

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	In sampling with replacement, the sampling units can be selected : (A) Only once (B) More than once (C) Less than once (D) None
2	Which of the following “CAN NOT” be H_0 : (A) $\theta \leq \theta_0$ (B) $\theta \geq \theta_0$ (C) $\theta \neq \theta_0$ (D) $\theta = \theta_0$
3	For 2×2 contingency table, d.f. = ----- : (A) $(r-1)(c-1)$ (B) $(r-1)+(c-1)$ (C) $(r-1)-(c-1)$ (D) $rc-1$
4	The sequence which follows irregular or random pattern of variations is called : (A) Signal (B) Model (C) Noise (D) Trend
5	Normal distribution has maximum ordinate at $X = \text{----}$: (A) μ (B) σ (C) 1 (D) 0
6	When two variables are uncorrelated, then the value of “r” will be : (A) Zero (B) +1 (C) -1 (D) 0.5
7	In standard normal distribution, mean and variance respectively are : (A) 0 and 3 (B) 0 and 1 (C) 0 and 5 (D) 0 and 2
8	If $\hat{y} = 2 + 0.6X$, then the value of slope is : (A) 2 (B) 0.30 (C) 1.2 (D) 0.6
9	Graph of time series is called : (A) Histogram (B) Historigram (C) Scatter diagram (D) Ogive
10	If level of significance is 0.05, then level of confidence will be : (A) 0.95 (B) 0.90 (C) 0.99 (D) 0.095
11	In normal distribution $P(-\infty < X < +\infty)$ is equal to : (A) -1 (B) 0 (C) 1 (D) 0.5
12	The formula or function used to estimate a parameter is called : (A) Estimate (B) Estimation (C) Predictor (D) Estimator
13	$\sum \bar{x} p(\bar{x})$ is equal to : (A) \bar{x} (B) $\mu_{\bar{x}}$ (C) μ^2 (D) N
14	Accepting H_0 , when H_0 is false, is : (A) No error (B) Type I error (C) Type II error (D) α
15	A population about which some information is desired is called : (A) Sampled population (B) Hypothetical population (C) Target population (D) Infinite population
16	In regression, $\sum \hat{y}$ is equal to : (A) 0 (B) $\sum y$ (C) a (D) b_{yx}
17	The limit of rank correlation coefficient is : (A) -1 and 0 (B) 0 and +1 (C) -1 and +1 (D) $-\infty$ and $+\infty$

Roll No _____ (To be filled in by the candidate) (Academic Sessions 2017 – 2019 to 2019 – 2021)

STATISTICS

221-(INTER PART – II)

Time Allowed : 2.40 hours

PAPER – II (Essay Type)

Maximum Marks : 68

SECTION – I

2. Write short answers to any EIGHT (8) questions :

16

- (i) What is standard normal distribution?
- (ii) Write any two properties of normal distribution.
- (iii) In a normal distribution, if $\mu = 20$ and $\sigma = 5$, find Q.D.
- (iv) Why β_1 is zero in normal distribution?
- (v) Define points of inflection in normal distribution.
- (vi) In a normal distribution, $\mu_2 = 9$, find μ_3 and μ_4 .
- (vii) Define unbiased estimator.
- (viii) What is best estimator?
- (ix) Define interval estimate.
- (x) Define statistical hypothesis.
- (xi) Define power of a test.
- (xii) Define level of significance.

3. Write short answers to any EIGHT (8) questions :

16

- (i) Define sampling.
- (ii) Define non-probability sampling.
- (iii) If $\sigma = 5$, $N = 3$, $n = 8$, find $\sigma_{\bar{x}}^2$ if sampling is done with replacement.
- (iv) Define sampling frame.
- (v) Write down any two advantages of sampling.
- (vi) A population consists of 2, 4, 6, 8, 9. How many possible samples of size 3 can be drawn without replacement?
- (vii) Define scatter diagram.
- (viii) What are the parameters of simple linear regression model?
- (ix) Given $\hat{y} = 0.72 + 1.33x$, $\Sigma y = 16.9$ and $x = 0, 1, 2, 3, 4$ then show that $\Sigma y = \Sigma \hat{y}$.
- (x) What is the range of correlation coefficient?
- (xi) What is the relationship between regression coefficients and correlation coefficient?
- (xii) If $r = 0.48$, $S_{xy} = 36$ and $S_x^2 = 16$, find the value of S_x .

4. Write short answers to any SIX (6) questions :

12

- (i) Define attributes.
- (ii) Define class and class frequency.
- (iii) What is ultimate class frequency?
- (iv) If $n = 600$, $(A) = 240$; $(B) = 270$, find (AB)
- (v) What is time series?
- (vi) Describe the seasonal variation.
- (vii) Discuss historigram.
- (viii) Explain the term secular trend.
- (ix) Discuss term noise.

(Turn Over)

SECTION – II

Note : Attempt any THREE questions.

5. (a) In a normal distribution the mean is 20 and S.D = 5, find :
 (i) $P(X \geq 8)$ (ii) $P(X < 24)$ 4

- (b) In normal distribution mean = 16 and variance = 25, find :
 (i) $P(11 < X < 21)$ (ii) $P(X > 26)$ 4

6. (a) A population consists of values 3, 6 and 9. Take all possible samples of size 3 with replacement. Form sampling distribution of mean. Verify the results : 4

(i) $\mu_{\bar{X}} = \mu$ (ii) $\sigma_{\bar{X}}^2 = \frac{\sigma^2}{n}$

- (b) A finite population consists of three values 2, 4, 6. Take all possible sample of size 2 with replacement. Form the sampling distribution of sample variance and verify that : 4

$$\mu_{S^2} = \frac{n-1}{n} \sigma^2$$

$$S^2 = \frac{\sum(X - \bar{X})^2}{n}$$

7. (a) Find a 90% confidence interval for the mean of a normal distribution if $\sigma = 2$ and a sample of size 8 gave the values 9, 14, 10, 12, 7, 13, 11, 12 4

- (b) Let $X \sim N(\mu, 100)$ and \bar{X} be the mean of a random sample of 64 observations of X , given that $\bar{X} = 15$ test $H_0: \mu = 12$ against $H_1: \mu > 12$ use $\alpha = .05$ 4

8. (a) For the following data : 4

X	6	8	10	12	14
Y	102	106	110	113	120

Find the mean values \bar{X} and \bar{Y} and using these values find the equation of the regression line $Y - \bar{Y} = b(X - \bar{X})$

- (b) Compute the coefficient of correlation for a sample of 20 pairs of observations 4

Given that : $\bar{X} = 2$, $\bar{Y} = 8$, $\sum X^2 = 180$, $\sum Y^2 = 1424$ and $\sum XY = 404$

9. (a) Find the association between injection against typhoid and exemption from attack from the following contingency table : 4

Attribute	Attacked	Not attacked
Inoculated	528	25
Not inoculated	790	175

- (b) Calculate 7 days moving average for the following records of attendance : 4

Days	Weeks	
	I	II
Sun	24	27
Mon	55	52
Tue	29	32
Wed	48	43
Thur	52	53
Fri	55	53
Sat	61	65