

Roll No.-----

<b>Paper Code</b>		
<b>2</b>	<b>5</b>	<b>6</b>
(To be filled in the OMR Sheet)		

प्रश्नपुस्तिका क्रमांक  
Question Booklet No.

O.M.R. Serial No.

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प्रश्नपुस्तिका सीरीज  
Question Booklet Series  
**D**

**B.Sc.-Part-I (Second Semester) Examination, July-2022**

**B060201T**

**Statistics**

**[Descriptive Statistics (Bivariate) and Probability Distribution]**

**Time : 1:30 Hours**

**Maximum Marks-100**

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

- निर्देश : -
1. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सीरीज का विवरण यथास्थान सही- सही भरें, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
  2. इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमें से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने हैं। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर पत्रक (O.M.R. ANSWER SHEET) में उसके अक्षर वाले वृत्त को काले या नीले बाल प्वाइंट पेन से पूरा भर दें। यदि किसी परीक्षार्थी द्वारा किसी प्रश्न का एक से अधिक उत्तर दिया जाता है, तो उसे गलत उत्तर माना जायेगा।
  3. प्रत्येक प्रश्न के अंक समान हैं। आप के जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
  4. सभी उत्तर केवल ओ०एम०आर० उत्तर पत्रक (O.M.R. ANSWER SHEET) पर ही दिये जाने हैं। उत्तर पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
  5. ओ०एम०आर० उत्तर पत्रक (O.M.R. ANSWER SHEET) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाय।
  6. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी ओ०एम०आर० शीट उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
  7. निगेटिव मार्किंग नहीं है।

महत्वपूर्ण : - प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।

**K-256**

## **Rough Work / रफ कार्य**

1. If the sum of squares of difference of ranks of 6 candidates in two criteria is 21, the rank correlation coefficient is :
  - (A) 0.5
  - (B) 0.6
  - (C) 0.4
  - (D) 0.7
  
2. The straight line  $Y = a + bX$  is fitted by the method of least squares from the data given below -  
 $X = 1 \ 2 \ 3$   
 $Y = 3 \ 6 \ 9$   
The value of b is :
  - (A) 0
  - (B) 1
  - (C) 2
  - (D) 3
  
3. If there are tied ranks in the data from two variables, what test should be used to examine the relationship between them ?
  - (A) Spearman's correlation
  - (B) Pearson's correlation
  - (C) Kendall's Tau-b
  - (D) Biserial correlation
  
4. Correlation coefficient was invented in the year :
  - (A) 1910
  - (B) 1890
  - (C) 1908
  - (D) None of the above

5. The geometric mean of the two regression coefficient  $\beta_{YX}$  and  $\beta_{XY}$  is equal to :
- (A)  $r$
  - (B)  $r^2$
  - (C) 1
  - (D) None of the above
6. For a  $3 \times 3$  contingency table, the degrees of freedom is :
- (A) 9
  - (B) 4
  - (C) 3
  - (D) 6
7. If for two attributes A and B,  $N=140$ ,  $(A)=100$ ,  $(b)=105$ ,  $(AB)=25$ , the attributes A and B are :
- (A) Dependent
  - (B) Positively associated
  - (C) Negatively associated
  - (D) Independent
8. A measure related to coefficient of contingency is :
- (A) Yule's coefficient
  - (B) Coefficient of correlation
  - (C) Tschuprow's coefficient
  - (D) All of the above

9. Coefficient of contingency is a measure of :
- (A) Independence of attributes
  - (B) Dependence of attributes
  - (C) Correlation
  - (D) All of the above
10. If (A)=55, (B)=70, N=100 then the lowest value of (AB) can be :
- (A) 0
  - (B) 55
  - (C) 25
  - (D) None of the above
11. If there is perfect positive association between the two attributes Q would be :
- (A) -1
  - (B) +0.99
  - (C) +1
  - (D) 0
12. Attributes A and B are positively associated if :
- (A)  $(AB) = \frac{(A) \times (B)}{N}$
  - (B)  $(Ab) > \frac{(A) \times (B)}{N}$
  - (C)  $(AB) > \frac{(A) \times (B)}{N}$
  - (D)  $(AB) \leq \frac{(A) \times (B)}{N}$
13. In case of two attributes A and B, the ultimate class frequencies are :
- (A) (AB), (Ab)
  - (B) (AB), (ab)
  - (C) (AB), (aB)
  - (D) (AB), (Ab), (aB), (ab)

14. With two attributes one can have in all :
- (A) Two class frequencies
  - (B) Four class frequencies
  - (C) Eight class frequencies
  - (D) Nine class frequencies
15. The frequency of a class can always be expressed as a sum of frequencies of :
- (A) Lower order classes
  - (B) Higher order classes
  - (C) Zero order classes
  - (D) None of the above
16. The notation (ABC) represents :
- (A) Combination of the attributes A, B and C
  - (B) Cell in a contingency table
  - (C) The frequency of the class ABC
  - (D) None of the above
17. Measures of association usually deal with :
- (A) Attributes
  - (B) Quantitative factors
  - (C) Variables
  - (D) Numbers
18. In Spearman rank correlation coefficient, the maximum value of  $\sum d_i^2$  in case of untied rank is :
- (A)  $\frac{1}{2}(n^2 - 1)$
  - (B)  $\frac{1}{4}n(n^2 - 1)$
  - (C)  $n$
  - (D)  $\frac{1}{3}n(n^2 - 1)$

19. Spearman's rank correlation coefficient is given by :
- (A)  $1 + \frac{6\sum d_i^2}{n(n^2-1)}$
  - (B)  $1 - \frac{6\sum d_i}{n(n^2-1)}$
  - (C)  $1 - \frac{6\sum d_i^2}{n(n^2-1)}$
  - (D)  $1 + \frac{6\sum d_i}{n(n^2-1)}$
20. Maximum value of rank correlation coefficient is :
- (A) 0
  - (B) +1
  - (C) -1
  - (D) None of the above
21. Rank correlation is superior method of analysis in case of \_\_\_\_\_ distribution.
- (A) Qualitative
  - (B) Quantitative
  - (C) Frequency
  - (D) None of the above
22. Rank correlation was found by
- (A) Galton
  - (B) Spearman
  - (C) Fisher
  - (D) Pearson
23. If S.D. of X is 25, coefficient of correlation is 0.2 and S.D. of Y is 10, then regression coefficient of X on Y will be :
- (A) 0.8
  - (B) 2.5
  - (C) 0.5
  - (D) 5.0

24. The correlation coefficient between X and Y is zero, then the angle between two regression lines is :
- (A)  $0^\circ$
  - (B)  $45^\circ$
  - (C)  $30^\circ$
  - (D)  $90^\circ$
25. If  $4x - 5y + 33 = 0$  and  $20x - 9y = 107$  are the two regression lines, then the correlation coefficient between x and y is :
- (A)  $\frac{4}{5}$
  - (B)  $\frac{9}{20}$
  - (C)  $\frac{3}{5}$
  - (D) None of the above
26. Given the two lines of regression as,  $3X - 4Y + 8 = 0$  and  $4X - 3Y = 1$ , the means of X and Y are :
- (A)  $\bar{X} = 4, \bar{Y} = 5$
  - (B)  $\bar{X} = 3, \bar{Y} = 4$
  - (C)  $\bar{X} = \frac{4}{3}, \bar{Y} = \frac{5}{4}$
  - (D) None of the above
27. The lines of regression intersect at the point :
- (A)  $(X, Y)$
  - (B)  $(\bar{X}, \bar{Y})$
  - (C)  $(0, 0)$
  - (D)  $(1, 1)$
28. If  $\beta_{YX} > 1$ , then  $\beta_{XY}$  is :
- (A) Less than 1
  - (B) Greater than 1
  - (C) Equal to 1
  - (D) Equal to 0



29. If  $\beta_{YX}$  and  $\beta_{XY}$  are two regression coefficients, they have :
- (A) Same sign
  - (B) Opposite sign
  - (C) Either same or opposite signs
  - (D) Nothing can be said
30. In the regression line  $Y = \beta_0 + \beta_1 X$ ,  $\beta_0$  is the :
- (A) Slope of the line
  - (B) Intercept of the line
  - (C) Both (A) and (B)
  - (D) Neither (A) nor (B)
31. The correlation measures the strength and direction of the nonlinear relationship between two variables :
- (A) Totally True
  - (B) Totally False
  - (C) Partially True
  - (D) Partially False
32. In a scatter diagram, all the points lie on a rising straight line. It is indication of :
- (A) Perfect positive correlation
  - (B) Perfect negative correlation
  - (C) No correlation
  - (D) None of the above
33. Which of the following indicates a strong negative correlation ?
- (A)  $r = -0.793$
  - (B)  $r = -0.846$
  - (C)  $r = 0.913$
  - (D)  $r = 0.45$

34. Which of the following can not be the possible value of a correlation coefficient ?
- (A)  $r = 1.99$
  - (B)  $r = 0$
  - (C)  $r = -0.73$
  - (D)  $r = -1.0$
35. In the regression line  $Y = \alpha + \beta X$ ,  $\beta$  is called the :
- (A) Slope of the line
  - (B) Intercept of the line
  - (C) Both (A) and (B)
  - (D) Neither (A) nor (B)
36. The range of the correlation coefficient is :
- (A)  $(-1, 1)$
  - (B)  $[-1, 1]$
  - (C)  $(0, 1)$
  - (D) None of the above
37. The dots of scatter diagram follow some path, this path may be :
- (A) A line
  - (B) A curve
  - (C) A function
  - (D) Both (A) and (B)
38. Scatter diagram of the variate values  $(X, Y)$  gives the idea about :
- (A) Functional relationship
  - (B) Regression model
  - (C) Distribution of errors
  - (D) None of the above
39. For estimating value of variable of X :
- (A) Regression equation of Y on X is used
  - (B) Regression equation of X on Y is used
  - (C) Both regression equations of Y on X and X on Y are used
  - (D) None of the above

40. Regression equation is also named is :
- (A) Prediction equation
  - (B) Estimating equation
  - (C) Line of average relationship
  - (D) All of the above
41. If X and Y are two variates, there can be at most :
- (A) One regression line
  - (B) Two regression lines
  - (C) Three regression lines
  - (D) An infinite number of regression lines
42. The term regression was introduced by :
- (A) R.A. Fisher
  - (B) Karl Pearson
  - (C) Sir Francis Galton
  - (D) None of the above
43. For fitting the curve  $Y = a + bX + cX^2$ , we have :
- (A) Two normal equations
  - (B) Three normal equations
  - (C) Four normal equations
  - (D) None of the above
44. The equation  $Y = \alpha\beta^{-X}$  for  $\beta < 1$  represents :
- (A) Exponential growth curve
  - (B) Exponential decay curve
  - (C) A parabola
  - (D) None of the above
45. The function  $Y = a + bX + cX^2 + dX^3$  represents :
- (A) A hyperbola
  - (B) A exponential curve
  - (C) A parabola
  - (D) All of the above

46.  $y = ab^x$  is a :
- (A) Exponential curve
  - (B) Logistic curve
  - (C) Gompertz curve
  - (D) None of the above
47. Given  $(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)$ , best fitting data to  $y = f(x)$  by least squares requires minimization of :
- (A)  $\sum_{i=1}^n [y_i - f(x_i)]$
  - (B)  $\sum_{i=1}^n |y_i - f(x_i)|$
  - (C)  $\sum_{i=1}^n [y_i - f(x_i)]^2$
  - (D)  $\sum_{i=1}^n [y_i - \bar{y}]^2, \bar{y} = \frac{\sum_{i=1}^n y_i}{n}$
48. A Linear curve is defined as :
- (A)  $Y = a + bX$
  - (B)  $Y = a + \frac{b}{X}$
  - (C)  $Y = a + bX + cX^2$
  - (D) All of the above
49. By method of least squares, if number of equations is less than the number of unknowns then :
- (A) Most plausible values can be obtained
  - (B) Infinite solution can be obtained
  - (C) Unique solution can be obtained
  - (D) None of the above
50. In a method of least squares, the sum of squares of residuals are :
- (A) Maximised
  - (B) Minimised
  - (C) Zero
  - (D) None of the above

51. A normal random variable has mean = 2 and variance = 4. Its fourth central moment  $\mu_4$  will be :
- (A) 16  
 (B) 64  
 (C) 80  
 (D) 48
52. Binomial distribution  $b(n, p)$  tends to Poisson distribution when :
- (A)  $n \rightarrow \infty, p \rightarrow 0$  and  $np = \mu$  (finite)  
 (B)  $n \rightarrow \infty, p \rightarrow \frac{1}{2}$  and  $np \rightarrow \mu$  (finite)  
 (C)  $n \rightarrow 0, p \rightarrow 0, np \rightarrow 0$   
 (D)  $n \rightarrow 20, p \rightarrow 0, np \rightarrow 0$
53. If  $X_1 \sim b(n_1, p_1)$  and  $X_2 \sim b(n_2, p_2)$  then the sum of the variates  $(X_1 + X_2)$  is distributed as :
- (A) Hypergeometric distribution  
 (B) Binomial distribution  
 (C) Poisson distribution  
 (D) None of the above
54. A discrete random variable has pmf:  $p(x) = Kq^x p; p + q = 1, x = 2, 3, 4, \dots$  the value K should be equal to :
- (A)  $\frac{1}{q^2}$   
 (B)  $\frac{1}{p}$   
 (C)  $\frac{1}{q}$   
 (D)  $\frac{1}{pq}$
55. For Poisson distribution :
- (A) Mean = Variance  
 (B) Mean = Standard deviation  
 (C) Mean > Variance  
 (D) Mean < Variance

56. The mean of a normal distribution is 50, its mode will be :
- (A) 25  
 (B) 40  
 (C) 50  
 (D) None of the above
57. The mean of Beta distribution of first kind with parameters  $m$  and  $n$  is :
- (A)  $\frac{m}{mn}$   
 (B)  $\frac{m}{m+n}$   
 (C)  $\frac{m}{m-n}$   
 (D)  $\frac{m+n}{mn}$
58. For an exponential distribution with probability density function,  $f(x) = \frac{1}{2}e^{-x/2}; x \geq 0$  its mean is :
- (A)  $\frac{1}{2}$   
 (B) 2  
 (C)  $\frac{1}{3}$   
 (D) 3
59. The abbreviation *iid* stands for ;
- (A) Identically and independently distributed  
 (B) Independent and identically distributed  
 (C) Both (A) and (B)  
 (D) None of (A) and (B)
60. Let  $X_1, X_2, \dots, X_n$  be independent identically distributed random variables with  $U(0, 1)$  then the density of  $X_{(K)}$  is given by :
- (A)  $n \binom{n}{K} x^{K-1} (1-x)^{n-K}, 0 < x < 1$   
 (B)  $(n-1) \binom{n}{K} x^{K-1} (1-x)^{n-K}, 0 < x < 1$   
 (C)  $n \binom{n}{K} x^{K-1} (1-x)^{n-K}, 0 < x < \infty$   
 (D)  $n \binom{n-1}{K-1} x^{K-1} (1-x)^{n-K}, 0 < x < 1$

61. For  $X_1, X_2, \dots, X_n$  iid continuous random variables with pdf  $f(x)$  and distribution function  $F(x)$ , then the density of the maximum of  $X_i$ 's ( $X_{(n)}$ ) is :
- (A)  $n f(x)[F(x)]^{n-1}$   
 (B)  $(n - 1) f(x)[F(x)]^{n-1}$   
 (C)  $f(x)[F(x)]^{n-1}$   
 (D) None of the above
62. For  $X_1, X_2, \dots, X_n$  iid continuous random variables with pdf  $f(x)$  and distribution function  $F(x)$ , then the density of the minimum of  $X_i$ 's ( $X_{(1)}$ ) is :
- (A)  $n f(x)[1 - F(x)]^{n-1}$   
 (B)  $f(x)[1 - F(x)]^n$   
 (C)  $(n - 1) f(x)[1 - F(x)]^n$   
 (D) All the above
63. Let  $X_{(1)} < X_{(2)} < \dots < X_{(n)}$  be the order statistics and  $F_X(x)$  be its distribution function then the *p. d. f.* of order statistics is given as:
- (A)  $f_{X_{(r)}}(x) = \frac{n!}{r!(n-r)!} f_X(x)[F_X(x)]^{r-1}$   
 (B)  $f_{X_{(r)}}(x) = \frac{n!}{(r-1)!(n-r)!} f_X(x)[F_X(x)]^{r-1}[1 - F_X(x)]^{n-r}$   
 (C)  $f_{X_{(r)}}(x) = f_X(x)[F_X(x)]^{r-1}[1 - F_X(x)]^{n-r}$   
 (D) None of the above
64. Let  $X_{(1)} = \text{Min}(X_1, X_2, \dots, X_n)$   
 $X_{(n)} = \text{Max}(X_1, X_2, \dots, X_n)$   
 and  $X_{(1)} < X_{(2)} < \dots < X_{(n)}$   
 Then the sample midrange defined as :
- (A)  $\frac{X_{(1)}+X_{(n)}}{2}$   
 (B)  $\frac{X_{(1)}-X_{(n)}}{2}$   
 (C)  $X_{(1)} + X_{(n)}$   
 (D)  $X_{(n)} - X_{(1)}$

65. Ordered statistics is a sequence of :
- (A) Observations
  - (B) Ranks
  - (C) Natural numbers
  - (D) Integers
66. For a standard normal variate, the mean and variance are :
- (A) Mean = 1, Variance = 0
  - (B) Mean = 0, Variance = 0
  - (C) Mean = 0, Variance = 1
  - (D) Mean = 1, Variance = 1
67. Let  $X \sim N(\mu, \sigma^2)$  then the central moments of odd order are :
- (A) One
  - (B) Zero
  - (C) Infinite
  - (D) Positive
68. Normal distribution was invented by :
- (A) Laplace
  - (B) De-Moivre
  - (C) Gauss
  - (D) All the above
69. The M.G.F. of the normal distribution of a normal variate  $X \sim N(\mu, \sigma^2)$  is :
- (A)  $e^{\mu t - \frac{1}{2}t^2\sigma^2}$
  - (B)  $e^{\mu t + \frac{1}{2}t^2\sigma^2}$
  - (C)  $e^{-\mu t + \frac{1}{2}t^2\sigma^2}$
  - (D)  $e^{-\mu t - \frac{1}{2}t^2\sigma^2}$



70. If  $X \sim N(8, 64)$ , then the standard normal variate  $Z$  will be :
- (A)  $Z = \frac{X-64}{8}$
- (B)  $Z = \frac{X-8}{64}$
- (C)  $Z = \frac{X-8}{8}$
- (D)  $Z = \frac{8-X}{8}$
71. If  $X \sim N(\mu, \sigma^2)$ , the points of inflexion of normal distribution curve are :
- (A)  $\pm\mu$
- (B)  $\mu \pm \sigma$
- (C)  $\sigma \pm \mu$
- (D)  $\pm\sigma$
72. If  $Y = 5X + 10$  and  $X \sim N(10, 25)$  then mean of  $Y$  is :
- (A) 135
- (B) 50
- (C) 70
- (D) 60
73. The normal curve is asymptotic to the :
- (A)  $Y$  – axis
- (B)  $X$  – axis
- (C) Along  $Y = X$
- (D) None of the above
74. The shape of the normal depends upon the value of :
- (A) Standard deviation
- (B)  $Q_1$ [Frist Quartile]
- (C) Mean deviation
- (D) Quartile deviation

75. The range of normal distribution is :
- (A) 0 to n  
 (B) 0 to  $\infty$   
 (C) -1 to 1  
 (D)  $-\infty$  to  $\infty$
76. The shape of the normal curve is :
- (A) Bell shaped  
 (B) Flat  
 (C) Circular  
 (D) Spiked
77. If  $X$  is a random variable the probability density function of the variable  $\log_e X \sim N(\mu, \sigma^2)$  is :
- (A)  $\frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2\sigma^2}(\log_e x - \mu)^2}$   
 (B)  $\frac{1}{X\sqrt{2\pi}} e^{-\frac{1}{2\sigma^2}(\log_e X - \mu)^2}$   
 (C)  $\frac{1}{\sigma X\sqrt{2\pi}} e^{-\frac{1}{2\sigma^2}(\log_e X - \mu)^2}$   
 (D) Any of the above
78. If  $X \sim C(-2, 3)$ , the probability density function of the variate  $X$  is :
- (A)  $\frac{1}{3\pi\left[1 - \left(\frac{X+2}{3}\right)^2\right]}$ , for  $-\infty < X \leq \infty$   
 (B)  $\frac{1}{\pi\left[1 + \left(\frac{X+2}{3}\right)^2\right]}$ , for  $-\infty < X < \infty$   
 (C)  $\frac{1}{3\pi\left[1 + \left(\frac{X+2}{3}\right)^2\right]}$ , for  $-\infty < X < \infty$   
 (D) All the above

79. A random variable X has a Weibul distribution with parameters  $K > 0, \alpha > 0$  and  $\mu$  if its probability density functions is :

- (A)  $\frac{K}{\alpha} \left(\frac{x-\mu}{\alpha}\right)^K \exp[-(x-\mu)^K]_i \quad x > \mu, K > 0$
- (B)  $\frac{K}{\alpha} \left(\frac{x-\mu}{\alpha}\right)^{K-1} \exp\left[-\left(\frac{x-\mu}{\alpha}\right)^K\right]_i \quad x > \mu, K > 0$
- (C)  $\frac{K^2}{\alpha^2} \left(\frac{x-\mu}{\alpha}\right)^K \exp\left[-\left(\frac{x-\mu}{\alpha}\right)^K\right]_i \quad x > \mu, K > 0$
- (D)  $K \left(\frac{x-\mu}{\alpha}\right)^K \exp\left[-\left(\frac{x-\mu}{\alpha}\right)^K\right]_i \quad x > \mu, K > 0$

80. The Pareto distribution depends on :

- (A) 1 parameter
- (B) 2 parameters
- (C) 3 parameters
- (D) None of the above

81. A continuous random variable X is said to have a Pareto's distribution if tis probability density function is given by :

- (A)  $\theta A^\theta \cdot \frac{1}{x^{\theta+1}}, \text{ for } x \geq A$
- (B)  $\theta A^{\theta-1} \cdot \frac{1}{x^{\theta+1}}, \text{ for } x < A$
- (C)  $\theta A^\theta \cdot \frac{1}{x^\theta}, \text{ for } x \geq A$
- (D) None of the above

82. The Laplace distribution is also known as :

- (A) Exponential
- (B) Double exponential
- (C) Double gamma
- (D) None of the above

83. The probability density function for Laplace variate  $X \sim L(\mu, \lambda)$  is :

(A)  $\frac{1}{2} e^{-\lambda|X-\mu|}$

(B)  $\frac{1}{2} \mu e^{-\lambda|X-\mu|}$

(C)  $\frac{1}{2} \lambda e^{\lambda|X-\mu|}$

(D)  $\frac{1}{2} \lambda e^{-\lambda|X-\mu|}$

84. The probability density function for Beta type II distribution with parameters  $\alpha, \beta > 0$  is :

(A)  $\frac{x^{\alpha-1}}{(1+x)^{\alpha+\beta}}, x > 0$

(B)  $\frac{1}{B(\alpha, \beta)} \frac{x^{\beta-1}}{(1+x)^{\alpha+\beta}}, \text{ for } (0 \leq x \leq 1)$

(C)  $\frac{1}{B(\alpha, \beta)} \frac{x^{\alpha-1}}{(1+x)^{\alpha+\beta}}, \text{ for } 0 \leq x \leq \alpha$

(D)  $\frac{1}{B(\alpha, \beta)} \frac{x^{\alpha-1}}{(1-x)^{\alpha+\beta}}, \text{ for } 0 < x < \alpha$

85. The probability density functions for Beta distribution of first kind with parameters  $m, n > 0$  is :

(A)  $\frac{1}{B(m, n)} x^{m-1} (1+x)^{n-1}, 0 < x < 1$

(B)  $\frac{1}{B(n, m)} x^{m-1} (1-x)^{n+1}; 0 < x < 1$

(C)  $\frac{1}{B(m, n)} x^{m-1} x^n; 0 < x < 1$

(D)  $\frac{1}{B(m, n)} x^{m-1} (1-x)^{n-1}; 0 < x < 1$

86. The mean and variance for Gamma distribution with parameters  $a$  and  $\lambda$  are :

(A)  $E(X) = \frac{1}{\lambda}, \text{Var}(X) = \frac{a}{\lambda^2}$

(B)  $E(X) = \frac{a}{\lambda}, \text{Var}(X) = \frac{1}{\lambda^2}$

(C)  $E(X) = \frac{a}{\lambda}, \text{Var}(X) = \frac{a}{\lambda^2}$

(D)  $E(X) = a\lambda, \text{Var}(X) = a\lambda^2$

87. The probability density functions of a random variable  $X$  distributed as Gamma variate with parameter  $n$  is given as :
- (A)  $\frac{1}{\Gamma(n)} X^{n-1} e^{-X}; n > 0, 0 < x < \infty$
- (B)  $\frac{1}{\Gamma(n)} X^{n-1} e^X; n > 0, 0 < x < \infty$
- (C)  $\frac{1}{\Gamma(n)} (1 - X)^{n-1} e^{-X}; n > 0, 0 < x < \infty$
- (D)  $\frac{1}{\Gamma(n)} e^{-\frac{1}{X}} X^{n-1}; n > 0, 0 < x < \infty$
88. The mean of exponential distribution with parameter  $\lambda$  is given as :
- (A)  $\frac{1}{\lambda}$
- (B)  $\lambda$
- (C)  $\lambda^2$
- (D)  $\frac{1}{\lambda^2}$
89. If  $X \sim \text{Expo}(5)$ , the probability density function of  $X$  is :
- (A)  $5e^{-5X}$  for  $X > 0$
- (B)  $e^{-5X}$  for  $X > 0$
- (C)  $\frac{1}{5}e^{-5X}$  for  $X > 0$
- (D) None of these
90. The recurrence relation between  $P(x)$  and  $P(x + 1)$  in a poisson distribution with parameter  $\lambda$  is given by :
- (A)  $P(x + 1) - \lambda P(x) = 0$
- (B)  $\lambda P(x + 1) - P(x) = 0$
- (C)  $(x + 1) P(x + 1) - \lambda P(x) = 0$
- (D)  $(x + 1) P(x) - x P(x + 1) = 0$
91. For a poisson distribution  $P(1) = P(2)$  then its variance is :
- (A) 3
- (B) 4
- (C) 6
- (D) 2

92. For a poisson distribution  $P(X = x) = \frac{e^{-3} 3^x}{x!}, x = 0, 1, 2, \dots$  the mean is :
- (A) 6  
 (B) 1.5  
 (C) 3  
 (D) None of the above
93. The probability mass function for the negative binomial distribution with parameters  $r$  and  $p$  is :
- (A)  $\binom{X+r-1}{r-1} p^r q^X$   
 (B)  $\binom{-r}{X} (-1)^X p^r q^X$   
 (C)  $\binom{-r}{X} p^r (-q)^X$   
 (D) All the above
94. The probability of hypergeometric variate  $X$ , with usual notations, is given as :
- (A)  $\binom{K}{X} \binom{N-K}{n-X} / \binom{N}{n}$   
 (B)  $\binom{n}{K} \binom{N-K}{n-X} / \binom{N}{n}$   
 (C)  $\binom{K}{X} \binom{N-K}{n-X} / \binom{N}{n}$   
 (D)  $\binom{n}{X} \binom{n-K}{n-X} / \binom{N}{n}$
95. Probability mass function for a binomial distribution with usual notations is :
- (A)  $\binom{n}{X} p^n q^{n-X}$   
 (B)  $\binom{n}{X} p^n q^X$   
 (C)  $\binom{n}{X} p^{n-X} q^X$   
 (D)  $\binom{n}{X} p^X q^{n-X}$

96. The moment generating function of Bernoulli distribution is :
- (A)  $(q + pe^t)^n$
  - (B)  $(q + pe^t)^{-n}$
  - (C)  $(q + pe^t)$
  - (D)  $(q + pe^{-t})$
97. If for a binomial distribution,  $b(n, p)$ ,  $n = 4$  and also  $P(X = 2) = 3P(X = 3)$ , the value of  $p$  is :
- (A)  $\frac{9}{11}$
  - (B) 1
  - (C)  $\frac{1}{3}$
  - (D) None of the above
98. In case of binomial distribution we see that :
- (A) *mean > variance*
  - (B) *mean < variance*
  - (C) *mean = variance*
  - (D) None of the above
99. The mean of binomial distribution is :
- (A)  $p$
  - (B)  $np$
  - (C)  $npq$
  - (D)  $p^2$
100. The outcomes of an experiment classified as success  $A$  or  $\bar{A}$  failure will follow a Bernoulli distribution *iff* :
- (A)  $P(A) = \frac{1}{2}$
  - (B)  $P(A) = 0$
  - (C)  $P(A) = 1$
  - (D)  $P(A)$  remains constant in all trials

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