Note : Four possible choices A , B , C , D to each question are given. Which choice is correct , fill that circle in front of that question number.Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.No.1 The Base of Octal System is :

(1) (A) 8 (B) 9 (C) 2 (D) 10

(2) If a Straight Line is fitted to the Time Series then :

(A) $\Sigma y = \Sigma \hat{y}$ (B) $\Sigma y > \Sigma \hat{y}$ (C) $\Sigma y < \Sigma \hat{y}$ (D) $\Sigma (y - \hat{y})^2 = 0$

(3) Business Cycle is an example of :

(A) Secular Trend (B) Cyclical Variation (C) Seasonal Variable (D) Irregular Variation

(4) If $(AB) < \dfrac{(A)(B)}{N}$ then the attributes A and B are said to be :

(A) Positively Associated (B) Independent (C) Negatively Associated (D) Both A and C

(5) The value of Chi - Square is always : (A) – ve (B) Zero (C) Non - ve (D) One

(6) The Regression Equation always passes through :

(A) (x , y) (B) (a , b) (C) $(\bar{x} , \bar{y})$ (D) $(\bar{x} , \hat{y})$

(7) The two Regression Coefficients have always :

(A) Opposite Sign (B) Same Signs (C) Negative Sign (D) Positive Sign

(8) The value of r_{xy} is always lies between :

(A) –1 and 1 (B) $-\infty$ and 0 (C) 0 and +1 (D) 0 and $+\infty$

(9) Testing $H_0 : \mu = 25$, against $H_1 : \mu \neq 25$ leads to :

(A) Two Tailed Test (B) Left Tailed Test (C) Right Tailed Test (D) None of these

(10) Sample Proportion is an Estimator for :

(A) Sample Mean (B) Population Mean (C) Population Proportion (D) Variance

(11) Interval Estimate is associated with :

(A) Probability (B) Non - Probability (C) Parameters (D) Both A and B

(12) In Sampling without replacement : (A) $n \leq N$ (B) $n > N$ (C) n / N (D) N / n

(13) The difference between the value of a Statistic and a Parameter is called :

(A) Standard Error (B) Sampling Error (C) Non Sampling Error (D) Bias

(14) Another Name of Probability Sampling is ------ Sampling :

(A) Non - Random (B) Judgement (C) Purposive (D) Random

(15) The Parameters of the Normal Distribution are :

(A) π and e (B) π and P (C) μ and σ^2 (D) e and μ

(16) If $X \sim N(40 , 25)$ then Median is : (A) 15 (B) 25 (C) 40 (D) 5

(17) In a Normal Curve, the Ordinate is highest at :

(A) Mean (B) Variance (C) Standard Deviation (D) Q_1

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Note: It is compulsory to attempt (8 - 8) parts each from Q.No.2 and 3 while attempt any (6) parts from Q. No.4 and attempt any (03) questions from Part II. Write same Question No. and its Part No. as given in the question paper.

Section - I

BwP-12-18   22 x 2 = 44

Q.No.2(i)	Explain Standard Normal Variable.	(ii)	What are the Parameters of Normal Distribution?
(iii)	What is meant by Statistical Inference?	(iv)	Define Interval Estimation.
(v)	Differentiate between Type - I and Type - II Error.	(vi)	Define Simple Hypothesis and Composite Hypothesis.
(vii)	What are the two types of Computers?	(viii)	Define Input and Output Devices.
(ix)	What are Points of Inflexion in Normal Distribution?	(x)	Write down the Theoratical Equation of Normal Distribution for $\mu = 16$ and $\sigma^2 = 4$
(xi)	Explain Level of Significance.	(xii)	If $\mu_2 = 4$ for $x \sim N(\mu, \sigma^2)$ find the value of μ_3 and μ_4
Q.No.3(i)	Differentiate between Parameter and Statistic.	(ii)	What is meant by Bias?
(iii)	If two Regression Lines are $x + 3\hat{y} - 5 = 0$ and $4\hat{x} + 3y - 8 = 0$, then find b_{yx} and b_{xy}.	(iv)	Differentiate between Sampling and Non-Sampling Errors.
(v)	Differentiate between Positive and Negative Correlation.	(vi)	From given Regression Lines, find " r ": $x + 2\hat{y} - 5 = 0$, $2\hat{x} + 3y - 8 = 0$
(vii)	Define the term Coefficient of Correlation.	(viii)	Define Regression.
(ix)	Define Sampling Distribution.	(x)	Define Stratified Random Sampling.
(xi)	What is a Scatter Diagram?	(xii)	If $\mu = 50$, $\sigma^2 = 250$ and $n = 50$ find the Mean and Variance for the Sampling Distribution of Mean if Sampling is done with replacement.
Q.No.4(i)	Define Attribute with an example.	(ii)	Define Degree of Freedom.
(iii)	What is Rank Correlation?	(iv)	What is Coefficient of Contingency?
(v)	What is Time Series?	(vi)	Give two demerits of Free Hand Curve Method.
(vii)	If $N = 1030$, $(A) = 140$, $(B) = 380$ then find (AB) when A and B are Independent Attributes.	(viii)	Write two examples of Secular Trend.
(ix)	What is Historigram?		

Section - II

Q.No5 (a) The heights of boys at a particular age follow a Normal Distribution with Mean 156 cm and Standard Deviation 5 cm. Find the Probability that a boy picked at random from this age group has height between 148 cm and 158 cm. (4)

(b) In a Normal Distribution, the lower and upper quartiles are 8 and 18 respectively. Find the Mean and Standard Deviation. (4)

Q.No6 (a) Draw all possible Samples of Size 2 without replacement from a population consisting of 5, 8, 9, 12,. Construct Sampling Distribution of Sample Proportion of Odd Numbers in the Sample. Show that : (i) $\mu_p = \pi$ (ii) $\sigma_p^2 = \frac{\pi(1 - \pi)}{n}\left(\frac{N - n}{N - 1}\right)$ (4)

(b) If the size of the Simple Random Sample from an Infinite Population is 55, the Variance of Sample Mean is 27, what must be the Standard Error of Sample Mean if $n = 165$? (4)

Q.No7 (a) Find 90% Confidence Interval for " P " if 24 heads are obtained in 40 tosses of a fair coin. " P " denotes Population Proportion. (4)

(b) A random sample of 10 from a population give $\bar{X} = 20$ and Sum of Squares of Deviation from Mean is 144. Test $H_0 : \mu \leq 19.5$ against $H_1 : \mu > 19.5$ using $\alpha = 0.05$ (4)

P.T.O.

Q.No.8 (a) From the Data given below, estimate the Linear Regression of Production (Y) on Fertilizer (X)   (4)

Fertilizer (X)	1	2	4	5
Production (Y)	15	14	13	12

(b) From the following Data, find the value of Correlation Coefficient :

X	2	1	2	3	4
Y	6	7	11	8	5

(4)

Comment your Answer.

Q.No.9 (a) Test the Association between Two Attributes A and B from the following data. Let $\alpha = 0.05$ (4)

Attributes	A_1	A_2
B_1	20	30
B_2	15	35

(b) Fit 2nd Degree Parabola to the following results for the years 1985 - 1995 (both inclusive)

$$\Sigma x = \Sigma x^3 = 0 , \quad \Sigma x^2 = 110$$

$$\Sigma x^4 = 1958 , \quad \Sigma y = 410 , \quad \Sigma xy = 601 , \quad \Sigma x^2 y = 4587$$ (4)