) Non-response errors

(D) Absolute errors

191. Match the following

(a)	Group control charts	1.	are called as modified control limits
(b)	Warning limits on $\overline{X}$ control chart	2.	number of sub groups from different sources are combined in single simplified chart
(c)	Reject limits	3.	V shaped mask is used for detecting a change quickly
(d)	Cusum chart	4.	$\pm 2\sigma$ and $\pm 3\sigma$

	(a)	(b)	(c)	(d)
(A)	4	3	2	1
(B)	2	4	1	3
(C)	2	1	3	4
(D)	4	2	1	3

192. If for 20 sub groups, $\sum R = 9.90$ and $d_2 = 3.7$, then the process capability is

(A) 7.4

(B) 0.84

(C) 6

(D) 0.14

193. In a SPRT, the criterion for acceptance of the lot with usual notations is

(A) $\lambda_m \leq \frac{\beta}{1-\alpha}$

(B) $\lambda_m \geq \frac{\beta}{1-\alpha}$

(C) $\lambda_m \leq \frac{1-\beta}{\alpha}$

(D) $\lambda_m \geq \frac{1-\beta}{\alpha}$

194. The function in '*R*' for finding the correlation coefficient between *X* and *Y* is

(A) Corr (*X*, *Y*)
(B) Cor 2 P cor (*X*, *Y*)
(C) P cor 2 cor (*X*, *Y*)
(D) Cor (*X*, *Y*)

195. Who developed R?

(A) Dennis Ritchie
(B) John chambers
(C) Bjarne Stroustrup
(D) James Gosling

196. To find the arithmetic mean of list of values in MS-Excel, the function ———— is used

(A) average ( )
(B) mean( )
(C) daverage ( )
(D) Xbar ( )

197. For a set of data given an interval, the frequency of observations with in the interval is given by

(A) COUNT (value 1, value 2,....)
(B) = FREQUENCY (Range of DATA, Range of BINS)
(C) FREQUENCY (Range of BINS, Range of Data)
(D) FDIST (Range of Data, Range of BINS)

198. In MS Excel, what type of chart is useful for comparing values over categories?

(A) Pie chart
(B) Dot graph
(C) Bar chart or column chart
(D) Line chart

199. Which function is used to calculate remainder in MS Excel?

(A) INT ( )
(B) FACT ( )
(C) MOD ( )
(D) DIV ( )

200. The cell reference for cell range of A2 to M12 is

(A) A 2 ! M 12
(B) A 2 . M 12
(C) A 2; M 12
(D) A 2: M 12

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