DGK-12-1-23

PAPER CODE – 8187

STATISTICS | **12th CLASS – 1st Annual 2023** | **TIME: 20 MINUTES** **MARKS: 17**

OBJECTIVE

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.

QUESTION NO. 1

1 Correlation co-efficient between X and X is
(A) 0 (B) -1 (C) + 1 (D) – 1 to + 1

2 Co-efficient of association Q lies between
(A) 0 to + 1 (B) - 1 and + 1 (C) - ∞ and + 1 (D) - ∞ to + ∞

3 The shape of χ^2 - distribution depends upon
(A) Mean (B) Degrees of freedom (C) Number of cells (D) S.D

4 A sudden decrease in supplies due to floods is
(A) Secular trend (B) Seasonal variations (C) Cyclical variations (D) Irregular variations

5 A sequence which follow regular variations is called
(A) Signal (B) Noise (C) Model (D) Trend

6 One byte equals
(A) 8 bits (B) 4 bits (C) 6 bits (D) 12 bits

7 Shape of normal curve is
(A) J (B) L (C) Bell (D) Circle

8 In a normal distribution $E(x - \mu)^2$ is
(A) Q.D (B) S.D (C) Variance (D) M.D

9 The maximum ordinate of standard normal curve is at
(A) 0 (B) 1 (C) μ (D) σ

10 In sampling with replacement the population becomes
(A) Infinite (B) Existent (C) Finite (D) Hypothetical

11 Non probability form of sampling is
(A) Quota sampling (B) Random sampling (C) Stratified sampling
(D) Systematic sampling

12 In sampling with replacement $\sigma_{\bar{x}}$ = ...
(A) $\frac{\sigma}{n}$ (B) $\frac{\sigma}{\sqrt{n}}$ (C) $\frac{\sigma^2}{n}$ (D) $\frac{\sigma}{\sqrt{n}} \cdot \frac{N-n}{N-1}$

13 A formula or function used to estimate a parameter is called
(A) Estimate (B) Estimation (C) Bias (D) Estimator

14 Which of the following cannot be null hypothesis
(A) $\theta \leq \theta_o$ (B) $\theta \geq \theta_o$ (C) $\theta = \theta_o$ (D) $\theta \neq \theta_o$

15 Probability of rejecting true hypothesis is called
(A) Critical region (B) Level of significance (C) Test statistic (D) Power of test

16 In the regression equation Y = a + bx , " a " is the
(A) Y-intercept (B) Slope (C) X-intercept (D) Trend

17 In least squares regression line $\Sigma(Y - \hat{Y})^2$ is always
(A) Negative (B) Non-negative (C) Zero (D) Fractional

D

STATISTICS | SUBJECTIVE | TIME: 2.40 HOURS

SECTION-I DGK-12-1-23 | MARKS: 68

QUESTION NO. 2 Write short answers any Eight (8) parts of the following 16

i	Describe relationship between Mean , Median and Mode of the normal distribution
ii	If $X \sim N(15, 4)$, Find the value Z , if $x = 18$
iii	What is standard normal distribution ?
iv	Write down the lower and upper quartile of the normal distribution
v	In normal distribution , $\mu = 9$, $Q_3 = 171$ Find standard deviation
vi	Define Estimation
vii	What is point estimation ?
viii	Explain statistical inference
ix	Define composite hypothesis
x	What is type-I error ?
xi	Define input devices
xii	Distinguish between hardware and software

QUESTION NO. 3 Write short answers any Eight (8) parts of the following 16

i	Find standard error of $\bar{X}$ if $N = 5$, $n = 2$, $\sigma^2 = 10$ if sampling is done without replacement
ii	Define probability sampling and non-probability sampling
iii	Define simple random sampling and stratified random sampling
iv	Write formulae of mean and variance of sampling distribution of mean without replacement
v	What are two disadvantages of non-probability sampling ?
vi	Distinguish between probability and non-probability sampling
vii	What is objective of correlation and of regression ?
viii	Write any two properties of intercept a_{yx}
ix	How would you interpret $a_{yx} = 3$?
x	Find γ if $b_{xy} = 4$, $S_y = 2$, $S_x = 10$
xi	Write any two real life applications of regression
xii	Define intercept and slope of a regression line. Write formulae of a_{yx}

QUESTION NO. 4 Write short answers any Six (6) parts of the following 12

i	Define ultimate class frequency
ii	Discuss negative association
iii	The value of $r_s = 0.19$ for 8 students in two subjects. Find Σd^2
iv	Give two examples of secular trend
v	What is seasonal variation ?
vi	Write down the components of time series
vii	What is Historigram ?
viii	What do you mean by analysis of time series ?
ix	Given $\hat{y} = 50 + 2x$ with origin at 1983 and unit of x is one year. Shift the origin at 1980

SECTION-II

Note: Attempt any Three questions from this section 8×3 = 24

Q. 5(a) Let X be normally distributed with mean 8 and standard deviation 4 .
Find (i) $P[4 \leq X \leq 12]$ (ii) $P[X \leq 3]$

(b) Let $X \sim N(40, 64)$ then find the single point which has 90 % area below it

Q. 6(a) The random variable X has the following probability distribution

x	4	5	6	7
P(x)	0.2	0.4	0.3	0.1

Find the mean $\mu_{\bar{x}}$, variance $\sigma^2_{\bar{x}}$ and standard errors $\sigma_{\bar{x}}$ of the mean $\bar{X}$ for a random sample of size 36

(b) Suppose that 60 % of a city population favours public finding for a proposed recreational facility. If 150 persons are to be randomly selected and interviewed , what is the mean and standard errors of the sample proportion favouring this issue

Q. 7(a) A random sample of size 36 is taken from a normal population with a known variance $\sigma^2 = 25$. If the mean of the sample is 42.6 , find 95 % confidence limits for the population mean

(b) A random sample of nine from the men of a large city gave a mean height of 68" and variance $s^2 = 4.5$ (inches)^2 . Test $H_o : \mu = 68.5$ against $H_1 : \mu \neq 68.5$

Q. 8(a) Find regression equation of Y on X of the following data

X	1	2	3	4	5
Y	5	8	14	13	18

(b) Find the correlation co-efficient r_{xy} for a given set of data of two regression lines

$\hat{Y} = 20.8 - 0.219\,X$

$\hat{X} = 16.2 - 0.785\,Y$

Also show that r is symmetrical and interpret the results

Q. 9(a) Find the rank correlation co-efficient for the following set of data

Rank (X)	8	3	10	11	5	9	7	1	4	2	6
Rank (Y)	6	1	10	11	2	9	8	5	7	3	4

(b) Fit a linear trend to the following information for the year 1986 to 1992 (both inclusive)
$\Sigma x = 0$, $\Sigma y = 245$, $\Sigma x^2 = 28$ and $\Sigma xy = 66$. Also compute the trend values

D