KANNUR UNIVERSITY
DEPARTMENT OF STATISTICAL SCIENCES

M.Sc. STATISTICS DEGREE ENTRANCE EXAMINATION

JUNE 2017

Do not open this booklet until you are asked to

Register number : | | | | | | | | | |

Name of the candidate :……………………………………….……….………..
(in block letters)

Signature of the candidate:………………………………………….…………..……

General instructions to candidates

1. *This booklet contains* **100** *multiple choice objective type questions.*

2. *Each correct answer carries* 4 *marks and each wrong answer carries* -1 *marks.*

3. *For each question* FOUR *answers are given under letters* [A] *to* [D] *of which only one answer is most correct.*

4. *Write the letter corresponding to the answer in the cell against the question number in the answer sheet.*

5. *Over writing or marking anything other than one of the letters* A *to* D *in the answer cells will render the answer invalid.*

6. *The blank pages at the end of the booklet can be used for calculations if needed.*

7. *Should not write anything in side the booklet except in the blank pages.*

8. *Candidates should not bring calculators, mathematical tables or any written or printed material other than Hall ticket in the examination hall.*

9. *Each candidate has to return the complete booklet along with the answer sheet to the invigilator at the end of the examination.*

10. *Bringing of electronic devices of any kind inside the examination hall is strictly prohibited.*

11. *Candidates indulging in malpractices of any kind will be disqualified for admission.*

Time: 2hrs	**Total Marks=100**

ANSWER SHEET

REGISTER NUMBER

S	T	A	T	1	7			

Q.No.	Answer		Q. No.	Answer		Q.No.	Answer		Q. No.	Answer
1			26			51			76	
2			27			52			77	
3			28			53			78	
4			29			54			79	
5			30			55			80	
6			31			56			81	
7			32			57			82	
8			33			58			83	
9			34			59			84	
10			35			60			85	
11			36			61			86	
12			37			62			87	
13			38			63			88	
14			39			64			89	
15			40			65			90	
16			41			66			91	
17			42			67			92	
18			43			68			93	
19			44			69			94	
20			45			70			95	
21			46			71			96	
22			47			72			97	
23			48			73			98	
24			49			74			99	
25			50			75			100	

QUESTIONS

1. The average salary of male employees in a firm was Rs.520 and that of female was Rs.420. The mean salary of all the employees was Rs.500. find the percentage of female employees in the firm.

   (A) 80

   (B) 20

   (C) 60

   (D) 40

2. When x_i and y_i are two random variables(i = 1,2,3,...,n) with geometric means G_1 and G_2 respectively, then the geometric mean of $\frac{x_i}{y_i}$ is

   (A) $\frac{G_1}{G_2}$

   (B) antilog$\left(\frac{G_1}{G_2}\right)$

   (C) n (log G_1 – log G_2)

   (D) antilog $\left(\frac{log\ G_1 - log\ G_2}{2n}\right)$

3. A letter is taken at random out of ASSISTANT and a letter out of STATISTICS. What is the chance that they are the same letters.

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

   (B) $\frac{16}{81}$

   (C) $\frac{1}{9}$

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

4. P is the probability that a man aged x years will die in a year. Find the probability that out of n men $A_1, A_2, ..., A_n$ each aged x, A_1 will die in a year and will be the first to die.

(A) $(1-p)^n$

(B) $\frac{1}{n}$

(C) $\frac{1}{n}[1-(1-p)^n]$

(D) $1-(1-p)^n$

5. Two six faced unbiased dies are drawn. Find the probability that the sum of the numbers shown is 7 or their product is 12

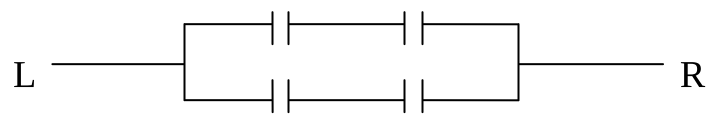
(A) $\frac{2}{9}$

(B) $\frac{3}{8}$

(C) $\frac{7}{12}$

(D) $\frac{1}{9}$

6. The probability of the closing of each relay of the circuit shown below is given by p. If all the relays function independently , what is the probability that a circuit exists between the terminals L and R



(A) 4p(1-p)

(B) $2p^2$

(C) $4p^2$

(D) $p^2(2- p^2)$

7. In answering a question on multiple choice test a student either knows the answer or he guesses. Let P be the probability that he know the answer and 1-P be the probability that he guesses. Assume that a student who guesses the answer will be correct with probability ¼ where 4 is the number of multiple choice alternatives. What is the conditional probability that a student knew the answer to a question given that he answered it correctly?

(A) $\frac{4P}{3P+1}$

(B) $\frac{5P}{4P+1}$

(C) $\frac{P}{3P+1}$

(D) $\frac{P}{4P+1}$

8. Let X be a continuous random variable with p.d.f f(x) given by

$$f(x)=\begin{cases} ax & 0 \le x \le 1 \\ a & 1 \le x \le 2 \\ -ax+3a & 2 \le x \le 3 \\ 0 & otherwise. \end{cases}$$

The value of a is

(A) $\frac{1}{8}$

(B) $\frac{1}{6}$

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

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

9. Let X has the standard exponential distribution. Then the distribution of $y = 1- e^{-X}$ is

(A) $\chi^2_{(1)}$

(B) N(0,1)

(C) U(0,1)

(D) Standard exponential

10. Which of the following is not a characteristic function

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

(B) $\Phi(t) = e^{-t}$

(C) $\Phi(t) = e^{-t^2}$

(D) $\Phi(t) = e^{-t^3}$

11. The distribution function of a random variable X is given by

$$F(x) = \begin{cases} 0 & ; x < 0 \\ \frac{x}{4} & ; 0 \le x < 1 \\ \frac{1}{2} & ; 1 \le x < 2 \\ \frac{x}{12} + \frac{1}{2} & ; 2 \le x < 3 \\ 1 & ; x \ge 0 \end{cases}$$

Then $P(1 \le x < 3)$ is

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

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

(C) 1

(D) 0

12. If X~N(0,1) and Y $\sim \chi^2_n$ then which of the following is true

(A) E(X+Y)=n

(B) V(X+Y)=1+2n

(C) $\frac{X}{\sqrt{\frac{y}{n}}} \sim t_{(n)}$

(D) All of the above

13. The R command for generating a random sample of 100 observation from a normal population with mean 5 and standard deviation 5 is

(A) pnorm(100,5,5)

(B) dnorm(100,5,5)

(C) rnorm(100,5,5)

(D) fnorm(100,5,5)

14. Component of a time series which is attached to short term fluctuation is

(A) Seasonal variations

(B) cyclical variations

(C) irregular variations

(D) Secular trend

15. Suppose that X is a Poisson random variable with P(X=1) = P(X=3). Then V(X) is

(A) √6

(B) 2

(C) 6

(D) 3

16. Let X be a random real number from (0,1). The probability density function of Y = $\frac{1}{X}$ is

(A) $\frac{1}{y^2}$; $1 < y < \infty$

(B) $\frac{1}{y^2}$; $0 < y < 1$

(C) $\frac{1}{y^2}$; $0 < y < \infty$

(D) $\frac{1}{y}$; $1 < y < \infty$

17. Let X be a random variable with the set of values {-1,0,1}. Given that P(X = -1) = P(X = 0) = P(X = 1) = $\frac{1}{3}$. If Y = X^2, choose the correct statement.

(A) X and Y are independent

(B) X and Y are correlated

(C) X and Y are uncorrelated

(D) X and Y are identically distributed.

18. If X_1, X_2, X_3, X_4 are independent standard normal variate , the distribution of

Y = $\frac{X_3 - X_4}{\sqrt{X_1^2 + X_2^2}}$ is

(A) $t_{(1)}$

(B) $t_{(2)}$

(C) $F_{(1,2)}$

(D) N(0, 2)

19. If X and Y are independent gamma variates, then the distribution of $Z = \frac{X}{X+Y}$ is

(A) Beta distribution of first kind

(B) Beta distribution of second kind

(C) Gamma distribution

(D) Exponential distribution

20. If a random variable assumes only positive integral values with the probability $P[X = x] = \frac{2}{3}\left(\frac{1}{3}\right)^{x-1}$; x=1,2,3,… . Then E(X) is

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

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

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

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

21. Let $f(x) = \cos|x|$ and $g(x) = \sin|x|$,then

(A) both f and g are even functions.

(B) both f and g are odd functions.

(C) f is an even function and g is an odd function.

(D) f is an odd function and g is an even function.

22. Which is true among the following?

(A) R is countable

(B) Q is countable

(C) R – Q is finite

(D) R is finite

23. If f and g are onto functions , which of the following is always true?

(A) $g \circ f$ is onto

(B) $g \circ f$ is not onto

(C) $g \circ f$ is one to one

(D) $g \circ f$ is bijective

24. If A = $\begin{bmatrix} 2 & 1 \\ -4 & -2 \end{bmatrix}$, then I + A + A^2 + … is

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

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

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

(D) None of these

25. Let $\{a_n\}$ and $\{b_n\}$ be two sequences of real numbers such that $\lim_{n\to\infty} a_n = 1$ and $\lim_{n\to\infty} b_n = -1$. Then the sequence $\{c_n\}$ where $c_n = a_{2n} + b_{2n+1}$, $n \in N$,

(A) converges to -1

(B) converges to 0

(C) converges to 1

(D) does not converge

26. Let $f: R \to R$ be a continuous function and $g: R \to R$ be a function such that $f(x) = \sin(x) + g(x), x \in R$. Then

(A) g is continuous but may not be differentiable

(B) g is always differentiable

(C) g is differentiable and bounded

(D) g is not continuous

27. Limit point of the set $\{1, 1/2, 1/3, \ldots\}$ is

(A) 1

(B) 0

(C) ∞

(D) -1

28. If A = $\begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, B = $\begin{bmatrix} x & 1 \\ y & -1 \end{bmatrix}$ and $(A + B)^2 = A^2 + B^2$, then $x + y$ is

(A) 6

(B) 5

(C) 0

(D) 12

29. If $A^2 - 3A + 2I = 0$, then

(A) A is singular

(B) $A^{-1} = \frac{3I + A}{2}$

(C) $A^{-1} = \frac{I - 3A}{2}$

(D) $A^{-1} = \frac{3I - A}{2}$

30. Given Re$\left(\frac{1}{z}\right)$ = 3, then z lies on

(A) circle with centre on Y- axis

(B) circle with centre on X- axis not pass through the origin

(C) circle with centre on X- axis and pass through the origin

(D) None of these

31 f(z) = $\int_0^\infty e^{-zt} g(t)dt$ is the:

(A) Laplace transform of g(t) (B) Fourier transform of g(t)

(C) Characteristic function of g(t) (D) CDF of g(t)

32. If two sets A and B are having n elements in common, then the number of elements common to A X B and B X A are

(A) 2^{99}

(B) 99

(C) 99^2

(D) 100

33. Let $1, \omega, \omega^2$ be cube roots of unity , then inverse of which of the following matrices exists

(A) $\begin{bmatrix} 1 & \omega \\ \omega & \omega^2 \end{bmatrix}$

(B) $\begin{bmatrix} \omega^2 & 1 \\ 1 & \omega \end{bmatrix}$

(C) $\begin{bmatrix} \omega & \omega^2 \\ \omega^2 & 1 \end{bmatrix}$

(D) none of these

34. If $A = \begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric, then $x =$

(A) 3

(B) 5

(C) 2

(D) 4

35. If A is a non-singular matrix of order n, then the rank of A is

(A) 1

(B) n-1

(C) n

(D) n-2

36. The system of equation $4x+6y=5, 6x+9y=7$ has

(A) a unique solution

(B) no solution

(C) infinitely many solutions

(D) none of these

37. The inverse of the matrix $\begin{bmatrix} 2 & -5 & 1 \\ 8 & 6 & 7 \\ \lambda & -10 & 2 \end{bmatrix}$ does not exist if $\lambda =$

(A) 1 (B) 2

(C) 4 (D) 6

38. For any square matrix A , $A + A^T$ is

(A) symmetric

(B) skew symmetric

(C)zero matrix

(D) null matrix

39. Given that A and B are 3×3 matrices and A is invertible. Let eigen values of AB be $\lambda_1, \lambda_2, \lambda_3$. Then eigen values of BA are

(A) $\lambda_1, \lambda_2, \lambda_3$

(B) $\frac{1}{\lambda_1}, \frac{1}{\lambda_2}, \frac{1}{\lambda_3}$

(C) $-\lambda_1, -\lambda_2, -\lambda_3$

(D) none of the above

40. An $n \times m$ matrix A is of rank 5, and $5 < n$ & $5 < m$. Identify the statement which is not true

(A) All the determinants of sub-square matrix of order $k \times k (k < 5)$ are zero

(B) There exists a set of k rows $(k < 5)$ which are linearly independent.

(C) The set of any k rows $(k > 5)$ are linearly dependent

(D) There exists a 5×5 submatrix whose determinant is no-zero

41. If $X_1, X_2, \ldots, X_n$ are independent and identically distributed random variables following exponential distribution with mean θ, then the distribution of $Z = E(\text{Min}(X_1, X_2, \ldots, X_n))$ is

(A) $n\theta^2$

(B) $n\theta$

(C) $\frac{\theta}{n}$

(D) $\frac{n}{\theta}$

42. X and Y are independent random variables with a common pdf

$$f(x) = \begin{cases} e^{-X} & ; x \geq 0 \\ 0 & ; x < 0 \end{cases}$$

Then what is the distribution of X-Y

(A) Logistic

(B) Exponential

(C) Laplace

(D) Gamma

43. Let X have a standard cauchy distribution. Then the distribution of X^2 is

(A) standard cauchy

(B) chi square

(C) beta distribution of first kind

(D) beta distribution of second kind

44. X is normally distributed with zero mean and unit variance.

The variance of X^2 is

(A) 0

(B) 1

(C) 2

(D) 4

45. The points of inflexion of normal curve are

(A) $\mu \pm \sigma$

(B) $\mu \pm 2\sigma$

(C) $\mu \pm 3\sigma$

(D) $\mu \pm \frac{2}{3}\sigma$

46. Let 8X-10Y+66 = 0 and 40X-18Y=214 be the lines of regression of Y on X and X on Y respectively. Then the value of the correlation coefficient is

(A) 0.4

(B) 0.6

(C) 0.8

(D) 1

47. Variables (X,Y) have joint pdf

$$f(x,y) = \begin{cases} 6(1-x-y) & ; x > 0, y > 0,\ x+y < 1 \\ 0 & ; otherwise \end{cases}$$

The regression equation of Y on X is

(A) y = $\frac{2}{3}(1-x)$

(B) y =$\frac{1}{3}(1-2x)$

(C) y = $\frac{1}{3}(1-x)$

(D) y =$\frac{1}{2}(1-3x)$

48. Given two lines of regression as 4X – 3Y -1 =0 and 3X – 4Y +8 =0, the means of X and Y are

(A) $\bar{X}$= 4 , $\bar{Y}$ = 5

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

(C) $\bar{X}$= $\frac{4}{3}$, $\bar{Y}$ = $\frac{5}{4}$

(D) $\bar{X}$= $\frac{3}{4}$, $\bar{Y}$ =$\frac{4}{5}$

49. Let X be a random variable with probability density function given by

f(X) = e^{-x} ,X$\geq$ 0

Let Y = $\begin{cases} X & ; X \leq 1 \\ \frac{1}{X} & ; X > 1 \end{cases}$

Then probability density function of Y is

(A) $e^{-y} + \frac{1}{y^2}\, e^{\frac{-1}{y}}$

(B) $e^{-y} - \frac{1}{y^2}\, e^{\frac{-1}{y}}$

(C) e^{-y}

(D) None of these

50. Let X and Y be independent random variables each having pmf

$P(X) = \frac{1}{2}\left(\frac{2}{3}\right)^x$, x = 0,1, 2,… Then find P(X+Y = 3)

(A) $\frac{3}{21}$

(B) $\frac{4}{27}$

(C) $\frac{8}{27}$

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

51. A right angled triangle has a hypotenuse of length 9. If the pdf of one sides length is $f(x) = \frac{1}{2}$;2<x<4 ,Then expected value of the square of the other side is

(A) $\frac{215}{3}$

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

(C) $\frac{214}{3}$

(D) None of these

52. If $X_1, X_2, \ldots, X_n$ is a random sample from a population $N(0,\sigma^2)$, the sufficient statistic for σ^2 is

(A) $\sum X_i$ (B) $\sum X_i^2$

(C) $\sum(X_i - \bar{X})^2$ (D) $\text{Max}(X_1, X_2, \ldots, X_n)$

53. Mean squared error of an estimator T_n of θ is expressed as

(A) bias + $V_\theta(T_n)$

(B) $(\text{bias} + V_\theta(T_n))^2$

(C) $(\text{bias})^2 + V_\theta(T_n)^2$

(D) $(\text{bias})^2 + \text{Var}(T_n)$

54. If $X_1, X_2, \ldots, X_n$ is a random sample from a population having density function

$f(x,\theta) = \frac{1}{\sqrt{2\pi\theta}} e^{-\frac{x^2}{2\theta}}$

Then the maximum likelihood estimator for θ is

(A) $\sqrt{\frac{\sum x_i^2}{n}}$

(B) $\frac{\sum x_i^2}{n}$

(C) $\frac{\sqrt{\sum x_i^2}}{n}$

(D) $\frac{\sum x_i^2}{\sqrt{n}}$

55. Let X and Y have joint pdf $f(x,y) = \frac{3}{2}(x^2 + y^2)$; $0<x<1$, $0<y<1$

Then $E(X^2 + Y^2)$ is

(A) $\frac{12}{15}$ (B) $\frac{4}{15}$

(C) $\frac{14}{15}$ (D) $\frac{4}{12}$

56. Let $X_1, X_2, \ldots, X_n$ be a random sample from a Bernoulli population $p^x(1-p)^{n-x}$. A sufficient statistic for p is

(A) $\sum X_i$ (B) $\prod_{i=1}^{n} X_i$

(C) $\text{Max}(X_1, X_2, \ldots, X_n)$ (D) $\text{Min}(X_1, X_2, \ldots, X_n)$

57. Formula for the confidence interval for the ratio of variances of two normal populations involves

(A) Normal distribution (B) χ^2-distribution

(C) F-distribution (D) t-distribution

58. For a negatively skewed data set

(A) mean < median < mode (B) mean > mode > median

(C) mean > median > mode (D) median < mean < mode

59. The maximum likelihood estimator of θ based on a random sample of size n from a population with pdf $f(x,\theta) = \frac{1}{2} e^{-|X-\theta|}$

(A) Mean $(X_1, X_2, \ldots X_n)$ (B) $\text{Median}(X_1, X_2, \ldots X_n)$

(C) $\text{Max}(X_1, X_2, \ldots X_n)$ (D) $\text{Min}(X_1, X_2, \ldots X_n)$

60. Which of the following is not true?

(A) If T is an unbiased estimator of θ, then T^2 is an unbiased estimator of θ^2.

(B) If T is a consistent estimator of θ, then T^2 is a consistent estimator of θ^2.

(C) If T is the MLE of θ, then T^2 is the MLE of θ^2.

(D) None of the above

61. Only real value of λ for which the following system of linear equations $x+2y+3z=\lambda x,\ 3x+y+2z=\lambda y,\ 2x+3y+z=\lambda z$ has non-zero solution is

(A) 3 (B) 4

(C) 5 (D) 6

62. The system of linear equations $x+y+z=2,\ 2x+y-z=3,\ 3x+y+kz=4$ has unique solution if

(A) $k \neq 0$ (B) $-1<k<1$

(C) $-2<k<1$ (D) $k=0$

63. Out of 800 boys in a school, 224 played cricket, 240 played hockey and 336 played basket ball. Of the total, 64 played both basket ball and hockey; 80 played cricket and basket ball; 40 played cricket and hockey; and 24 played all the 3 games. Then number of boys who did not play any game is

(A) 859 (B) 140

(C) 1872 (D) 160

64. If f is strictly increasing function, then $\lim_{x\to 0} \frac{f(x^2)-f(x)}{f(x)-f(0)}$ is

(A) 1 (B) 0

(C) 2 (D) -1

65. 18! + 1 is divisible by

(A) 19 (B) 23

(C) 19 and 23 (D) none of these

66. If the complex numbers z_1, z_2, z_3 are in A.P , then they lie on a

(A) circle

(B) parabola

(C) ellipse

(D) line

67. The cube roots of unity

(A) form an equilateral triangle

(B) are collinear

(C) lie on a circle of radius 3

(D) none of these

68. If α, β, γ are roots of the equation $x^3 - px^2 + qx - r$ then, $(\alpha+\beta)(\beta+\gamma)(\gamma+\alpha) =$

(A) $pq - r$

(B) $p - qr$

(C) $p(q+r)$

(D) none of these

69. The equation $x^n + 1 = 0$ has no real roots when n is

(A) even

(B) odd

(C) both of them

(D) none of these

70. $1+\frac{2^3}{2!}+\frac{3^3}{3!}+\frac{4^3}{4!}+\ldots=$

(A) 3e

(B) 5e

(C) 7e

(D) 9e

71. If $y+\frac{y^3}{3}+\frac{y^5}{5}+\ldots=2(x+\frac{x^3}{3}+\frac{x^5}{5}+\ldots)$, then the relation between x and y is

(A) $x^2=2x-y$

(B) $y^2=2y-x$

(C) $y^2=2y-x$

(D) $x^2y=2x-y$

72. The rank of the linear transformation $T:R^3\to R^3$ defined by $T(x,y,z)=(y,0,z)$ is

(A) 1 (B) 2

(C) 3 (D) 0

73. $\lim_{x\to 0}(\cos x)^{1/x^2}=$

(A) $\sqrt{e}$ (B) $\frac{1}{\sqrt{e}}$

(C) 1 (D) does not exist

74. The shortest distance of the point (0,c) where $0 \le c \le 5$, from the parabola $y = x^2$ is

(A) $\sqrt{4c+1}$

(B) $\frac{\sqrt{4c+1}}{2}$

(C) $\frac{\sqrt{4c-1}}{2}$

(D) none of these

75. The least value of $f(x) = 2x + \frac{8}{x^2}, x > 0$ is

(A) 4

(B) 6

(C) 8

(D) 12

76. The curve $y = x^3 - 3x^2 - 9x + 9$ has a point of inflexion at

(A) $x = -1$

(B) $x = 1$

(C) $x = 2$

(D) $x = -2$

77. If f(x) = $\begin{cases} e^x & , x \le 0 \\ |1-x| & , x > 0 \end{cases}$, then

(A) f(x) is differentiable at x=0

(B) f(x) is continuous at x=0

(C) f(x) is differentiable at x=1

(D) none of these

78. The value of $\lim_{n\to\infty} \frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \ldots + \frac{1}{(2n-1)(2n+1)}$ is

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

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

79. f(x) = $\begin{vmatrix} x^3 & \sin x & \cos x \\ 6 & -1 & 0 \\ p & p^2 & p^3 \end{vmatrix}$,where p is a constant. Then $\frac{d^3(f(x))}{dx^3}$ at x=0 is

(A) p

(B) $p^2 + p$

(C) $p + p^3$

(D) 0

80. The value of $\frac{d}{dx}[|x-1| + |x-5|]$ at x=3 is

(A) -2

(B) 0

(C) 2

(D) 4

81. If $X_1, X_2, \ldots X_n$ be a random sample of size n from B(1,θ) and $T = \sum_{i=1}^{n} X_i$ then the unbiased estimator of θ^2 is

(A) $\frac{T^2}{n^2}$

(B) $\frac{T(T+1)}{n(n+1)}$

(C) $\frac{T(T-1)}{n(n-1)}$

(D) $\frac{T}{n}$

82. The joint pdf of X and Y is given by $f(x,y) = ce^{-x};\ x \geq 0,\ |y| < x$

Then find the value of c

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

(C) $\frac{1}{2}$ (D) None of the above

83. To test $H_0 : \mu = \mu_0$ Vs $H_1 : \mu > \mu_0$ when the population standard deviation is unknown ,the appropriate test is

(A) t-test

(B) Z –test

(C) χ^2-test

(D) F- test

84. The coefficient of x^3y^4 in the expansion of $(2x-4y)^7$ is

(A) $\binom{7}{2}2^{11}$

(B) $\binom{7}{3}2^{11}$

(C) $\binom{11}{3}2^{11}$

(D) None of these

85. The hypothesis that the population variance has a specified value can be tested by

(A) t-test (B) Z –test

(C) χ^2-test (D) F- test

86. Degrees of freedom for χ^2 in case of contingency table of order (4 x3) is

(A) 12 (B) 9

(C) 8 (D) 6

87. Analysis of variance utilises

(A) t-test (B) Z –test

(C) χ^2-test (D) F- test

88. A point is selected at random from the interval (0,200). What is the probability that it is an even integer.

(A) 1 (B) 0

(C) $\frac{1}{200}$ (D) $\frac{1}{100}$

89. If five numbers are selected at random from the set {1,2,3,…,20}, find then probability that their minimum is larger than 5.

(A) $1-\left(\frac{3}{4}\right)^5$ (B) 0

(C) $\left(\frac{3}{4}\right)^5$ (D) None of these

90. A bus arrives at a station every day at random time between 1:00 PM and 1:30 PM. A person arrives this station at 1:00 PM and waits for the bus. If at 1:15 the bus has not yet arrived, what is the probability that the person will have to wait at least an additional 5 minutes.

(A) $\frac{14}{15}$ (B) $\frac{1}{15}$

(C) 0 (D) $\frac{10}{15}$

91. A fair coin is tossed 3 times. Then the probability of getting no successive heads is

(A) $\frac{6}{8}$ (B) $\frac{1}{3}$

(C) $\frac{5}{8}$ (D) 0

92. An urn contains 10 white and 12 red chips. Two chips are drawn at random and without looking at their colours, are discarded. What is the probability that third chip drawn is red.

(A) $\frac{10}{22}$ (B) $\frac{12}{22}$

(C) $\frac{3}{12}$ (D) none of the above

93. A minimum value of $\int_o^x te^{-t^2}\,dt$ is

(A) 1 (B) 2

(C) 3 (D) 0

94. The straight line $x + y = a$ will be a tangent to the ellipse $\frac{x^2}{9} + \frac{y^2}{16} = 1$, if value of a is

(A) 8 (B) ± 5

(C) 10 (D) ± 6

95. f(x) = x$e^{x(1-x)}$, then f(x) is

(A) increasing on $[\frac{-1}{2}, 1]$

(B) increasing on **R**

(C) decreasing on **R**

(D) decreasing on $[\frac{-1}{2}, 1]$

96. The area of the region bounded by the lines y = |x-2|, x=1, x=3 and the X-axis is

(A) 1

(B) 2

(C) -6

(D) 6

97. The area bounded by parabola $y^2 = x$ and the straight line 2y = x is

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

(B) 2

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

(D) 6

98. If 5x-y , 2x+y, x+2y are in AP and $(x-1)^2$, (xy+1),$(y+1)^2$ are in GP , x≠0, then x + y =

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

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

(C) 5

(D) 3

99. If $f(0) = 0$ and $f''(x)$ exists for all $x > 0$ then $f(x)/x$

(A) decrease on $(0, \infty)$

(B) increases on $(0, \infty)$

(C) decreases on $(1, \infty)$

(D) none of these

100. If p and q are real numbers such that $p^2+q^2 = 1$, then the maximum value of $p+q$ is

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

(C) 4 (D) 2

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