Total No. of Printed Pages : 21

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A

SET-X

PG-EE-June, 2023

SUBJECT : Statistics

10073

Sr. No. .....

Time : **1¼ Hours** Max. Marks : **100** Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Date of Birth_____

Father's Name _____ Mother's Name _____

Date of Examination_____

_____ _____

(Signature of the Candidate) (Signature of the Invigilator)

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SEAL

1. The vectors $u = (6, 2, 3, 4)$, $v = (0, 5, -3, 1)$ and $w = (0, 0, 7, -2)$ are :
   (1) Dependent (2) Independent
   (3) Data is insufficient (4) None of these

2. Let a 4×4 matrix P have determinant 10, then the determinant of matrix $-3P$ is :
   (1) -30 (2) 30
   (3) -810 (4) 810

3. The eigen values of the matrix :

$$A = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 1 & 4 & 0 & 1 \\ 3 & 1 & 5 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

   are :
   (1) 3, 2, 3, 4 (2) 1, 2, 4, 5
   (3) 1, 2, 3, 5 (4) 3, 2, 1, 4

4. Let $S = \{(1, 2, 3), (1, 0, -1)\}$. The value of k for which the vector $(2, 1, k)$ belongs to the linear span of S, is :
   (1) 1 (2) 2
   (3) 3 (4) 0

5. If 'A' is a square matrix and A' is its transpose, then $A + A'$ is :
   (1) Symmetric (2) Skew-symmetric
   (3) Hermition (4) Skew-Harmition

6. The dimension of zero space is :
   (1) 0 (2) 1
   (3) 2 (4) 3

7. Which of the following is ***not*** true ?

(1) Every subset of a linearly independent set is linearly independent

(2) Every super set of a linearly dependent set is linearly independent

(3) Any set which contains the null vector 0 is linearly dependent

(4) None of these

8. Any square matrix 'A' is said to be Idempotent if :

(1) $A^2 = 0$ (2) $A^2 = A$

(3) $A^m = 0$, if $\exists$ a positive integer 'm' (4) $A^2 = I$

9. Which of the following is ***true*** ?

(1) C is not a vector space over C (2) C is not a vector space over R

(3) R is not a vector space over C (4) Q is a vector space over R

SEAL

10. Which of the following matrix satisfy $A^2 - 5A = 0$

(1) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ (2) $\begin{bmatrix} -1 & 0 \\ -2 & -3 \end{bmatrix}$

(3) $\begin{bmatrix} 0 & -10 \\ -5 & 0 \end{bmatrix}$ (4) $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$

11. $\lim_{x \to 0} \left(\frac{1}{x^2} - \frac{1}{\sin^2 x} \right)$ is equal to :

(1) 0 (2) 3

(3) $\frac{3}{2}$ (4) $-\frac{1}{3}$

12. $\lim_{x \to 0} \frac{4x^5 + 9x + 7}{3x^6 + x^3 + 1}$ is equal to :

(1) 4 (2) 0

(3) 5 (4) 6

13. Consider $f(x)=\begin{cases}\dfrac{|x|}{x} & ; \quad x\neq 0 \\ 1 & ; \quad x=0\end{cases}$, then :

(1) $f(x)$ is continuous at the origin

(2) $f(x)$ is not continuous at the origin

(3) $f(x)$ is differentiable at origin

(4) None of these

14. The n^{th} derivative of e^{2-3x} is :

(1) $3^n e^{2-3x}$

(2) $(-3)^n e^{2-3x}$

(3) $\dfrac{1}{3^n} e^{2-3x}$

(4) $\dfrac{1}{(-3)^n} e^{2-3x}$

15. $\underset{n\to\infty}{\text{Lim}} (n)^{1/n}$ equal to :

(1) ∞

(2) 0

(3) 1

(4) does not exist

16. The value of $\int_0^{\pi/2} \sin^2 x.dx$ is :

(1) 0

(2) $\dfrac{\pi}{2}$

(3) $\dfrac{\pi}{3}$

(4) $\dfrac{\pi}{4}$

17. The minimum value of $|z-2|+|z-3|$ is : (where z is real number) :

(1) 0

(2) 1

(3) 2

(4) 3

18. If u be a homogeneous function of degree 'n' in x and y, then :

(1) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=nu$

(2) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=nu$

(3) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=(n-1)u$

(4) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=(n-1)u$

19. The value of $\int_0^1 xe^x . dx$ is :

(1) 1

(2) 2

(3) 3

(4) 0

20. The function $f(x)=\begin{cases} x\sin\frac{1}{x} & ; \quad x\neq 0 \\ 0 & ; \quad x=0 \end{cases}$ is :

(1) differentiable at 0 but not continuous

(2) having second derivative at the origin

(3) continuous at the origin but not differentiable

(4) neither continuous nor differentiable at the origin

21. The order of differential equation $\left[1+\left(\frac{dy}{dx}\right)^2\right]^{3/2}=a.\frac{d^2y}{dx}$ is :

(1) 2

(2) 3

(3) 1

(4) None of these

22. The degree of differential equation $y=x.\frac{dy}{dx}+a\sqrt{1+\left(\frac{dy}{dx}\right)^2}$

(1) 4

(2) 3

(3) 2

(4) 1

23. The solution of the differential equation $\frac{dy}{dx} = \frac{1-x}{y}$ represents :

(1) a family of circles centered at (1, 0)

(2) a family of circles centered at (0, 0)

(3) a family of straight lines with slope –1

(4) a family of straight lines with slope +1

24. The value of Wronskian $w(x, x^2, x^3)$ is :

(1) $2x^4$ (2) $2x^3$

(3) $2x^2$ (4) $2x$

25. The solution of $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = 0$ is :

(1) $y = c_1e^{-x} + c_2e^{x}$ (2) $y = c_1e^{-2x} + c_2e^{-x}$

(3) $y = c_1e^{-2x} + c_2e^{x}$ (4) $y = c_1e^{-2x} + c_2e^{2x}$

26. The P.I of $(D^2 + 5D + 6)y = e^x$ is :

(1) e^x (2) $\frac{e^x}{6}$

(3) $\frac{e^x}{10}$ (4) $\frac{e^x}{12}$

27. Integrating factor of $\frac{dy}{dx} = \frac{y}{x} - 1$, is :

(1) e^{-x} (2) $e^{-\frac{1}{x}}$

(3) $\frac{1}{x}$ (4) $\frac{-1}{x}$

28. The solution of $\frac{dx}{dy} + Px = Q$, where P, Q are functions of y only or constants :

(1) $x \cdot e^{\int P.dy} = \int Q.e^{\int Pdy} \cdot dy + c$

(2) $y.e^{\int P.dx} = \int Q.e^{\int P.dx} \cdot dx + c$

(3) $x.e^{\int Pdx} = \int Q.e^{\int P.dx} .dx + c$

(4) $y.e^{\int Pdy} = \int Q \cdot e^{\int Pdy} .dy + c$

29. The sequence {1, 0, 1, 0, 1, 0, ……..} is :

(1) increasing sequence

(2) decreasing sequence

(3) monotone sequence

(4) None of these

30. The series $\sum_{n=1}^{\infty} \frac{n^2}{3^n}$, is :

(1) divergent

(2) convergent

(3) unbounded

(4) None of these

31. $\underset{n\to\infty}{\text{Lim}} \left(\frac{x^2+5x+3}{x^2+x+2} \right)^x$ is equal to :

(1) 1 (2) e

(3) e^4 (4) e^2

SEAL

32. The improper Riemann integral $\int_0^x y^{-\frac{1}{2}}.dy$, is :

(1) continuous in $[0, \infty)$

(2) continuous only in $(0, \infty)$

(3) discontinuous in $(0, \infty)$

(4) discontinuous only in $\left(\frac{1}{2}, \infty\right)$

33. The series $2 + 4 + 6 + 8 + \ldots\ldots\ldots$:

(1) divergent

(2) convergent

(3) unbounded

(4) None of these

34. For function to be Reimann integral, function should be :

(1) unbounded over finite domain

(2) unbounded over infinite domain

(3) bounded over infinite domain

(4) bounded over finite domain

35. The sequence $< \frac{1}{3^n} >$ converges to :

(1) 0

(2) 1

(3) 2

(4) 3

36. Which of the following is ***not*** true :

(1) Interior of a set is an open set

(2) The intersection of an arbitrary family of closed set is not closed

(3) The union of a finite number of closed set is closed set

(4) Subset and superset of an open set may or may not be open

37. The optimal value of the objective function is attained at the point :

(1) On X-axis

(2) On Y-axis

(3) Corner point of the feasible region

(4) None of these

38. Any solution to a general LPP which satisfies the non-negative restrictions of the problem is called :

(1) unbounded solution

(2) feasible solution

(3) infeasible solution

(4) optimum solution

39. Which of the following method is ***not*** used to find an initial basis feasible solution to a transportation problem ?

(1) North-West Corner Method

(2) Least Cost Method

(3) Vogel's Approximation Method

(4) Modified Distribution Method

40. In any simplex table, in the column corresponding to entering variable if all elements ≤ 0, then the solution will be :

(1) unbounded (2) infeasible

(3) degenerate (4) feasible

41. A necessary and sufficient condition for a basic feasible solution to be an optimum (maximum) is that (for all j) :

(1) $z_j - c_j \leq 0$ (2) $z_j - c_j = 0$

(3) $z_j - c_j \geq 0$ (4) $z_j - c_j > 0$ or $z_j - c_j < 0$

42. In a balanced transportation problem with 'm' sources and 'n' destinations, the number of linearly independent constraints is :

(1) $m+n$ (2) $m-n$

(3) $m+n-1$ (4) $m+n+1$

43. The graphical method of LPP uses :

(1) objective function equation (2) constraint equations

(3) both (1) and (2) (4) None of these

44. The transportation model is basically a linear program that can be solved by :

(1) Game theory (2) Simplex method

(3) Both (1) and (2) (4) None of these

45. Which of the following is ***not*** a relational operator in C ?

(1) < (2) >

(3) <= (4) ++

46. Which of the following unit convert the data received from the user into a computer understandable format ?

(1) Input unit (2) Secondary storage

(3) Arithmetic and logic unit (4) Output unit

47. Which of the following is ***not*** a type of Computer Code ?

(1) BCD (2) EBC

(3) ASCII (4) EBCDIC

48. Decimal equivalent of the binary number 101101 is :

(1) 42 (2) 43

(3) 44 (4) 45

49. Which of the following is the shortcut key to cut the selected content to the clipboard ?

(1) Ctrl + X

(2) Ctrl + N

(3) Ctrl + V

(4) Ctrl + C

50. Two binary numbers are added as given below :

$$\begin{array}{cccc} 1 & f & 1 & 0 \\ + \quad e & 0 & 1 & g \\ \hline 1 & 1 & h & 1 \end{array}$$

the (e, f, g, h) is equal to :

(1) (0, 0, 1, 1)

(2) (1, 0, 0, 1)

(3) (1, 0, 1, 0)

(4) (0, 0, 1, 0)

51. Formulae in MS-Excel always begins with :

(1) = (2) %

(3) * (4) $

52. One 'nibble' is equal to :

(1) 4 bytes

(2) 8 bytes

(3) 4 bits

(4) 8 bits

53. If δ and E are central difference operator and shift operator respectively, then which one of the followings is ***true*** ?

(1) $\delta \equiv \frac{1}{2}\left(E^{1/2} + E^{-1/2}\right)$

(2) $\delta \equiv E^{1/2} - E^{-1/2}$

(3) $\delta \equiv E^{1/2} + E^{-1/2}$

(4) $\delta \equiv \frac{1}{2}\left(E^{1/2} - E^{-1/2}\right)$

54. Newton's backward formula is used when the interpolating value lies :

(1) in the beginning of the series

(2) in the middle of the series

(3) at the end of the series

(4) None of these

55. The Newton-Raphson's method is also called :

(1) Methods of tangents

(2) Bisection method

(3) Intrapolation method

(4) Extrapolation method

56. The order of convergence of Regula-Falsi method is :

(1) 1.17

(2) 2.17

(3) 1.618

(4) 2.618

57. If E is shift operator and Δ and ∇ are forward and backward difference operators respectively, then :

(1) $E \equiv 1 - \Delta$

(2) $E \equiv 1 + \Delta$

(3) $E \equiv 1 + \nabla$

(4) $E \equiv 1 - \nabla$

58. Secant method is also called :

(1) 2 – Point method

(2) 3 – Point method

(3) 4 – Point method

(4) 5 – Point method

59. If $f(x) = x^2 + 2x + 2$ and interval of differencing is unity, then $\Delta f(x)$ is equal to :

(1) $2x - 3$

(2) $2x + 3$

(3) $x - 3$

(4) $x + 3$

60. If $f(x) = x^2$, then the second order divided difference for the points x_0, x_1, x_2 will be :

(1) +1

(2) $\frac{-x_2}{x_1 - x_0}$

(3) $\frac{x_0}{x_2 - x_1}$

(4) -1

61. If shoe size of the most of the people in a city is number 8, which measure of central tendency does it represent ?

(1) Mean
(2) Median
(3) Mode
(4) Harmonic mean

62. Mean deviation is a measure of :

(1) Location
(2) Dispersion
(3) Correlation
(4) Skewness

63. Ogives, for more than and less than type intersect at :

(1) Mean
(2) Median
(3) Mode
(4) Origin

64. If X is a random variable with its mean $\overline{X}$, then expression $E(X-\overline{X})^2$ represents :

(1) the variance of X
(2) second central moment
(3) third central moment
(4) both (1) and (2)

65. In case of positive skewed distribution, the relation between mean, median and mode is :

(1) Mean > Median > Mode
(2) Mean > Mode > Median
(3) Mode > Median > Mean
(4) Mean = Mode = Median

66. If the coefficient of kurtosis γ_2 of a distribution is zero, the frequency curve is :

(1) Leptokurtic
(2) Mesokurtic
(3) Platykurtic
(4) Skewed

67. Range of multiple correlation coefficient is :

(1) -1 to $+1$ (2) -1 to 0

(3) 0 to $+1$ (4) 0 to ∞

68. The coefficient of correlation between X and Y series is zero, the two regression lines are :

(1) Parallel (2) Coincident

(3) Perpendicular (4) Both (1) and (2)

69. If X and Y are independent random variables, then correlation coefficient between X and Y is :

(1) 0 (2) $+1$

(3) -1 (4) 0.5

70. Two lines of regressions X on Y and Y on X, intersect at the point :

(1) $(0, 0)$ (2) (X, Y)

(3) $(\bar{X}, 0)$ (4) $(\bar{X}, \bar{Y})$

71. If $b_{xy} = 0.2$ and $b_{yx} = 0.8$, then correlation coefficient between variables X and Y is :

(1) 0.16 (2) -0.16

(3) 0.4 (4) -0.4

72. The correct relationship between Arithmetic Mean (A.M.), Geometric Mean (G.M.) and Harmonic Mean (H. M.) is :

(1) A. M. $\leq$ G.M. $\leq$ H.M. (2) A.M. $\geq$ G.M. $\geq$ H.M.

(3) G.M. $\geq$ A.M. $\geq$ H.M. (4) G.M. $\geq$ H.M. $\geq$ A.M.

73. The average of $2n$ natural numbers from 1 to $2n$:

(1) $\frac{2n+1}{2}$ (2) $\frac{n+1}{2}$

(3) $n(2n+1)$ (4) $\frac{n(n+1)}{2}$

74. Sum of deviations taken from mean is :

(1) Minimum (2) Maximum

(3) 0 (4) 1

75. If the observations recorded on five sampled items are 3, 3, 3, 3, 3, the sample variance is :

(1) 3 (2) 2

(3) 1 (4) 0

76. Total number of possible outcomes of a random experiment is known as :

(1) Exhaustive events (2) Mutually exclusive events

(3) Equally likely events (4) Independent events

77. The variable 'Height' is an example of :

(1) Pseudo variable (2) Discrete variable

(3) Continuous variable (4) None of these

78. If 'A' be an event, then P(A) lies between :

(1) [0, 1) (2) [0, 1]

(3) (0, 1) (4) (0, 1]

79. A bag contains one red ball, three white balls and three black balls. Two balls are drawn from the well shaked bag. The probability of both the balls being red is :

(1) $\frac{3}{7}$ (2) $\frac{2}{7}$

(3) $\frac{1}{7}$ (4) 0

80. If A and B are two events, then P (neither A nor B) is :

(1) $1 - P(A \cup B)$

(2) $1 - P(A) + P(B)$

(3) $P(A) + P(B)$

(4) $P(A) + P(B) - P(A \cap B)$

81. For the constants 'g' and 'h' E $(gX + h)$ is :

(1) gE (X) (2) $gE(X) + h$

(3) E(X) (4) g^2E (X)

82. If X and Y are independent random variables with variances σ_1^2 and σ_2^2 respectively, the variance of $X + 3Y$ is :

(1) $\sigma_1^2 + \sigma_2^2$ (2) $\sigma_1^2 + 6\sigma_2^2$

(3) $\sigma_1^2 + 3\sigma_2^2$ (4) $\sigma_1^2 + 9\sigma_2^2$

83. If in a binomial distribution the mean is 4 and the variance is $\frac{4}{3}$, then the probability of success is :

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

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

84. If X is a Binomial variate with parameters 'n' and 'p'. If $n = 1$, the distribution of X reduces to :

(1) Poisson distribution

(2) Normal distribution

(3) Geometric distribution

(4) Bernoulli distribution

85. If the mean of a Poisson distribution is 5, then its standard deviation is :

(1) 5 (2) $\sqrt{5}$

(3) 10 (4) 0

86. The distribution for which mean is always greater than its variance is :

(1) Poisson distribution

(2) Binomial distribution

(3) Normal distribution

(4) None of these

87. If mode of the normal distribution is 10, then its median is :

(1) 10 (2) 5

(3) 2 (4) 0

88. The mean and variance of a standardized variable are :

(1) $\mu = 0 = \sigma^2$ (2) $\mu = 1, \sigma^2 = 0$

(3) $\mu = 0, \sigma^2 = 1$ (4) $\mu = 1 = \sigma^2$

89. Two random variables X and Y are said to be independent if :

(1) $E(X.Y) = E(X) + E(Y)$

(2) $E(X.Y) = E(X).E(Y)$

(3) $E(X.Y) = 0$

(4) $E(X.Y) = -1$

90. If $X \sim \exp(7)$, the probability density function of X is :

(1) $7e^{-X}$ for $X > 0$

(2) $7e^{-7X}$ for $X > 0$

(3) e^{-7X} for $X > 0$

(4) $\frac{1}{7}e^{-7X}$ for $X > 0$

91. Index number for the base period is always taken as :

(1) 100

(2) 1000

(3) 10

(4) 1

92. The circular test is an extension of :

(1) the time reversal test

(2) the factor reversal test

(3) the unit test

(4) None of these

93. If P is the size of a population, F and M are the number of females and males respectively in the sample population, then the sex ratio is usually defined as :

(1) $\frac{F}{P} \times 1000$

(2) $\frac{M}{P} \times 1000$

(3) $\frac{F}{M} \times 1000$

(4) $\frac{M}{F} \times 1000$

94. The death rate obtained for a segment of a population is known as :

(1) Neonatal mortality rate

(2) Specific death rate

(3) Crude death rate

(4) Standardized death rate

95. The condition for time reversal test to hold for price index number is given by :

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

(2) $P_{01} \times P_{10} = 0$

(3) $\frac{P_{01}}{P_{10}} = 1$

(4) $P_{01} + P_{10} = 1$

96. If the income elasticity of demand for a good is negative, it must be :

(1) a normal good

(2) a luxury good

(3) an inferior good

(4) an elastic good

97. Which index number is considered as ideal ?

(1) Laspeyre's index number

(2) Paasche's index number

(3) Marshall – Edgeworth's index number

(4) Fisher's index number

98. The formula $\frac{\sum_{i=1}^{n} p_{1i}\ q_{1i}}{\sum_{i=1}^{n} p_{0i}\ q_{1i}} \times 100$ is used to calculate :

(1) Paasche's price index

(2) Paasche's quantity index

(3) Laspeyre's price index

(4) Laspeyre's quantity index

99. NSSO stands for :

(1) National Sample Survey Organization

(2) National Sample Survey Office

(3) National Small Survey Office

(4) National Sample Service Organization

100. Crude rate of natural increase is equal to :

(1) Crude birth rate

(2) Crude death rate

(3) Crude birth rate + Crude death rate

(4) Crude birth rate – Crude death rate

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B

PG-EE-June, 2023

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SET-X

10078

Sr. No. .....

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Father's Name _____ Mother's Name_____

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1. $\lim_{x\to 0}\left(\frac{1}{x^2}-\frac{1}{\sin^2 x}\right)$ is equal to :

(1) 0 (2) 3

(3) $\frac{3}{2}$ (4) $-\frac{1}{3}$

2. $\lim_{x\to 0}\frac{4x^5+9x+7}{3x^6+x^3+1}$ is equal to :

(1) 4 (2) 0

(3) 5 (4) 6

3. Consider $f(x)=\begin{cases}\frac{|x|}{x} & ; \quad x\neq 0\\ 1 & ; \quad x=0\end{cases}$, then :

(1) $f(x)$ is continuous at the origin

(2) $f(x)$ is not continuous at the origin

(3) $f(x)$ is differentiable at origin

(4) None of these

4. The n^{th} derivative of e^{2-3x} is :

(1) $3^n e^{2-3x}$ (2) $(-3)^n e^{2-3x}$

(3) $\frac{1}{3^n}e^{2-3x}$ (4) $\frac{1}{(-3)^n}e^{2-3x}$

5. $\lim_{n\to\infty}(n)^{1/n}$ equal to :

(1) ∞ (2) 0

(3) 1 (4) does not exist

6. The value of $\int_0^{\pi/2} \sin^2 x.dx$ is :

(1) 0 (2) $\frac{\pi}{2}$

(3) $\frac{\pi}{3}$ (4) $\frac{\pi}{4}$

7. The minimum value of $|z-2|+|z-3|$ is : (where z is real number) :

(1) 0 (2) 1

(3) 2 (4) 3

8. If u be a homogeneous function of degree 'n' in x and y, then :

(1) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=nu$ (2) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=nu$

(3) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=(n-1)u$ (4) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=(n-1)u$

9. The value of $\int_0^1 xe^x.dx$ is :

(1) 1 (2) 2

(3) 3 (4) 0

10. The function $f(x)=\begin{cases} x\sin\frac{1}{x} & ; \quad x\neq 0 \\ 0 & ; \quad x=0 \end{cases}$ is :

(1) differentiable at 0 but not continuous

(2) having second derivative at the origin

(3) continuous at the origin but not differentiable

(4) neither continuous nor differentiable at the origin

11. Index number for the base period is always taken as :

(1) 100 (2) 1000

(3) 10 (4) 1

12. The circular test is an extension of :

(1) the time reversal test (2) the factor reversal test

(3) the unit test (4) None of these

13. If P is the size of a population, F and M are the number of females and males respectively in the sample population, then the sex ratio is usually defined as :

(1) $\frac{F}{P}\times 1000$ (2) $\frac{M}{P}\times 1000$

(3) $\frac{F}{M}\times 1000$ (4) $\frac{M}{F}\times 1000$

14. The death rate obtained for a segment of a population is known as :

(1) Neonatal mortality rate (2) Specific death rate

(3) Crude death rate (4) Standardized death rate

15. The condition for time reversal test to hold for price index number is given by :

(1) $P_{01}\times P_{10}=1$ (2) $P_{01}\times P_{10}=0$

(3) $\frac{P_{01}}{P_{10}}=1$ (4) $P_{01}+P_{10}=1$

16. If the income elasticity of demand for a good is negative, it must be :

(1) a normal good (2) a luxury good

(3) an inferior good (4) an elastic good

17. Which index number is considered as ideal ?

(1) Laspeyre's index number

(2) Paasche's index number

(3) Marshall – Edgeworth's index number

(4) Fisher's index number

18. The formula $\frac{\sum_{i=1}^{n} p_{1i}\ q_{1i}}{\sum_{i=1}^{n} p_{0i}\ q_{1i}} \times 100$ is used to calculate :

(1) Paasche's price index (2) Paasche's quantity index

(3) Laspeyre's price index (4) Laspeyre's quantity index

19. NSSO stands for :

(1) National Sample Survey Organization

(2) National Sample Survey Office

(3) National Small Survey Office

(4) National Sample Service Organization

20. Crude rate of natural increase is equal to :

(1) Crude birth rate

(2) Crude death rate

(3) Crude birth rate + Crude death rate

(4) Crude birth rate – Crude death rate

21. If $b_{xy} = 0.2$ and $b_{yx} = 0.8$, then correlation coefficient between variables X and Y is :

(1) 0.16 (2) –0.16

(3) 0.4 (4) –0.4

22. The correct relationship between Arithmetic Mean (A.M.), Geometric Mean (G.M.) and Harmonic Mean (H. M.) is :

(1) A. M. $\leq$ G.M. $\leq$ H.M. (2) A.M. $\geq$ G.M. $\geq$ H.M.

(3) G.M. $\geq$ A.M. $\geq$ H.M. (4) G.M. $\geq$ H.M. $\geq$ A.M.

23. The average of $2n$ natural numbers from 1 to $2n$:

(1) $\frac{2n+1}{2}$ (2) $\frac{n+1}{2}$

(3) $n\,(2n+1)$ (4) $\frac{n(n+1)}{2}$

24. Sum of deviations taken from mean is :

(1) Minimum (2) Maximum

(3) 0 (4) 1

25. If the observations recorded on five sampled items are 3, 3, 3, 3, 3, the sample variance is :

(1) 3 (2) 2

(3) 1 (4) 0

26. Total number of possible outcomes of a random experiment is known as :

(1) Exhaustive events

(2) Mutually exclusive events

(3) Equally likely events

(4) Independent events

27. The variable 'Height' is an example of :

(1) Pseudo variable (2) Discrete variable

(3) Continuous variable (4) None of these

28. If 'A' be an event, then P(A) lies between :

(1) [0, 1) (2) [0, 1]

(3) (0, 1) (4) (0, 1]

29. A bag contains one red ball, three white balls and three black balls. Two balls are drawn from the well shaked bag. The probability of both the balls being red is :

(1) $\frac{3}{7}$ (2) $\frac{2}{7}$

(3) $\frac{1}{7}$ (4) 0

30. If A and B are two events, then P (neither A nor B) is :

(1) $1 - P(A \cup B)$

(2) $1 - P(A) + P(B)$

(3) $P(A) + P(B)$

(4) $P(A) + P(B) - P(A \cap B)$

31. Formulae in MS-Excel always begins with :

(1) =

(2) %

(3) *

(4) $

32. One 'nibble' is equal to :

(1) 4 bytes

(2) 8 bytes

(3) 4 bits

(4) 8 bits

33. If δ and E are central difference operator and shift operator respectively, then which one of the followings is ***true*** ?

(1) $\delta \equiv \frac{1}{2}\left(E^{1/2} + E^{-1/2}\right)$

(2) $\delta \equiv E^{1/2} - E^{-1/2}$

(3) $\delta \equiv E^{1/2} + E^{-1/2}$

(4) $\delta \equiv \frac{1}{2}\left(E^{1/2} - E^{-1/2}\right)$

34. Newton's backward formula is used when the interpolating value lies :

(1) in the beginning of the series

(2) in the middle of the series

(3) at the end of the series

(4) None of these

35. The Newton-Raphson's method is also called :

(1) Methods of tangents

(2) Bisection method

(3) Intrapolation method

(4) Extrapolation method

36. The order of convergence of Regula-Falsi method is :

(1) 1.17 (2) 2.17

(3) 1.618 (4) 2.618

37. If E is shift operator and Δ and ∇ are forward and backward difference operators respectively, then :

(1) $E \equiv 1 - \Delta$ (2) $E \equiv 1 + \Delta$

(3) $E \equiv 1 + \nabla$ (4) $E \equiv 1 - \nabla$

38. Secant method is also called :

(1) 2 – Point method (2) 3 – Point method

(3) 4 – Point method (4) 5 – Point method

39. If $f(x) = x^2 + 2x + 2$ and interval of differencing is unity, then $\Delta f(x)$ is equal to :

(1) $2x - 3$ (2) $2x + 3$

(3) $x - 3$ (4) $x + 3$

40. If $f(x)=x^2$, then the second order divided difference for the points x_0, x_1, x_2 will be :

(1) +1

(2) $\frac{-x_2}{x_1-x_0}$

(3) $\frac{x_0}{x_2-x_1}$

(4) -1

41. $\underset{n\to\infty}{\text{Lim}}\left(\frac{x^2+5x+3}{x^2+x+2}\right)^x$ is equal to :

(1) 1

(2) e

(3) e^4

(4) e^2

42. The improper Riemann integral $\int_0^x y^{-\frac{1}{2}}.dy$, is :

(1) continuous in $[0, \infty)$

(2) continuous only in $(0, \infty)$

(3) discontinuous in $(0, \infty)$

(4) discontinuous only in $\left(\frac{1}{2}, \infty\right)$

43. The series $2 + 4 + 6 + 8 + \ldots\ldots\ldots$:

(1) divergent

(2) convergent

(3) unbounded

(4) None of these

44. For function to be Reimann integral, function should be :

(1) unbounded over finite domain

(2) unbounded over infinite domain

(3) bounded over infinite domain

(4) bounded over finite domain

45. The sequence $< \frac{1}{3^n} >$ converges to :

(1) 0 (2) 1

(3) 2 (4) 3

46. Which of the following is ***not*** true :

(1) Interior of a set is an open set

(2) The intersection of an arbitrary family of closed set is not closed

(3) The union of a finite number of closed set is closed set

(4) Subset and superset of an open set may or may not be open

47. The optimal value of the objective function is attained at the point :

(1) On X-axis

(2) On Y-axis

(3) Corner point of the feasible region

(4) None of these

48. Any solution to a general LPP which satisfies the non-negative restrictions of the problem is called :

(1) unbounded solution

(2) feasible solution

(3) infeasible solution

(4) optimum solution

49. Which of the following method is ***not*** used to find an initial basis feasible solution to a transportation problem ?

(1) North-West Corner Method

(2) Least Cost Method

(3) Vogel's Approximation Method

(4) Modified Distribution Method

50. In any simplex table, in the column corresponding to entering variable if all elements ≤ 0, then the solution will be :

(1) unbounded

(2) infeasible

(3) degenerate

(4) feasible

51. The order of differential equation $\left[1+\left(\frac{dy}{dx}\right)^2\right]^{3/2} = a.\frac{d^2y}{dx}$ is :

(1) 2

(2) 3

(3) 1

(4) None of these

52. The degree of differential equation $y = x.\frac{dy}{dx} + a\sqrt{1+\left(\frac{dy}{dx}\right)^2}$

(1) 4

(2) 3

(3) 2

(4) 1

53. The solution of the differential equation $\frac{dy}{dx} = \frac{1-x}{y}$ represents :

(1) a family of circles centered at (1, 0)

(2) a family of circles centered at (0, 0)

(3) a family of straight lines with slope –1

(4) a family of straight lines with slope +1

54. The value of Wronskian $w(x, x^2, x^3)$ is :

(1) $2x^4$

(2) $2x^3$

(3) $2x^2$

(4) $2x$

55. The solution of $\frac{d^2y}{dx^2}+\frac{dy}{dx}-2y=0$ is :

(1) $y=c_1e^{-x}+c_2e^{x}$ (2) $y=c_1e^{-2x}+c_2e^{-x}$

(3) $y=c_1e^{-2x}+c_2e^{x}$ (4) $y=c_1e^{-2x}+c_2e^{2x}$

56. The P.I of $(D^2+5D+6)y=e^x$ is :

(1) e^x (2) $\frac{e^x}{6}$

(3) $\frac{e^x}{10}$ (4) $\frac{e^x}{12}$

57. Integrating factor of $\frac{dy}{dx}=\frac{y}{x}-1$, is :

(1) e^{-x} (2) $e^{-\frac{1}{x}}$

(3) $\frac{1}{x}$ (4) $\frac{-1}{x}$

58. The solution of $\frac{dx}{dy}+Px=Q$, where P, Q are functions of y only or constants :

(1) $x\,.\,e^{\int P.dy}=\int Q.e^{\int Pdy}\,.\,dy+c$

(2) $y.e^{\int P.dx}=\int Q.e^{\int P.dx}.\,dx+c$

(3) $x.e^{\int Pdx}=\int Q.e^{\int P.dx}.dx+c$

(4) $y.e^{\int Pdy}=\int Q\,.\,e^{\int Pdy}.dy+c$

59. The sequence {1, 0, 1, 0, 1, 0, ...} is :

(1) increasing sequence

(2) decreasing sequence

(3) monotone sequence

(4) None of these

60. The series $\sum_{n=1}^{\infty} \frac{n^2}{3^n}$, is :

(1) divergent

(2) convergent

(3) unbounded

(4) None of these

61. A necessary and sufficient condition for a basic feasible solution to be an optimum (maximum) is that (for all j) :

(1) $z_j - c_j \leq 0$ (2) $z_j - c_j = 0$

(3) $z_j - c_j \geq 0$ (4) $z_j - c_j > 0$ or $z_j - c_j < 0$

62. In a balanced transportation problem with 'm' sources and 'n' destinations, the number of linearly independent constraints is :

(1) $m + n$ (2) $m - n$

(3) $m + n - 1$ (4) $m + n + 1$

63. The graphical method of LPP uses :

(1) objective function equation (2) constraint equations

(3) both (1) and (2) (4) None of these

64. The transportation model is basically a linear program that can be solved by :

(1) Game theory
(2) Simplex method
(3) Both (1) and (2)
(4) None of these

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(1) <
(2) >
(3) <=
(4) ++

66. Which of the following unit convert the data received from the user into a computer understandable format ?

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$$\begin{array}{cccc} 1 & f & 1 & 0 \\ + \quad e & 0 & 1 & g \\ \hline 1 & 1 & h & 1 \end{array}$$

the (e, f, g, h) is equal to :

(1) (0, 0, 1, 1)

(2) (1, 0, 0, 1)

(3) (1, 0, 1, 0)

(4) (0, 0, 1, 0)

71. If shoe size of the most of the people in a city is number 8, which measure of central tendency does it represent ?

(1) Mean (2) Median

(3) Mode (4) Harmonic mean

72. Mean deviation is a measure of :

(1) Location (2) Dispersion

(3) Correlation (4) Skewness

73. Ogives, for more than and less than type intersect at :

(1) Mean (2) Median

(3) Mode (4) Origin

74. If X is a random variable with its mean $\overline{X}$, then expression $E(X - \overline{X})^2$ represents :

(1) the variance of X

(2) second central moment

(3) third central moment

(4) both (1) and (2)

75. In case of positive skewed distribution, the relation between mean, median and mode is :

(1) Mean > Median > Mode

(2) Mean > Mode > Median

(3) Mode > Median > Mean

(4) Mean = Mode = Median

76. If the coefficient of kurtosis γ_2 of a distribution is zero, the frequency curve is :

(1) Leptokurtic

(2) Mesokurtic

(3) Platykurtic

(4) Skewed

77. Range of multiple correlation coefficient is :

(1) -1 to $+1$

(2) -1 to 0

(3) 0 to $+1$

(4) 0 to ∞

78. The coefficient of correlation between X and Y series is zero, the two regression lines are :

(1) Parallel

(2) Coincident

(3) Perpendicular

(4) Both (1) and (2)

79. If X and Y are independent random variables, then correlation coefficient between X and Y is :

(1) 0

(2) +1

(3) -1

(4) 0.5

80. Two lines of regressions X on Y and Y on X, intersect at the point :

(1) $(0, 0)$ (2) (X, Y)

(3) $(\bar{X}, 0)$ (4) $(\bar{X}, \bar{Y})$

81. The vectors $u = (6, 2, 3, 4)$, $v = (0, 5, -3, 1)$ and $w = (0, 0, 7, -2)$ are :

(1) Dependent (2) Independent

(3) Data is insufficient (4) None of these

82. Let a 4×4 matrix P have determinant 10, then the determinant of matrix $-3P$ is :

(1) -30 (2) 30

(3) -810 (4) 810

83. The eigen values of the matrix :

$$A = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 1 & 4 & 0 & 1 \\ 3 & 1 & 5 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

are :

(1) 3, 2, 3, 4 (2) 1, 2, 4, 5

(3) 1, 2, 3, 5 (4) 3, 2, 1, 4

84. Let $S = \{(1, 2, 3), (1, 0, -1)\}$. The value of k for which the vector $(2, 1, k)$ belongs to the linear span of S, is :

(1) 1 (2) 2

(3) 3 (4) 0

85. If 'A' is a square matrix and A' is its transpose, then $A + A'$ is :

(1) Symmetric (2) Skew-symmetric

(3) Hermition (4) Skew-Harmition

86. The dimension of zero space is :

(1) 0

(2) 1

(3) 2

(4) 3

87. Which of the following is ***not*** true ?

(1) Every subset of a linearly independent set is linearly independent

(2) Every super set of a linearly dependent set is linearly independent

(3) Any set which contains the null vector 0 is linearly dependent

(4) None of these

88. Any square matrix 'A' is said to be Idempotent if :

(1) $A^2 = 0$

(2) $A^2 = A$

(3) $A^m = 0$, if $\exists$ a positive integer 'm'

(4) $A^2 = I$

89. Which of the following is ***true*** ?

(1) C is not a vector space over C

(2) C is not a vector space over R

(3) R is not a vector space over C

(4) Q is a vector space over R

90. Which of the following matrix satisfy $A^2 - 5A = 0$

(1) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

(2) $\begin{bmatrix} -1 & 0 \\ -2 & -3 \end{bmatrix}$

(3) $\begin{bmatrix} 0 & -10 \\ -5 & 0 \end{bmatrix}$

(4) $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$

91. For the constants 'g' and 'h' E $(gX + h)$ is :

(1) gE (X)

(2) $gE(X) + h$

(3) E(X)

(4) g^2E (X)

92. If X and Y are independent random variables with variances σ_1^2 and σ_2^2 respectively, the variance of $X + 3Y$ is :

(1) $\sigma_1{}^2 + \sigma_2{}^2$ (2) $\sigma_1{}^2 + 6\sigma_2{}^2$

(3) $\sigma_1{}^2 + 3\sigma_2{}^2$ (4) $\sigma_1{}^2 + 9\sigma_2{}^2$

93. If in a binomial distribution the mean is 4 and the variance is $\frac{4}{3}$, then the probability of success is :

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

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

94. If X is a Binomial variate with parameters 'n' and 'p'. If $n = 1$, the distribution of X reduces to :

(1) Poisson distribution

(2) Normal distribution

(3) Geometric distribution

(4) Bernoulli distribution

95. If the mean of a Poisson distribution is 5, then its standard deviation is :

(1) 5 (2) $\sqrt{5}$

(3) 10 (4) 0

96. The distribution for which mean is always greater than its variance is :

(1) Poisson distribution

(2) Binomial distribution

(3) Normal distribution

(4) None of these

97. If mode of the normal distribution is 10, then its median is :

(1) 10 (2) 5

(3) 2 (4) 0

98. The mean and variance of a standardized variable are :

(1) $\mu = 0 = \sigma^2$ (2) $\mu = 1, \sigma^2 = 0$

(3) $\mu = 0, \sigma^2 = 1$ (4) $\mu = 1 = \sigma^2$

99. Two random variables X and Y are said to be independent if :

(1) $E(X \,.\, Y) = E(X) + E(Y)$ (2) $E(X \,.\, Y) = E(X) \,.\, E(Y)$

(3) $E(X \,.\, Y) = 0$ (4) $E(X \,.\, Y) = -1$

100. If $X \sim \exp(7)$, the probability density function of X is :

(1) $7e^{-X}$ for $X > 0$ (2) $7e^{-7X}$ for $X > 0$

(3) e^{-7X} for $X > 0$ (4) $\frac{1}{7}e^{-7X}$ for $X > 0$

Total No. of Printed Pages : 21

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C

PG-EE-June, 2023

SET-X

SUBJECT : Statistics

10079

Sr. No. .....

Time : **1¼ Hours** Max. Marks : **100** Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Date of Birth_____

Father's Name _____ Mother's Name _____

Date of Examination _____

_____ _____

(Signature of the Candidate) (Signature of the Invigilator)

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2. The candidates ***must return*** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
5. The candidate ***must not*** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers ***must not*** be ticked in the question booklet.
6. ***There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.***
7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
8. *Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained* **30** *minutes after starting of the examination.*

SEAL

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(3) 1

(4) None of these

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(1) 4

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(1) $2x^4$

(2) $2x^3$

(3) $2x^2$

(4) $2x$

15. The solution of $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = 0$ is :

(1) $y = c_1e^{-x} + c_2e^{x}$

(2) $y = c_1e^{-2x} + c_2e^{-x}$

(3) $y = c_1e^{-2x} + c_2e^{x}$

(4) $y = c_1e^{-2x} + c_2e^{2x}$

16. The P.I of $(D^2+5D+6)y=e^x$ is :

(1) e^x (2) $\frac{e^x}{6}$

(3) $\frac{e^x}{10}$ (4) $\frac{e^x}{12}$

17. Integrating factor of $\frac{dy}{dx}=\frac{y}{x}-1$, is :

(1) e^{-x} (2) $e^{-\frac{1}{x}}$

(3) $\frac{1}{x}$ (4) $\frac{-1}{x}$

18. The solution of $\frac{dx}{dy}+Px=Q$, where P, Q are functions of y only or constants :

(1) $x \cdot e^{\int P.dy} = \int Q.e^{\int Pdy} \cdot dy + c$

(2) $y.e^{\int P.dx} = \int Q.e^{\int P.dx} \cdot dx + c$

(3) $x.e^{\int Pdx} = \int Q.e^{\int P.dx} .dx + c$

(4) $y.e^{\int Pdy} = \int Q \cdot e^{\int Pdy} .dy + c$

19. The sequence {1, 0, 1, 0, 1, 0, ……..} is :

(1) increasing sequence

(2) decreasing sequence

(3) monotone sequence

(4) None of these

20. The series $\sum_{n=1}^{\infty} \frac{n^2}{3^n}$, is :

(1) divergent

(2) convergent

(3) unbounded

(4) None of these

21. The vectors $u = (6, 2, 3, 4)$, $v = (0, 5, -3, 1)$ and $w = (0, 0, 7, -2)$ are :

(1) Dependent (2) Independent

(3) Data is insufficient (4) None of these

22. Let a 4×4 matrix P have determinant 10, then the determinant of matrix $-3P$ is :

(1) -30 (2) 30

(3) -810 (4) 810

23. The eigen values of the matrix :

$$A = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 1 & 4 & 0 & 1 \\ 3 & 1 & 5 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

are :

(1) 3, 2, 3, 4 (2) 1, 2, 4, 5

(3) 1, 2, 3, 5 (4) 3, 2, 1, 4

24. Let $S = \{(1, 2, 3), (1, 0, -1)\}$. The value of k for which the vector $(2, 1, k)$ belongs to the linear span of S, is :

(1) 1 (2) 2

(3) 3 (4) 0

25. If 'A' is a square matrix and A' is its transpose, then $A + A'$ is :

(1) Symmetric (2) Skew-symmetric

(3) Hermition (4) Skew-Harmition

26. The dimension of zero space is :

(1) 0 (2) 1

(3) 2 (4) 3

27. Which of the following is ***not*** true ?

(1) Every subset of a linearly independent set is linearly independent

(2) Every super set of a linearly dependent set is linearly independent

(3) Any set which contains the null vector 0 is linearly dependent

(4) None of these

28. Any square matrix 'A' is said to be Idempotent if :

(1) $A^2 = 0$ (2) $A^2 = A$

(3) $A^m = 0$, if $\exists$ a positive integer 'm' (4) $A^2 = I$

29. Which of the following is ***true*** ?

(1) C is not a vector space over C (2) C is not a vector space over R

(3) R is not a vector space over C (4) Q is a vector space over R

30. Which of the following matrix satisfy $A^2 - 5A = 0$

(1) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ (2) $\begin{bmatrix} -1 & 0 \\ -2 & -3 \end{bmatrix}$

(3) $\begin{bmatrix} 0 & -10 \\ -5 & 0 \end{bmatrix}$ (4) $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$

31. Index number for the base period is always taken as :

(1) 100 (2) 1000

(3) 10 (4) 1

32. The circular test is an extension of :

(1) the time reversal test

(2) the factor reversal test

(3) the unit test

(4) None of these

33. If P is the size of a population, F and M are the number of females and males respectively in the sample population, then the sex ratio is usually defined as :

(1) $\frac{F}{P}\times 1000$

(2) $\frac{M}{P}\times 1000$

(3) $\frac{F}{M}\times 1000$

(4) $\frac{M}{F}\times 1000$

34. The death rate obtained for a segment of a population is known as :

(1) Neonatal mortality rate

(2) Specific death rate

(3) Crude death rate

(4) Standardized death rate

35. The condition for time reversal test to hold for price index number is given by :

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

(2) $P_{01}\times P_{10}=0$

(3) $\frac{P_{01}}{P_{10}}=1$

(4) $P_{01}+P_{10}=1$

36. If the income elasticity of demand for a good is negative, it must be :

(1) a normal good

(2) a luxury good

(3) an inferior good

(4) an elastic good

37. Which index number is considered as ideal ?

(1) Laspeyre's index number

(2) Paasche's index number

(3) Marshall – Edgeworth's index number

(4) Fisher's index number

38. The formula $\frac{\sum_{i=1}^{n} p_{1i}\ q_{1i}}{\sum_{i=1}^{n} p_{0i}\ q_{1i}} \times 100$ is used to calculate :

(1) Paasche's price index

(2) Paasche's quantity index

(3) Laspeyre's price index

(4) Laspeyre's quantity index

39. NSSO stands for :

(1) National Sample Survey Organization

(2) National Sample Survey Office

(3) National Small Survey Office

(4) National Sample Service Organization

40. Crude rate of natural increase is equal to :

(1) Crude birth rate

(2) Crude death rate

(3) Crude birth rate + Crude death rate

(4) Crude birth rate – Crude death rate

41. If shoe size of the most of the people in a city is number 8, which measure of central tendency does it represent ?

(1) Mean (2) Median

(3) Mode (4) Harmonic mean

42. Mean deviation is a measure of :

(1) Location (2) Dispersion

(3) Correlation (4) Skewness

43. Ogives, for more than and less than type intersect at :

(1) Mean (2) Median

(3) Mode (4) Origin

44. If X is a random variable with its mean $\overline{X}$, then expression $E(X - \overline{X})^2$ represents :

(1) the variance of X (2) second central moment

(3) third central moment (4) both (1) and (2)

45. In case of positive skewed distribution, the relation between mean, median and mode is :

(1) Mean > Median > Mode (2) Mean > Mode > Median

(3) Mode > Median > Mean (4) Mean = Mode = Median

46. If the coefficient of kurtosis γ_2 of a distribution is zero, the frequency curve is :

(1) Leptokurtic (2) Mesokurtic

(3) Platykurtic (4) Skewed

47. Range of multiple correlation coefficient is :

(1) -1 to $+1$

(2) -1 to 0

(3) 0 to $+1$

(4) 0 to ∞

48. The coefficient of correlation between X and Y series is zero, the two regression lines are :

(1) Parallel

(2) Coincident

(3) Perpendicular

(4) Both (1) and (2)

49. If X and Y are independent random variables, then correlation coefficient between X and Y is :

(1) 0

(2) $+1$

(3) -1

(4) 0.5

50. Two lines of regressions X on Y and Y on X, intersect at the point :

(1) $(0, 0)$

(2) (X, Y)

(3) $(\overline{X}, 0)$

(4) $(\overline{X}, \overline{Y})$

51. $\underset{n\to\infty}{\text{Lim}}\left(\frac{x^2+5x+3}{x^2+x+2}\right)^x$ is equal to :

(1) 1

(2) e

(3) e^4

(4) e^2

52. The improper Riemann integral $\int_0^x y^{-\frac{1}{2}}.dy$, is :

(1) continuous in $[0, \infty)$

(2) continuous only in $(0, \infty)$

(3) discontinuous in $(0, \infty)$

(4) discontinuous only in $\left(\frac{1}{2}, \infty\right)$

53. The series $2 + 4 + 6 + 8 + \ldots\ldots\ldots$:

(1) divergent (2) convergent

(3) unbounded (4) None of these

54. For function to be Reimann integral, function should be :

(1) unbounded over finite domain

(2) unbounded over infinite domain

(3) bounded over infinite domain

(4) bounded over finite domain

55. The sequence $< \frac{1}{3^n} >$ converges to :

(1) 0 (2) 1

(3) 2 (4) 3

56. Which of the following is ***not*** true :

(1) Interior of a set is an open set

(2) The intersection of an arbitrary family of closed set is not closed

(3) The union of a finite number of closed set is closed set

(4) Subset and superset of an open set may or may not be open

57. The optimal value of the objective function is attained at the point :

(1) On X-axis

(2) On Y-axis

(3) Corner point of the feasible region

(4) None of these

58. Any solution to a general LPP which satisfies the non-negative restrictions of the problem is called :

(1) unbounded solution

(2) feasible solution

(3) infeasible solution

(4) optimum solution

59. Which of the following method is ***not*** used to find an initial basis feasible solution to a transportation problem ?

(1) North-West Corner Method

(2) Least Cost Method

(3) Vogel's Approximation Method

(4) Modified Distribution Method

60. In any simplex table, in the column corresponding to entering variable if all elements ≤ 0, then the solution will be :

(1) unbounded (2) infeasible

(3) degenerate (4) feasible

61. If $b_{xy} = 0.2$ and $b_{yx} = 0.8$, then correlation coefficient between variables X and Y is :

(1) 0.16 (2) –0.16

(3) 0.4 (4) –0.4

62. The correct relationship between Arithmetic Mean (A.M.), Geometric Mean (G.M.) and Harmonic Mean (H. M.) is :

(1) A. M. $\leq$ G.M. $\leq$ H.M. (2) A.M. $\geq$ G.M. $\geq$ H.M.

(3) G.M. $\geq$ A.M. $\geq$ H.M. (4) G.M. $\geq$ H.M. $\geq$ A.M.

63. The average of $2n$ natural numbers from 1 to $2n$:

(1) $\frac{2n+1}{2}$ (2) $\frac{n+1}{2}$

(3) $n\,(2n+1)$ (4) $\frac{n(n+1)}{2}$

64. Sum of deviations taken from mean is :

(1) Minimum (2) Maximum

(3) 0 (4) 1

65. If the observations recorded on five sampled items are 3, 3, 3, 3, 3, the sample variance is :

(1) 3 (2) 2

(3) 1 (4) 0

66. Total number of possible outcomes of a random experiment is known as :

(1) Exhaustive events (2) Mutually exclusive events

(3) Equally likely events (4) Independent events

67. The variable 'Height' is an example of :

(1) Pseudo variable (2) Discrete variable

(3) Continuous variable (4) None of these

68. If 'A' be an event, then P(A) lies between :

(1) [0, 1)
(2) [0, 1]
(3) (0, 1)
(4) (0, 1]

69. A bag contains one red ball, three white balls and three black balls. Two balls are drawn from the well shaked bag. The probability of both the balls being red is :

(1) $\frac{3}{7}$
(2) $\frac{2}{7}$
(3) $\frac{1}{7}$
(4) 0

70. If A and B are two events, then P (neither A nor B) is :

(1) $1 - P(A \cup B)$
(2) $1 - P(A) + P(B)$
(3) $P(A) + P(B)$
(4) $P(A) + P(B) - P(A \cap B)$

71. For the constants 'g' and 'h' E $(gX + h)$ is :

(1) gE (X)
(2) $gE(X) + h$
(3) E(X)
(4) g^2E (X)

72. If X and Y are independent random variables with variances σ_1^2 and σ_2^2 respectively, the variance of $X + 3Y$ is :

(1) $\sigma_1^{\ 2} + \sigma_2^{\ 2}$
(2) $\sigma_1^{\ 2} + 6\sigma_2^{\ 2}$
(3) $\sigma_1^{\ 2} + 3\sigma_2^{\ 2}$
(4) $\sigma_1^{\ 2} + 9\sigma_2^{\ 2}$

73. If in a binomial distribution the mean is 4 and the variance is $\frac{4}{3}$, then the probability of success is :

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

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

74. If X is a Binomial variate with parameters 'n' and 'p'. If $n = 1$, the distribution of X reduces to :

(1) Poisson distribution

(2) Normal distribution

(3) Geometric distribution

(4) Bernoulli distribution

75. If the mean of a Poisson distribution is 5, then its standard deviation is :

(1) 5 (2) $\sqrt{5}$

(3) 10 (4) 0

76. The distribution for which mean is always greater than its variance is :

(1) Poisson distribution

(2) Binomial distribution

(3) Normal distribution

(4) None of these

77. If mode of the normal distribution is 10, then its median is :

(1) 10 (2) 5

(3) 2 (4) 0

78. The mean and variance of a standardized variable are :

(1) $\mu = 0 = \sigma^2$ (2) $\mu = 1, \sigma^2 = 0$

(3) $\mu = 0, \sigma^2 = 1$ (4) $\mu = 1 = \sigma^2$

79. Two random variables X and Y are said to be independent if :

(1) $E(X.Y) = E(X) + E(Y)$ (2) $E(X.Y) = E(X).E(Y)$

(3) $E(X.Y) = 0$ (4) $E(X.Y) = -1$

80. If $X \sim \exp(7)$, the probability density function of X is :

(1) $7e^{-X}$ for $X > 0$ (2) $7e^{-7X}$ for $X > 0$

(3) e^{-7X} for $X > 0$ (4) $\frac{1}{7}e^{-7X}$ for $X > 0$

81. $\lim\limits_{x \to 0}\left(\frac{1}{x^2} - \frac{1}{\sin^2 x}\right)$ is equal to :

(1) 0 (2) 3

(3) $\frac{3}{2}$ (4) $-\frac{1}{3}$

82. $\lim\limits_{x \to 0}\frac{4x^5 + 9x + 7}{3x^6 + x^3 + 1}$ is equal to :

(1) 4 (2) 0

(3) 5 (4) 6

83. Consider $f(x)=\begin{cases}\dfrac{|x|}{x} & ; \quad x\neq 0 \\ 1 & ; \quad x=0\end{cases}$, then :

(1) $f(x)$ is continuous at the origin

(2) $f(x)$ is not continuous at the origin

(3) $f(x)$ is differentiable at origin

(4) None of these

84. The n^{th} derivative of e^{2-3x} is :

(1) $3^n e^{2-3x}$

(2) $(-3)^n e^{2-3x}$

(3) $\dfrac{1}{3^n}e^{2-3x}$

(4) $\dfrac{1}{(-3)^n}e^{2-3x}$

85. $\underset{n\to\infty}{\text{Lim}}\,(n)^{1/n}$ equal to :

(1) ∞

(2) 0

(3) 1

(4) does not exist

86. The value of $\int_0^{\pi/2}\sin^2 x.dx$ is :

(1) 0

(2) $\dfrac{\pi}{2}$

(3) $\dfrac{\pi}{3}$

(4) $\dfrac{\pi}{4}$

87. The minimum value of $|z-2|+|z-3|$ is : (where z is real number) :

(1) 0

(2) 1

(3) 2

(4) 3

88. If u be a homogeneous function of degree 'n' in x and y, then :

(1) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=nu$ (2) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=nu$

(3) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=(n-1)u$ (4) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=(n-1)u$

89. The value of $\int_0^1 xe^x . dx$ is :

(1) 1 (2) 2

(3) 3 (4) 0

90. The function $f(x)=\begin{cases} x\sin\frac{1}{x} & ; \quad x\neq 0 \\ 0 & ; \quad x=0 \end{cases}$ is :

(1) differentiable at 0 but not continuous

(2) having second derivative at the origin

(3) continuous at the origin but not differentiable

(4) neither continuous nor differentiable at the origin

91. Formulae in MS-Excel always begins with :

(1) = (2) %

(3) * (4) $

92. One 'nibble' is equal to :

(1) 4 bytes (2) 8 bytes

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93. If δ and E are central difference operator and shift operator respectively, then which one of the followings is ***true*** ?

(1) $\delta \equiv \frac{1}{2}\left(E^{1/2} + E^{-1/2}\right)$ (2) $\delta \equiv E^{1/2} - E^{-1/2}$

(3) $\delta \equiv E^{1/2} + E^{-1/2}$ (4) $\delta \equiv \frac{1}{2}\left(E^{1/2} - E^{-1/2}\right)$

94. Newton's backward formula is used when the interpolating value lies :

(1) in the beginning of the series

(2) in the middle of the series

(3) at the end of the series

(4) None of these

95. The Newton-Raphson's method is also called :

(1) Methods of tangents

(2) Bisection method

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96. The order of convergence of Regula-Falsi method is :

(1) 1.17 (2) 2.17

(3) 1.618 (4) 2.618

97. If E is shift operator and Δ and ∇ are forward and backward difference operators respectively, then :

(1) $E \equiv 1 - \Delta$ (2) $E \equiv 1 + \Delta$

(3) $E \equiv 1 + \nabla$ (4) $E \equiv 1 - \nabla$

98. Secant method is also called :

(1) 2 – Point method (2) 3 – Point method

(3) 4 – Point method (4) 5 – Point method

99. If $f(x) = x^2 + 2x + 2$ and interval of differencing is unity, then $\Delta f(x)$ is equal to :

(1) $2x - 3$ (2) $2x + 3$

(3) $x - 3$ (4) $x + 3$

100. If $f(x) = x^2$, then the second order divided difference for the points x_0, x_1, x_2 will be :

(1) +1 (2) $\frac{-x_2}{x_1 - x_0}$

(3) $\frac{x_0}{x_2 - x_1}$ (4) -1

Total No. of Printed Pages : 21

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D

SET-X

PG-EE-June, 2023

SUBJECT : Statistics

10028

Sr. No. .....

Time : **1¼ Hours** Max. Marks : **100** Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Date of Birth_____

Father's Name _____ Mother's Name _____

Date of Examination _____

_____ _____

(Signature of the Candidate) (Signature of the Invigilator)

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2. The candidates ***must return*** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
5. The candidate ***must not*** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers ***must not*** be ticked in the question booklet.
6. ***There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.***
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8. *Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained* **30** *minutes after starting of the examination.*

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(3) Corner point of the feasible region

(4) None of these

28. Any solution to a general LPP which satisfies the non-negative restrictions of the problem is called :

(1) unbounded solution

(2) feasible solution

(3) infeasible solution

(4) optimum solution

29. Which of the following method is ***not*** used to find an initial basis feasible solution to a transportation problem ?

(1) North-West Corner Method

(2) Least Cost Method

(3) Vogel's Approximation Method

(4) Modified Distribution Method

30. In any simplex table, in the column corresponding to entering variable if all elements ≤ 0, then the solution will be :

(1) unbounded

(2) infeasible

(3) degenerate

(4) feasible

31. $\lim_{x \to 0} \left(\frac{1}{x^2} - \frac{1}{\sin^2 x} \right)$ is equal to :

(1) 0

(2) 3

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

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

32. $\lim_{x \to 0} \frac{4x^5 + 9x + 7}{3x^6 + x^3 + 1}$ is equal to :

(1) 4 (2) 0

(3) 5 (4) 6

33. Consider $f(x) = \begin{cases} \frac{|x|}{x} & ; \quad x \neq 0 \\ 1 & ; \quad x = 0 \end{cases}$, then :

(1) $f(x)$ is continuous at the origin

(2) $f(x)$ is not continuous at the origin

(3) $f(x)$ is differentiable at origin

(4) None of these

34. The n^{th} derivative of e^{2-3x} is :

(1) $3^n e^{2-3x}$ (2) $(-3)^n e^{2-3x}$

(3) $\frac{1}{3^n} e^{2-3x}$ (4) $\frac{1}{(-3)^n} e^{2-3x}$

35. $\lim_{n \to \infty} (n)^{1/n}$ equal to :

(1) ∞ (2) 0

(3) 1 (4) does not exist

36. The value of $\int_0^{\pi/2} \sin^2 x.dx$ is :

(1) 0 (2) $\frac{\pi}{2}$

(3) $\frac{\pi}{3}$ (4) $\frac{\pi}{4}$

37. The minimum value of $|z-2|+|z-3|$ is : (where z is real number) :

(1) 0 (2) 1

(3) 2 (4) 3

38. If u be a homogeneous function of degree 'n' in x and y, then :

(1) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=nu$ (2) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=nu$

(3) $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=(n-1)u$ (4) $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}=(n-1)u$

39. The value of $\int_0^1 xe^x . dx$ is :

(1) 1 (2) 2

(3) 3 (4) 0

40. The function $f(x)=\begin{cases} x\sin\frac{1}{x} & ; \quad x\neq 0 \\ 0 & ; \quad x=0 \end{cases}$ is :

(1) differentiable at 0 but not continuous

(2) having second derivative at the origin

(3) continuous at the origin but not differentiable

(4) neither continuous nor differentiable at the origin

41. Index number for the base period is always taken as :

(1) 100 (2) 1000

(3) 10 (4) 1

42. The circular test is an extension of :

(1) the time reversal test

(2) the factor reversal test

(3) the unit test

(4) None of these

43. If P is the size of a population, F and M are the number of females and males respectively in the sample population, then the sex ratio is usually defined as :

(1) $\frac{F}{P}\times 1000$

(2) $\frac{M}{P}\times 1000$

(3) $\frac{F}{M}\times 1000$

(4) $\frac{M}{F}\times 1000$

44. The death rate obtained for a segment of a population is known as :

(1) Neonatal mortality rate

(2) Specific death rate

(3) Crude death rate

(4) Standardized death rate

45. The condition for time reversal test to hold for price index number is given by :

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

(2) $P_{01}\times P_{10}=0$

(3) $\frac{P_{01}}{P_{10}}=1$

(4) $P_{01}+P_{10}=1$

46. If the income elasticity of demand for a good is negative, it must be :

(1) a normal good

(2) a luxury good

(3) an inferior good

(4) an elastic good

47. Which index number is considered as ideal ?

(1) Laspeyre's index number

(2) Paasche's index number

(3) Marshall – Edgeworth's index number

(4) Fisher's index number

48. The formula $\frac{\sum_{i=1}^{n} p_{1i}\ q_{1i}}{\sum_{i=1}^{n} p_{0i}\ q_{1i}} \times 100$ is used to calculate :

(1) Paasche's price index

(2) Paasche's quantity index

(3) Laspeyre's price index

(4) Laspeyre's quantity index

49. NSSO stands for :

(1) National Sample Survey Organization

(2) National Sample Survey Office

(3) National Small Survey Office

(4) National Sample Service Organization

50. Crude rate of natural increase is equal to :

(1) Crude birth rate

(2) Crude death rate

(3) Crude birth rate + Crude death rate

(4) Crude birth rate – Crude death rate

51. If shoe size of the most of the people in a city is number 8, which measure of central tendency does it represent ?

(1) Mean (2) Median

(3) Mode (4) Harmonic mean

52. Mean deviation is a measure of :

(1) Location (2) Dispersion

(3) Correlation (4) Skewness

53. Ogives, for more than and less than type intersect at :

(1) Mean (2) Median

(3) Mode (4) Origin

54. If X is a random variable with its mean $\overline{X}$, then expression $E(X - \overline{X})^2$ represents :

(1) the variance of X (2) second central moment

(3) third central moment (4) both (1) and (2)

55. In case of positive skewed distribution, the relation between mean, median and mode is :

(1) Mean > Median > Mode (2) Mean > Mode > Median

(3) Mode > Median > Mean (4) Mean = Mode = Median

56. If the coefficient of kurtosis γ_2 of a distribution is zero, the frequency curve is :

(1) Leptokurtic (2) Mesokurtic

(3) Platykurtic (4) Skewed

57. Range of multiple correlation coefficient is :

(1) -1 to $+1$ (2) -1 to 0

(3) 0 to $+1$ (4) 0 to ∞

58. The coefficient of correlation between X and Y series is zero, the two regression lines are :

(1) Parallel (2) Coincident

(3) Perpendicular (4) Both (1) and (2)

59. If X and Y are independent random variables, then correlation coefficient between X and Y is :

(1) 0 (2) $+1$

(3) -1 (4) 0.5

60. Two lines of regressions X on Y and Y on X, intersect at the point :

(1) $(0, 0)$ (2) (X, Y)

(3) $(\overline{X}, 0)$ (4) $(\overline{X}, \overline{Y})$

61. For the constants 'g' and 'h' E $(gX + h)$ is :

(1) gE (X) (2) $gE(X) + h$

(3) E(X) (4) g^2E (X)

62. If X and Y are independent random variables with variances σ_1^2 and σ_2^2 respectively, the variance of $X + 3Y$ is :

(1) $\sigma_1^{\,2} + \sigma_2^{\,2}$ (2) $\sigma_1^{\,2} + 6\sigma_2^{\,2}$

(3) $\sigma_1^{\,2} + 3\sigma_2^{\,2}$ (4) $\sigma_1^{\,2} + 9\sigma_2^{\,2}$

63. If in a binomial distribution the mean is 4 and the variance is $\frac{4}{3}$, then the probability of success is :

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

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

64. If X is a Binomial variate with parameters 'n' and 'p'. If $n = 1$, the distribution of X reduces to :

(1) Poisson distribution

(2) Normal distribution

(3) Geometric distribution

(4) Bernoulli distribution

65. If the mean of a Poisson distribution is 5, then its standard deviation is :

(1) 5 (2) $\sqrt{5}$

(3) 10 (4) 0

66. The distribution for which mean is always greater than its variance is :

(1) Poisson distribution

(2) Binomial distribution

(3) Normal distribution

(4) None of these

67. If mode of the normal distribution is 10, then its median is :

(1) 10 (2) 5

(3) 2 (4) 0

68. The mean and variance of a standardized variable are :

(1) $\mu = 0 = \sigma^2$ (2) $\mu = 1, \sigma^2 = 0$

(3) $\mu = 0, \sigma^2 = 1$ (4) $\mu = 1 = \sigma^2$

69. Two random variables X and Y are said to be independent if :

(1) $E(X \,.\, Y) = E(X) + E(Y)$ (2) $E(X \,.\, Y) = E(X) \,.\, E(Y)$

(3) $E(X \,.\, Y) = 0$ (4) $E(X \,.\, Y) = -1$

70. If $X \sim \exp(7)$, the probability density function of X is :

(1) $7e^{-X}$ for $X > 0$ (2) $7e^{-7X}$ for $X > 0$

(3) e^{-7X} for $X > 0$ (4) $\frac{1}{7}e^{-7X}$ for $X > 0$

71. A necessary and sufficient condition for a basic feasible solution to be an optimum (maximum) is that (for all j) :

(1) $z_j - c_j \leq 0$ (2) $z_j - c_j = 0$

(3) $z_j - c_j \geq 0$ (4) $z_j - c_j > 0$ or $z_j - c_j < 0$

72. In a balanced transportation problem with 'm' sources and 'n' destinations, the number of linearly independent constraints is :

(1) $m + n$ (2) $m - n$

(3) $m + n - 1$ (4) $m + n + 1$

73. The graphical method of LPP uses :

(1) objective function equation (2) constraint equations

(3) both (1) and (2) (4) None of these

74. The transportation model is basically a linear program that can be solved by :

(1) Game theory (2) Simplex method

(3) Both (1) and (2) (4) None of these

75. Which of the following is ***not*** a relational operator in C ?

(1) < (2) >

(3) <= (4) ++

76. Which of the following unit convert the data received from the user into a computer understandable format ?

(1) Input unit (2) Secondary storage

(3) Arithmetic and logic unit (4) Output unit

77. Which of the following is ***not*** a type of Computer Code ?

(1) BCD (2) EBC

(3) ASCII (4) EBCDIC

78. Decimal equivalent of the binary number 101101 is :

(1) 42 (2) 43

(3) 44 (4) 45

79. Which of the following is the shortcut key to cut the selected content to the clipboard ?

(1) Ctrl + X

(2) Ctrl + N

(3) Ctrl + V

(4) Ctrl + C

80. Two binary numbers are added as given below :

$$\begin{array}{cccc} 1 & f & 1 & 0 \\ + \quad e & 0 & 1 & g \\ \hline 1 & 1 & h & 1 \end{array}$$

the (e, f, g, h) is equal to :

(1) (0, 0, 1, 1)

(2) (1, 0, 0, 1)

(3) (1, 0, 1, 0)

(4) (0, 0, 1, 0)

81. The order of differential equation $\left[1+\left(\frac{dy}{dx}\right)^2\right]^{3/2} = a.\frac{d^2y}{dx}$ is :

(1) 2 (2) 3

(3) 1 (4) None of these

82. The degree of differential equation $y = x.\frac{dy}{dx} + a\sqrt{1+\left(\frac{dy}{dx}\right)^2}$

(1) 4 (2) 3

(3) 2 (4) 1

83. The solution of the differential equation $\frac{dy}{dx}=\frac{1-x}{y}$ represents :

(1) a family of circles centered at (1, 0)

(2) a family of circles centered at (0, 0)

(3) a family of straight lines with slope –1

(4) a family of straight lines with slope +1

84. The value of Wronskian $w(x, x^2, x^3)$ is :

(1) $2x^4$ (2) $2x^3$

(3) $2x^2$ (4) $2x$

85. The solution of $\frac{d^2y}{dx^2}+\frac{dy}{dx}-2y=0$ is :

(1) $y=c_1e^{-x}+c_2e^{x}$ (2) $y=c_1e^{-2x}+c_2e^{-x}$

(3) $y=c_1e^{-2x}+c_2e^{x}$ (4) $y=c_1e^{-2x}+c_2e^{2x}$

86. The P.I of $\left(D^2+5D+6\right)y=e^x$ is :

(1) e^x (2) $\frac{e^x}{6}$

(3) $\frac{e^x}{10}$ (4) $\frac{e^x}{12}$

87. Integrating factor of $\frac{dy}{dx}=\frac{y}{x}-1$, is :

(1) e^{-x} (2) $e^{-\frac{1}{x}}$

(3) $\frac{1}{x}$ (4) $\frac{-1}{x}$

88. The solution of $\frac{dx}{dy} + Px = Q$, where P, Q are functions of y only or constants :

(1) $x \cdot e^{\int P.dy} = \int Q.e^{\int P dy} \cdot dy + c$

(2) $y.e^{\int P.dx} = \int Q.e^{\int P.dx} \cdot dx + c$

(3) $x.e^{\int P dx} = \int Q.e^{\int P.dx} .dx + c$

(4) $y.e^{\int P dy} = \int Q \cdot e^{\int P dy} .dy + c$

89. The sequence {1, 0, 1, 0, 1, 0, ……..} is :

(1) increasing sequence

(2) decreasing sequence

(3) monotone sequence

(4) None of these

90. The series $\sum_{n=1}^{\infty} \frac{n^2}{3^n}$, is :

(1) divergent

(2) convergent

(3) unbounded

(4) None of these

91. The vectors $u = (6, 2, 3, 4)$, $v = (0, 5, -3, 1)$ and $w = (0, 0, 7, -2)$ are :

(1) Dependent

(2) Independent

(3) Data is insufficient

(4) None of these

92. Let a 4×4 matrix P have determinant 10, then the determinant of matrix $-3P$ is :

(1) -30 (2) 30

(3) -810 (4) 810

93. The eigen values of the matrix :

$$A = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 1 & 4 & 0 & 1 \\ 3 & 1 & 5 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

are :

(1) 3, 2, 3, 4 (2) 1, 2, 4, 5

(3) 1, 2, 3, 5 (4) 3, 2, 1, 4

94. Let $S = \{(1, 2, 3), (1, 0, -1)\}$. The value of k for which the vector $(2, 1, k)$ belongs to the linear span of S, is :

(1) 1 (2) 2

(3) 3 (4) 0

95. If 'A' is a square matrix and A' is its transpose, then $A + A'$ is :

(1) Symmetric (2) Skew-symmetric

(3) Hermition (4) Skew-Harmition

96. The dimension of zero space is :

(1) 0 (2) 1

(3) 2 (4) 3

97. Which of the following is ***not*** true ?

(1) Every subset of a linearly independent set is linearly independent

(2) Every super set of a linearly dependent set is linearly independent

(3) Any set which contains the null vector 0 is linearly dependent

(4) None of these

98. Any square matrix 'A' is said to be Idempotent if :

(1) $A^2 = 0$ (2) $A^2 = A$

(3) $A^m = 0$, if $\exists$ a positive integer 'm' (4) $A^2 = I$

99. Which of the following is ***true*** ?

(1) C is not a vector space over C (2) C is not a vector space over R

(3) R is not a vector space over C (4) Q is a vector space over R

100. Which of the following matrix satisfy $A^2 - 5A = 0$

(1) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ (2) $\begin{bmatrix} -1 & 0 \\ -2 & -3 \end{bmatrix}$

(3) $\begin{bmatrix} 0 & -10 \\ -5 & 0 \end{bmatrix}$ (4) $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$

ANSWER KEYS OF M.Sc. (STATISTICS) COURSE FOR SESSION 2023-24				
Q. NO.	A	B	C	D
1	2	4	3	3
2	4	1	3	2
3	2	2	3	1
4	4	2	2	3
5	1	3	4	4
6	1	4	1	1
7	2	2	2	3
8	2	2	4	2
9	3	1	1	4
10	4	3	4	1
11	4	1	1	1
12	1	1	3	3
13	2	3	1	2
14	2	2	2	3
15	3	1	3	1
16	4	3	4	3
17	2	4	3	2
18	2	1	1	1
19	1	2	3	2
20	3	4	2	4
21	1	3	2	3
22	3	2	4	1
23	1	1	2	1
24	2	3	4	4
25	3	4	1	1
26	4	1	1	2
27	3	3	2	3
28	1	2	2	2
29	3	4	3	4
30	2	1	4	1
31	3	1	1	4
32	1	3	1	1
33	1	2	3	2
34	4	3	2	2
35	1	1	1	3
36	2	3	3	4
37	3	2	4	2
38	2	1	1	2
39	4	2	2	1
40	1	4	4	3
41	3	3	3	1
42	3	1	2	1
43	3	1	2	3
44	2	4	4	2
45	4	1	1	1
46	1	2	2	3
47	2	3	3	4
48	4	2	3	1
49	1	4	1	2
50	4	1	4	4

29/6/2023

29/6/23

Mandal 29/06/2023

ANSWER KEYS OF M.Sc. (STATISTICS) COURSE FOR SESSION 2023-24				
Q. NO.	A	B	C	D
51	1	1	3	3
52	3	3	1	2
53	2	1	1	2
54	3	2	4	4
55	1	3	1	1
56	3	4	2	2
57	2	3	3	3
58	1	1	2	3
59	2	3	4	1
60	4	2	1	4
61	3	3	3	2
62	2	3	2	4
63	2	3	1	2
64	4	2	3	4
65	1	4	4	2
66	2	1	1	2
67	3	2	3	1
68	3	4	2	3
69	1	1	4	2
70	4	4	1	2
71	3	3	2	3
72	2	2	4	3
73	1	2	2	3
74	3	4	4	2
75	4	1	2	4
76	1	2	2	1
77	3	3	1	2
78	2	3	3	4
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86	2	1	4	4
87	1	2	2	3
88	3	2	2	1
89	2	3	1	3
90	2	4	3	2
91	1	2	1	2
92	1	4	3	4
93	3	2	2	2
94	2	4	3	4
95	1	2	1	1
96	3	2	3	1
97	4	1	2	2
98	1	3	1	2
99	2	2	2	3
100	4	2	4	4

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