Note: You have four choices for each objective type question as A, B, C and D. The choice which you think 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. Attempt as many questions as given in objective type question paper and leave others blank. No credit will be awarded in case BUBBLES are not filled. Do not solve questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) In a normal distribution, $P(-\infty < x < +\infty)$ is equal to:-

(A) 1   (B) 0   (C) -1 (D) -2

(2) In a normal distribution, M.D (x) is equal to:-

(A) $.8989\sigma$ (B) $.7979\sigma$ (C) $.6969\sigma$ (D) $.5959\sigma$

(3) In a normal distribution if mean = 50, then the value of Median is:-

(A) 50   (B) 40   (C) 30   (D) 60

(4) A sample is a part of the:-

(A) Sampling   (B) Population   (C) Unit   (D) None of these

(5) Any value calculated from sample data is called:-

(A) Error   (B) μ (C) Statistic   (D) Bias

(6) The complete list of all the sampling units are called:-

(A) Sampling frame   (B) Sample design   (C) Sampled population   (D) Target population

(7) A point estimation is used to estimate the unknown true value of population:-

(A) Data   (B) Parameter   (C) Estimation   (D) Estimate

(8) The probability of type – II error is denoted by:-

(A) α (B) β (C) $1 - \beta$ (D) $1 - \alpha$

(9) If $n < 30$ and σ unknown we use:-

(A) F – test   (B) Z – test   (C) t – test   (D) Chi – square test

(10) The dependence of one variable upon other is called:-

(A) Regression   (B) Correlation   (C) Covariance   (D) None of these

(11) In regression equation $\hat{y} = a + bx$, $\sum(y - \hat{y}) = $ _____

(A) -1 (B) 0   (C) 1   (D) 2

(12) The value of correlation coefficient r lies between:-

(A) -1 and 0   (B) -1 and $+1$ (C) 0 and $+1$ (D) -2 and $+2$

(13) The two attributes are independent if:-

(A) $Q = -1$ (B) $Q = 1$ (C) $Q = 2$ (D) $Q = 0$

(14) Qualitative variable is also called:-

(A) Frequency   (B) Attribute   (C) Class   (D) None of these

(15) Systematic component of variation in a time series is called:-

(A) Component   (B) Noise   (C) Signal   (D) Series

(16) Fire in a factory is an example of:-

(A) Secular trend   (B) Cyclical variation   (C) Seasonal variation   (D) Irregular variation

(17) The number of instructions processed in one second is called:-

(A) Data   (B) Storage   (C) Accuracy   (D) Speed

NOTE: - Write same question number and its part number in answer book, as given in the question paper.

SECTION-I

2.   **Attempt any eight parts.** $8 \times 2 = 16$

(i)   Define a Normal Distribution.

(ii)   Enlist four properties of normal distribution.

(iii)   The value of variance in normal distribution is 16. Find the values of μ_2 and μ_4.

(iv)   In a standard normal distribution find mode and Quartile Deviation.

(v)   In a normal distribution the mean is zero and variance is one. Write down its equation and find the value of maximum ordinate.

(vi)   Differentiate between Estimator and Estimate.

(vii)   Define Unbiasedness.

(viii)   Differentiate the terms level of significance and level of confidence.

(ix)   Explain the terms simple and composite hypothesis.

(x)   Define the term test of hypothesis.

(xi)   Write down the main categories of computers.

(xii)   What is Central Processing Unit?

3.   **Attempt any eight parts.** $8 \times 2 = 16$

(i)   What are Random Digits?

(ii)   What are the purposes of Sampling?

(iii)   Define Sampling Unit.

(iv)   What is Statistic?

(v)   Given $N = 310$, $n = 100$, $\sigma^2 = 3500$, sampling is done without replacement, then find $\sigma_{\bar{x}}$.

(vi)   Define Simple Random Sampling.

(vii)   Define Regression.

(viii)   What is meant by Scatter Diagram?

(ix)   In regression y on x, if $a = 130$, $b = 3.956$ then what is the estimate of y for $x = 12$.

(x)   Define Correlation.

(xi)   State any two properties of Correlation Coefficient.

(xii)   If $b_{yx} = -0.49$ and $b_{xy} = -1.07$ then find "r".

4.   **Attempt any six parts.** $6 \times 2 = 12$

(i)   What is an Attribute?

(ii)   Define Negative Association.

(iii)   When two attributes are said to be independent?

(iv)   Given $n = 100$, $(A) = 40$, find (α).

(v)   Given $(A) = 364$, $(B) = 1024$, $(AB) = 256$ and $n = 1216$. Show that attributes A and B are not independent.

(vi)   What is meant by Analysis of Time Series?

(vii)   What are the different components of a time series?

(viii)   Define Irregular fluctuations.

(ix)   Write down Additive Model of Time Series.

P.T.O

MTN-12-18

NOTE: - **Attempt any three questions.** $3 \times 8 = 24$

5.(a)   In a normal distribution 25 % of items are under 50 and 10 % are over 100.
        Find mean and standard deviation of the distribution.   4

   (b)   If $X \sim N(60, 100)$, find   (i) a point that has 15 % area below it
                                           (ii) a point that has 28 % area above it   4

6.(a)   Draw all possible samples of size 2 with replacement from a population 2, 4 and 6.
        Show that $\sigma_{\bar{x}}^2 = \sigma^2 \big/ 2$ 4

   (b)   If the size of simple random sample is 49 and variance of sample means is 27.
        What must be the standard error of sample mean if $n = 169$.   4

7.(a)   Obtained the best unbiased estimates of the population mean (μ) and variance (σ^2)
        from which the following sample is drawn $n = 8$; $\sum X = 120$; $\sum(X - \bar{X})^2 = 302$ 4

   (b)   Test the null hypothesis $\mu \geq 140$, the mean weight of a sample of 36 people
        is 146 Lb. Using $\sigma = 15 \ Lb$ $\alpha = 0.05$ 4

8.(a)   Given that $n = 5$, $\sum X = 15$, $\sum Y = 25$, $\sum(X - \bar{X})(Y - \bar{Y}) = 13$,
        $\sum(X - \bar{X})^2 = 10$, $\sum(Y - \bar{Y})^2 = 26$. Find regression equation of X and Y.   4

   (b)   For a set of 8 pairs of observation we have $\bar{X} = 18$, $\bar{Y} = 20$, $S_x = S_y = 5$ and
        $\sum(X - \bar{X})(Y - \bar{Y}) = 180$.   Find the value of correlation coefficient.   4

9.(a)   Find whether the data given below in each case are consistent:-   4
        (i) $n = 120$, $(A) = 82$, $(AB) = 90$ (ii) $n = 1000$, $(AB) = 200$, $(A\beta) = 350$, $(\alpha B) = 500$

   (b)   The parabolic trend equation for the projects of a company is $\hat{y} = 10.4 + 0.6x + 0.7x^2$,
        with origin at 1980 and unit of measurement for x is one year. Shift the origin to 1975.   4