Statistics (Objective)   Time: 20 Minutes   Marks : 17

Note:-   Write answers to the questions on the objective answer sheet provided. Four possible answers are given. Which answer you consider correct fill the corresponding circle A,B,C or D in front of each question with marker or ink on the answer sheet provided.

1.1   If Y = 2 + 0.6X, then the value of Y-intercept is :
   (A)   2   (B)   Zero   (C)   0.6   (D)   2.6

2.   Regression line always passes through :
   (A)   (X,Y)   (B)   (a,b)   (C) $(\bar{X}, Y)$ (D) $(\bar{X}, \bar{Y})$

3.   Perfect positive correlation is signified by :
   (A)   -1   (B)   +1   (C)   0   (D)   <1

4.   Two attributes A and B are said to be independent if :
   (A) $(AB) = \frac{(A)(B)}{N}$ (B) $(AB) \neq \frac{(A)(B)}{N}$ (C) $(AB) > \frac{(A)(B)}{N}$ (D) $(AB) < \frac{(A)(B)}{N}$

5.   For 3×3 contingency table, the degree of freedom is :
   (A)   3   (B)   9   (C)   4   (D)   6

6.   Long term variations in time series data are regarded as :
   (A)   Seasonal variations   (B)   Cyclical variations
   (C)   Irregular variations   (D)   Secular trend

7.   In semi average method, data is divided into _____ parts.
   (A)   4   (B)   2   (C)   3   (D)   5

8.   Which of the following is **NOT** hardware :
   (A)   Assembler   (B)   Hard disk   (C)   Key board   (D)   Motherboard

9.   If Z is N(0,1), then P(-2 ≤ Z ≤2) is equal to :
   (A)   0.8013   (B)   0.9944   (C)   0.9544   (D)   0.8944

10.   The coefficient of skewness of a normal distribution is :
   (A)   Zero   (B)   Positive   (C)   Negative   (D)   3

11.   Normal distribution has parameters:
   (A)   1   (B)   2   (C)   3   (D)   4

12.   Standard error of the mean is the standard deviation of :
   (A)   Popuplation   (B)   Sample   (C)   Parameter   (D)   Sampling distribution of means

13.   The finite population correction factor is :
   (A) $\frac{n}{N}$ (B) $\frac{N}{n}$ (C) $\frac{N-1}{N-n}$ (D) $\sqrt{\frac{N-n}{N-1}}$

14.   In sampling without replacement a sampling unit can be selected :
   (A)   Twice   (B)   Less than one
   (C)   Only once   (D)   More than one

15.   An estimator T is said to be unbiased estimator of θ if :
   (A)   E(T) = θ (B)   E(T) ≠ θ (C)   E(T) > θ (D)   E(T) < θ

16.   A formula used to estimate a parameter is called :
   (A)   Estimation   (B)   Estimator   (C)   Estimate   (D)   Bias

17.   Rejecting H_0 when H_0 is true is :
   (A)   Standard error   (B)   Type-II error   (C)   Type-I error   (D)   No error

Statistics (Subjective)

RWP-24

Marks : 68

Section - I

2. Write short answer of any eight parts of the following: (8x2=16)

(i) In a normal distribution $\mu = 50$ and $\sigma = 2$. Find μ_2.   (ii) $P(\mu \pm 2\sigma) = 0.9545$. Prove it.   (iii) If $Z \sim N(0,1)$, then find median.

(iv) What is the relationship between binomial and normal distribution?   (v) At what point normal distribution has maximum ordinate?

(vi) If n=64, $\sigma = 8$, $\overline{x} = 400$ and $Z_{1-\alpha/2} = 1.96$. Find confidene interval for μ.   (vii) Define interval estimation.

(viii) Explain two tailed test.   (ix) What is degree of freedom?   (x) Describe monitor.

(xi) Given $\sigma = 80$, n=625, $\mu = 350$ and $\overline{x} = 356$. Find Z.   (xii) Explain programming.

3. Write short answer of any eight parts of the following: (8x2=16)

(i) Define Non-sampling Error.   (ii) What is the difference between statistic and parameter?

(iii) Define probability sampling.   (iv) If $\mu = 40$, $\sigma_{\overline{x}} = 2$, n = 4. Find σ.

(v) Given n=2, $\sigma^2_{\overline{x}} = 2.5$, $\mu_{\overline{x}} = 10$. Find μ and σ if sampling is done with replacement.   (vi) What is scatter diagram?

(vii) Define standard error of sample means.   (viii) Write down any two properties of correlation coefficient.

(ix) What is the difference between regressor and regressand?   (x) If $b_{yx} = -0.35$, $b_{xy} = -0.65$. find " r ".

(xi) If we have n=12, $\sum xy = 89894$, $\sum x = 628$, $\sum y = 1684$, $\sum x^2 = 34416$. Compute the value of b_{yx}.

(xii) Given, $r_{yx} = 0.97$, $b_{yx} = 0.81$, $S_y = 14.34$. find "S_x".

4. Write short answer of any six parts of the following:- (6x2=12)

(i) Define attribute. Give two examples of attribute from real life.   (ii) Define Independence and Association.

(iii) Find (A) if (AB) = 30 and (Aβ) = 200.   (iv) What are components of a time series?

(v) What are four phases of a business cycle?   (vi) Define seasonal variation. Give its two examples.

(vii) Distinguish between signal and noise.   (viii) Write two merits of moving average method.

(ix) Write normal equations of a second degree parabola $\hat{Y} = a + bX + cX^2$.

Section - II

Note: Answer any three questions from the following. (8x3=24)

5. (a) The scores made by candidates in a certain test are normally distributed with mean 500 and standard deviation 100. What percent of candidates received scores : (4)

(i) Between 400 and 600   (ii) Which differ from mean by more than 150

(b) A random variable X is normally distributed with mean = 40 and standard deviation = 4. Find the two points containing the middle 98% area. (4)

6. (a) Taking all possible samples of size 2 with replacement from the population 1,3,5. Show that the population mean is equal to the mean of sample means i.e. $\mu_{\overline{x}} = \mu$ (4)

(b) There are five digits in a population 12,14,15,18,19. Draw all possible samples of size "3" without replacement and find sample proportion ($\hat{p}$) of even digits in each sample. Verify that E($\hat{p}$) = P. (4)

7. (a) Find 95% confidence interval for a population mean from the given data: (4)

n=16, $\sum X = 261.2$, $\sum (X - \overline{X})^2 = 13.22$

(b) Two samples of size 400 and 300 having means 52 and 50 are drawn from same population of $\sigma = 3$. Test the hypothesis $H_0: \mu_1 = \mu_2$ vs $H_1: \mu_1 > \mu_2$. Use $\alpha = 0.05$. (4)

8. (a) From the information given below: (4)

$\sum (X - \overline{X})(Y - \overline{Y}) = 150$, $S^2_X = 64$, $S^2_Y = 260$, n=16. Compute two regression coefficients.

(b) Given the following data : (4)

n=10, $\sum X = 120$, $\sum Y = 250$, $\sum XY = 3070.7$, $S_X = 3.5$, $S_Y = 7.2$. Find correlation coefficient.

9. (a) An investigation into colour blindness and sex of a person gave the following results: (4)

Sex	Colour Blindness	
	Colour Blind	Not Colour Blind
Male	36	964
Female	19	981

Is there evidence at 5% level of significance of an association between sex of a person and whether or not they are colour blind?

(b) Fit a straight line Y = a + bx from the following results for the years 1988-1998 (both inclusive): (4)

$\sum x = 0$, $\sum x^2 = 110$ $\sum y = 438.9$, , $\sum xy = 84.4$. Also find trend values.

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