Entrance Examination for Admission to the P.G. Courses in the Teaching Departments, 2025

CSS

STATISTICS / APPLIED STATISTICS AND DATA ANALYTICS

For office use only

General Instructions

1. The Question Paper is having 100 Objective Questions, each carrying one mark.

2. The answers are to be (✓) 'tick marked' **only** in the "**Response Sheet**" provided.

3. **Negative marking** : **0.25 marks** will be deducted for each wrong answer .

Time : 2 Hours   **Max. Marks : 100**

To be filled in by the Candidate										
Register Number	in Figures									
	in words									

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Choose appropriate answer from the options in the questions.

(100 × 1 = 100 marks)

1. Which of the following is a one-dimensional diagram?

    A. Bar diagram

    B. Histogram

    C. Pie chart

    D. All of the above

_____

2. Frequency of a variate is always

    A.   Fraction   B.   Percentage

    C.   Ratio   D.   An integer

3. Which one of the following is not a graphical representation of frequency distribution?

    A.   Frequency polygon   B.   Bar diagram

    C.   Histogram   D.   Ogive

4. With the help of ogive curve one can determine

    A.   Arithmetic mean   B.   Median

    C.   Mode   D.   None of these

5. Classification is applicable in case of
   - A. Qualitative characteristics
   - B. Quantitative characteristics
   - C. Both A and B
   - D. None of the above

6. The mean of 10 items is 110. If the first item is increased by 1, the second by 2 and so on, the new mean is
   - A. 110
   - B. 110.5
   - C. 115
   - D. 115.5

7. Geometric mean can be used to find out
   - A. Population growth
   - B. Growth rate of gross national product
   - C. Both A and B
   - D. Neither A nor B

8. Out of a batch of 20 students, 8 students failed in an examination. The mark of the 12 students who had passed are 45,52,56,65,68,70,73,75,76,84,87,90. The median mark of all the 20 students is
   - A. 50
   - B. 65
   - C. 54
   - D. 58

9. If the harmonic mean and geometric mean of two numbers are 6 and 9 respectively, then the arithmetic mean of these numbers is
   - A. 4
   - B. 6
   - C. 8
   - D. 10

10. If each observation of a series is divided by 5, the coefficient of variation reduced by
   - A. 5%
   - B. 10%
   - C. 100%
   - D. 0%

11. Which measure of dispersion can be calculated in case of open-end classes
    - A. Range
    - B. Mean deviation
    - C. Standard deviation
    - D. Quartile deviation

12. Sum of the absolute deviations about median is

A. 0 B. maximum

C. minimum D. none of these

13. Karl Pearson's coefficient of skewness ranges from

A. 1-to 0 B. 0 to 1

C. -3 to 3 D. $-\infty$ to ∞

14. For a leptokurtic distribution, the measure of kurtosis is

A. 0 B. 3

C. greater than 3 D. less than 3

15. The coefficient of correlation between x and y is 0.9 and their covariance is 15 and standard deviation of x is 5 then standard deviation of y is

A. 1/3 B. 10/3

C. 3/10 D. 3

16. If X and Y denote the number of heads and number of tails respectively in tossing of a unbiased coin n times. Then the correlation between X and Y is

A. −1 B. 0

C. 1 D. 0.5

17. Let two regression lines be x=2y and y= 8x, the correlation coefficient between x and y is

A. 1/2 B. −1/2

C. 1/4 D. −1/4

18. Regression coefficient is independent of

A. Origin B. Scale

C. Both origin and scale D. Neither origin nor scale

19. In bivariate distribution, if the two lines of regression coincide, then the correlation coefficient between the variables is

A. −1 B. ± 1

C. 1 D. +1

20. In a trivariate set up, if all the pairwise simple correlation coefficient equals r, then all the partial correlation coefficients are equals

    A. $\dfrac{r}{1-r}$

    B. $\dfrac{r}{1+r}$

    C. $\dfrac{r}{1-2r}$

    D. $\dfrac{r}{1+2r}$

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

    A. simple correlation

    B. partial correlation

    C. multiple correlation

    D. none of these

22. Most preferred type of average for index numbers is

    A. arithmetic mean

    B. geometric mean

    C. harmonic mean

    D. none of these

23. Consumer price index is used for

    A. Formulation of price policy

    B. Product evaluation

    C. Both A and B

    D. Neither A nor B

24. The weights used in Paasche's index numbers belongs to

    A. Fixed base index

    B. Current year method index

    C. Base year method index

    D. None of these

25. Which index number satisfies the factor reversal test?

    A. Laspeyres's index number

    B. Paasche's index number

    C. Dorbish-Bowley index number

    D. None of these

26. The component of a time series which is attached to short-term fluctuations is

    A. Seasonal variations

    B. Cyclic variations

    C. Irregular variations

    D. All of the above

27. Simple average method in time series analysis is used to calculate

    A. trend values

    B. cyclic variations

    C. seasonal variations

    D. none of these

28. Least square estimates of parameter of a trend line
    A. have maximum variance
    B. have zero correlation
    C. are unbiased
    D. none of these

29. The death rate of women due to delivery of children is termed as
    A. Neonatal mortality rate
    B. Infant mortality rate
    C. Maternal mortality rate
    D. None of these

30. The death rate obtained for a segment of a population is known as
    A. Specific death rate
    B. Crude death rate
    C. Foetal death rate
    D. None of these

31. Vital rates are customarily expressed as
    A. Percentages
    B. Per thousand
    C. Per million
    D. All of the above

32. The current chief Statistician of India is
    A. Pranob Sen
    B. Gynesh Kumar
    C. Rajiv Kumar
    D. G P Samanta

33. Let A and B be two sets, then $(A \cup B)' \cup (A' \cap B)$ is
    A. A'
    B. A
    C. B
    D. B'

34. If $A = A = \{(x, y) : x^2 + y^2 = 25\}$ and $B = \{(x, y) : x^2 + 9y^2 = 144\}$, then $A \cap B$ contains
    A. one point
    B. two points
    C. three points
    D. four points

35. If $a > 0$, then $\sum_{n=1}^{\infty} \left(\dfrac{x}{1+x} \right)^n$ is

    A. $\dfrac{a}{2a+1}$
    B. $\dfrac{1+a}{2a+1}$
    C. $a+1$
    D. a

36. If $x = 1 + 2 + \dfrac{4}{2!} + \dfrac{8}{3!} + \dfrac{16}{4!} + \cdots$ then x^{-1} is

   A. e^2 B. e^{-2}

   C. $e^{1/2}$ D. none of these

37. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then $A^2 = I$ is true for

   A. $\theta = 0$ B. $\theta = \dfrac{\pi}{4}$

   C. $\theta = \dfrac{\pi}{2}$ D. none of these

38. The square matrix $A = \left[a_{ij}\right]$ where $a_{ij} = (i - j)^3$, is a

   A. Symmetric matrix   B. Skew-symmetric

   C. Diagonal matrix   D. None of these

39. The rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \end{bmatrix}$ is

   A. 1   B. 2

   C. 3   D. 4

40. The value of $A = \begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix}$ is

   A. 1   B. −1

   C. 0   D. 3

41. Let $A = \begin{bmatrix} 1 & -3 & 3 \\ 0 & -5 & 6 \\ 0 & -3 & 4 \end{bmatrix}$, then the product of eigen values is

   A. −2   B. −1

   C. 0   D. 1

42. For real constants p and q, suppose that the system of linear equations $x + 2y + 3z = 6$, $x + y + pz = 3$, $2y + z = q$, has infinitely many solutions, then, the values of a and b are

A. $p = 2.5 \; q = 6$ B. $p = 2 \; q = 6$

C. $p = 0 \; q = 3$ D. $p = 2 \; q = 2$

43. The general solution of differential equation for $2^{x-y}\, dx + 2^{y-x}\, dy = 0$ is

A. $2^{2x} + 2^{2y} = a$ constant   B. $2^{2x} - 2^{2y} = a$ constant

C. $2^{x} + 2^{y} = a$ constant   D. $2^{x} - 2^{y} = a$ constant

44. A box A contains 5 red and 3 white balls and box B contains 4 red and 4 white balls. A box is selected and a ball is drawn from it, the probability that the ball is red is

A. 4/16   B. 6/16

C. 8/16   D. 9/16

45. Five-digit number is formed by the digits 1,2,3,4 and 5 without repetition. The probability that the number formed is divided by 4 is

A. 0.2   B. 0.5

C. 0.25   D. 1

46. Let A and B be two events with $P(A) = 0.5$, $P(B) = 0.2$ and $P(A \cap B^c) = 0.3$, then $P(B \,|\, A \cup B^c)$ is equal to

A. 0   B. 0.1

C. 0.2   D. 0.5

47. Two unbiased coins are drawn. If A be the event that both coins show the same face and B be the event that at least one coin shows head, then $P((A \,|\, B)$ is

A. 1/3   B. 1/2

C. 1/4   D. 3/4

48. Two numbers are chosen at random in the interval (0.1). The probability that the sum of the chosen numbers exceed ½ is

A. 1/8   B. 1/4

C. 7/8   D. 1

49. Suppose 40% of the women in a class received a first class on the test and 20% of the men received a first class. The class is 70% women. Given that a person chosen at random received a first class, what is the probability this person is a woman?

 A. 14/17   B. 13/14

 C. 10/14   D. 17/14

50. If a random variable x has the probability density function (pdf)

$$f(x) = 3x, 0 < x < 1 \text{ and } 0 \text{ otherwise}$$

Then the pdf of $Y = 4X + 3$ is

 A. $3(4y+3)$ B. $\dfrac{3}{16}(y-3)$

 C. $\dfrac{3}{16}(y+3)$ D. none of these

51. Let X be a discrete random variable with probability mass function $f(x) = k(1+|x|)^2$, $x = -2, -1, 0, 1, 2$ where k is real constant. The value of k is

 A. 1/9   B. 1/27

 C. 1/3   D. none of these

52. For Bernoulli distribution with probability p of success and q of a failure, the relation between mean and variance is

 A. mean = variance   B. mean < variance

 C. mean > variance   D. none of these

53. The family of parametric distributions for which moment generating function does not exist is

 A. t-distribution   B. Pareto distribution

 C. F-distribution   D. All of above

54. Let X be a continuous random variable with pdf $f(x) = \begin{cases} 6x(1-x), & 0 \le x \le 1 \\ 0, & otherwise \end{cases}$.

The median of the distribution is

 A. 1/3   B. 1/4

 C. 1/2   D. 1/6

55. The random variable has the p.d.f. $f(x) = \begin{cases} \dfrac{1}{7}, & -3 \le x \le 4 \\ 0, & otherwise \end{cases}$, then $P\left(|X| < \dfrac{1}{2}\right)$ is

  A. 1/3
  B. 1/4
  C. 1
  D. 1/7

56. The pdf of a random variable X is $f(x) = \begin{cases} e^{-x}, & 0 \le x \le \infty \\ 0, & otherwise \end{cases}$. The pdf of $\sqrt{X}$ is

  A. $e^{-\sqrt{x}}$
  B. xe^{-x}
  C. $2xe^{-x^2}$
  D. xe^{-x^2}

57. Let (X, Y) be random vector with joint pdf $f(x, y) = \begin{cases} x+y, & 0 \le x \le 1, 0 \le y \le 1 \\ 0, & otherwise \end{cases}$

  $P(X + Y < 1)$ is

  A. 1/3
  B. 2/3
  C. 1/2
  D. none of these

58. Let (X, Y) be random vector with joint pdf $f(x,y) = \begin{cases} 4xy, & 0 \le x \le 1, 0 \le y \le 1 \\ 0, & otherwise \end{cases}$.

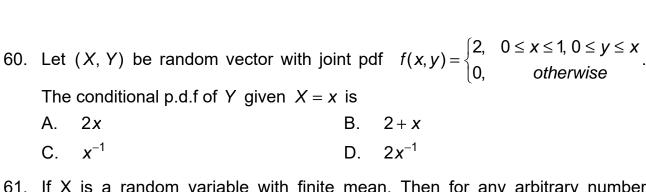 The marginal p.d.f. of X is
  A. $f_x(x) = x$, $0 \le x \le 1$
  B. $f_x(x) = 2x$, $0 \le x \le 1$

  C. $f_x(x) = \dfrac{x}{2}$, $0 \le x \le 1$
  D. None of these

59. Let (X, Y) be random vector with joint pdf

$$f(x,y) = \begin{cases} 0.25(1+xy), & -1 \le x \le 1, -1 \le y \le 1 \\ 0, & otherwise \end{cases}$$

  A. Then X and Y are independent
  B. X^2 and Y^2 are independent
  C. X^2 and Y^2 are dependent
  D. None of these

60. Let (X, Y) be random vector with joint pdf $f(x, y) = \begin{cases} 2, & 0 \le x \le 1, 0 \le y \le x \\ 0, & otherwise \end{cases}$.

The conditional p.d.f of Y given $X = x$ is

A. $2x$

B. $2 + x$

C. x^{-1}

D. $2x^{-1}$

61. If X is a random variable with finite mean. Then for any arbitrary number $A E|X - A|$ s minimum when A is

A. $E(X)$

B. median

C. geometric mean

D. all of these

62. Let X be a continuous random variable with pdf symmetric about 0. If $Var(X) < \infty$, then which of the following conditions is true

A. $Var(|X| = Var(X)$

B. $Var(|X| > Var(X)$

C. $Var(|X|) < Var(X)$

D. None of these

63. If X and Y are two random variables with finite means, the covariance between $aX + b$ and $cY + d$ is

A. $Cov(X, Y)$

B. $ac\,Cov(X, Y) + bd$

C. $bd\,Cov(X, Y) + ab$

D. $acCov(X, Y)$

64. If X is a binomial random variable with parameters n=20 and p=0.5, then

A. $P(X > 10) = 0.5$

B. $P(X > 10) > 0.5$

C. $P(X < 10) = 0.5$

D. $P(X < 10) < 0.5$

65. Let X be discrete random variable with moment generating function $M_X(t) = e^{0.5(e^t - 1)}$, $t \in R$, then $P(X \le 1)$ equals

A. $e^{0.5}$

B. $0.5e^{0.5}$

C. $1.5e^{0.5}$

D. e^{-1}

66. If X and Y are two random variables each representing the number of failures preceding the first success in a sequence of Bernoulli trials with p as probability of success and q as the probability of failure, then P(X=Y) is equals to

A. pq

B. $\dfrac{p}{1+q}$

C. $\dfrac{q}{1+p}$

D. none of these

67. The distribution possessing the lack of memory property is

    A.   Geometric distribution
    B.   Poisson distribution

    C.   Hyper geometric distribution
    D.   All of the above

68. If X and Y are independent standard normal random variables then the distribution of $\frac{X}{|Y|}$ is

    A.   Normal
    B.   t-distribution

    C.   Chi-square distribution
    D.   Cauchy distribution

69. The area under the standard normal curve beyond the lines z = ±1.96 is

    A.   95%
    B.   99%

    C.   5%
    D.   1%

70. The relation between the mean and variance of chi-square distribution with n degrees of freedom is

    A.   Mean = variance
    B.   Mean = 2 variance

    C.   2 mean = 3 variance
    D.   2 mean = variance

71. F-distribution is used for

    A.   Testing equality of two population variances

    B.   Testing equality of two or more population means

    C.   Testing equality of regression coefficients

    D.   All of the above

72. The Chi-square goodness of fit test is based on

    A.   Multinomial distribution
    B.   Hyper-geometric distribution

    C.   Normal distribution
    D.   None of these

73. In contingency table, the expected frequencies are computed under

    A.   Null hypothesis
    B.   Alternative hypothesis

    C.   Both A and B
    D.   Neither A or B

74. Let X be a standard normal variate and Y be Chi-square variate with n degrees of freedom, independent of X, then $\dfrac{\sqrt{n}X}{\sqrt{Y}}$ has

    A. t-distribution with n d.f.   B. t-distribution with n-1 d.f

    C. N (0, n)   D. None of these

75. Standard error of the difference of proportions $(p_1 - p_2)$ in two classes under the hypothesis $H_0 : P_1 = P_2$ with usual notations is

    A. $\sqrt{\hat{p}\hat{q}\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}$ B. $\sqrt{\hat{p}\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}$

    C. $\hat{p}\hat{q}\sqrt{\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}$ D. None of these

76. Let $X_1, X_2, \cdots, X_n$ be a random sample from a normal distribution $N(\mu, 1)$, then an unbiased estimator of $1 + \mu^2$ is

    A. $\sum_{i=1}^{n} X_i$ B. $\sum_{i=1}^{n} X_i^2$

    C. $\sum_{i=1}^{n}(X_i - \overline{X})^2$ D. none of these

77. Let $X_1, X_2, \cdots, X_n$ be a random sample from the exponential distribution with parameter $\dfrac{1}{\theta}$, then $E(\min(X_1, X_2, \cdots, X_n))$ is

    A. $\dfrac{n}{\theta}$ B. $\dfrac{\theta}{n}$

    C. θ D. none of these

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

    A. Unbiased   B. Efficient

    C. Sufficient   D. Consistent

79. Let $X_1, X_2, \cdots, X_n$ be a random the Cauchy distribution with pdf $(x) = \dfrac{1}{\pi} \dfrac{1}{1 + (x - \theta)^2}$. The sample median as an estimator of θ is

    A. Unbiased and consistent   B. Unbiased and inconsistent

    C. Biased and consistent   D. Biased and inconsistent

80. If $\hat{\theta}_1$ is the most efficient estimator of θ with variance v_2 and $\hat{\theta}_2$ is any other estimator of θ with variance v_2, then efficiency of $\hat{\theta}_2$ will be

   A. $\dfrac{v_1}{v_2}$

   B. $\dfrac{v_2}{v_1}$

   C. $v_1 v_2$

   D. none of these

81. Factorization theorem for sufficiency of an estimator is known as
   A. Rao-Blackwell theorem
   B. Crammer-Rao theorem
   C. Fisher-Neyman theorem
   D. None of these

82. Let X_1 and X_2 be two independent Poisson random variables with common parameter λ, then a sufficient statistic for λ is
   A. $X_1 + X_2$
   B. $X_1 - X_2$
   C. $X_1 + 2X_2$
   D. All of these

83. Let $X_1, X_2, \cdots, X_n$ be a random sample from $V\left(\theta - \dfrac{1}{2}, \theta + \dfrac{1}{2}\right)$, $\theta \in R$. then the statistic $T(X_1, X_2, \cdots, X_n) = (\min(X_i), \max(X_i))$ is
   A. Sufficient and complete
   B. Sufficient and not complete
   C. Complete and not sufficient
   D. Neither sufficient and nor complete

84. 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. both upper and lower bounds on the variance
   D. none of these

85. Rao-Balckwell theorem tells us to obtain minimum variance unbiased estimator through
   A. complete statistic
   B. efficient statistic
   C. sufficient statistic
   D. none of these

86. Let $X_1, X_2, \cdots, X_n$ be a random sample from an exponential distribution with parameter θ, then maximum likelihood estimate of θ is

   A. $\bar{x}$

   B. $\dfrac{1}{\bar{X}}$

   C. $\min(X_i)$

   D. $\max(X_i)$

87. Let $\hat{\theta}$ be the maximum likelihood estimate of θ. Then it does not possess which one of the following properties

A. m.l.e is unbiased unique

B. m.l.e is consistent under some regularity conditions

C. it is a function of sufficient statistic, if it exists

D. it is asymptotically efficient under some regularity conditions

88. Let $X_1, X_2, \cdots, X_n$ be a random sample from $U(0, \theta)$, then the moment estimator of θ is

A. $\bar{x}$

B. $2\bar{x}$

C. $\min(X_i)$

D. $\max(X_i)$

89. Confidence interval for the ratio of variances of two normal populations involves

A. Normal distribution

B. Chi-square distribution

C. t-distribution

D. F-distribution

90. Degrees of freedom is related to

A. Null hypothesis

B. Alternative hypothesis

C. Size of the test

D. Number of independent observations in a set

91. Level of significance is the probability of

A. Type I error

B. Type II error

C. 0 mean square error

D. All of these

92. For testing a simple hypothesis against a simple alternative, the Neyman-Pearson theorem provides a method for finding a

A. Most powerful test

B. Locally most powerful test

C. Uniformly most powerful test

D. All of these

93. Ordinary sign test considers the difference of observed values from the hypothetical median in terms of

A. Signs only

B. Magnitude only

C. Both sign and magnitude

D. None of these

94. Kolmogorov - Smirnov test is used as
   A. a test for goodness of fit
   B. a test for equality of two populations
   C. a measure of confidence sets
   D. all of these

95. Probability of including a specified unit in a sample of size n selected out of N units is
   A. 1/n
   B. 1/N
   C. n/N
   D. N/n

96. In simple random sampling with replacement, the same sampling unit may be included in the sample
   A. Only once
   B. Only twice
   C. More than once
   D. None of these

97. Under proportional allocation, the size of the sample from each stratum is
   A. Of same size from each stratum
   B. Proportional to stratum size
   C. In proportion to the per unit cost of survey of the stratum
   D. All of the above

98. A systematic sample does not yield good results if
   A. variation in units is periodic
   B. units at regular intervals are correlated
   C. both A and B
   D. neither A nor B

99. Replication in an experiment means
   A. The number of blocks
   B. Total number of treatments
   C. The number of times a treatment occurs in an experiment
   D. None of these

100. Error sum of squares in randomized block design as compared to completely randomized design using the same materials is
   A. more
   B. less
   C. equal
   D. none of these

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RESPONSE SHEET

1	A B C D E	26	A B C D E	51	A B C D E	76	A B C D E
2	A B C D E	27	A B C D E	52	A B C D E	77	A B C D E
3	A B C D E	28	A B C D E	53	A B C D E	78	A B C D E
4	A B C D E	29	A B C D E	54	A B C D E	79	A B C D E
5	A B C D E	30	A B C D E	55	A B C D E	80	A B C D E
6	A B C D E	31	A B C D E	56	A B C D E	81	A B C D E
7	A B C D E	32	A B C D E	57	A B C D E	82	A B C D E
8	A B C D E	33	A B C D E	58	A B C D E	83	A B C D E
9	A B C D E	34	A B C D E	59	A B C D E	84	A B C D E
10	A B C D E	35	A B C D E	60	A B C D E	85	A B C D E
11	A B C D E	36	A B C D E	61	A B C D E	86	A B C D E
12	A B C D E	37	A B C D E	62	A B C D E	87	A B C D E
13	A B C D E	38	A B C D E	63	A B C D E	88	A B C D E
14	A B C D E	39	A B C D E	64	A B C D E	89	A B C D E
15	A B C D E	40	A B C D E	65	A B C D E	90	A B C D E
16	A B C D E	41	A B C D E	66	A B C D E	91	A B C D E
17	A B C D E	42	A B C D E	67	A B C D E	92	A B C D E
18	A B C D E	43	A B C D E	68	A B C D E	93	A B C D E
19	A B C D E	44	A B C D E	69	A B C D E	94	A B C D E
20	A B C D E	45	A B C D E	70	A B C D E	95	A B C D E
21	A B C D E	46	A B C D E	71	A B C D E	96	A B C D E
22	A B C D E	47	A B C D E	72	A B C D E	97	A B C D E
23	A B C D E	48	A B C D E	73	A B C D E	98	A B C D E
24	A B C D E	49	A B C D E	74	A B C D E	99	A B C D E
25	A B C D E	50	A B C D E	75	A B C D E	100	A B C D E

V – 2352

ROUGH WORK

ROUGH WORK

ROUGH WORK