

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)  $-\infty$  and +1 (D)  $-\infty$  to  $+\infty$
- 3 The shape of  $\chi^2$  - 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)  $\mu$  (D)  $\sigma$
- 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  $\sigma_{\bar{x}} = \dots\dots\dots$   
(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)  $\theta \leq \theta_0$  (B)  $\theta \geq \theta_0$  (C)  $\theta = \theta_0$  (D)  $\theta \neq \theta_0$
- 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

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

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

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

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- Find standard error of  $\bar{X}$  if  $N = 5$ ,  $n = 2$ ,  $\sigma^2 = 10$  if sampling is done without replacement
- Define probability sampling and non-probability sampling
- Define simple random sampling and stratified random sampling
- Write formulae of mean and variance of sampling distribution of mean without replacement
- What are two disadvantages of non-probability sampling?
- Distinguish between probability and non-probability sampling
- What is objective of correlation and of regression?
- Write any two properties of intercept  $a_{yx}$
- How would you interpret  $a_{yx} = 3$ ?
- Find  $\gamma$  if  $b_{xy} = 4$ ,  $S_y = 2$ ,  $S_x = 10$
- Write any two real life applications of regression
- 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**

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- Define ultimate class frequency
- Discuss negative association
- The value of  $r_s = 0.19$  for 8 students in two subjects. Find  $\Sigma d^2$
- Give two examples of secular trend
- What is seasonal variation?
- Write down the components of time series
- What is Histogram?
- What do you mean by analysis of time series?
- 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  $\sigma_{\bar{x}}^2$  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 funding 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)<sup>2</sup>. Test  $H_0: \mu = 68.5$  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

FBD-12-23

Roll No. : \_\_\_\_\_

Objective  
Paper Code  
**8181**Intermediate Part Second  
**STATISTICS (Objective)**  
Time: 20 Minutes Marks: 17

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

S.#	Questions	A	B	C	D
1	If $X \sim N(20,16)$ then the value of $\beta_1$ is:	Zero	3	0.5	1
2	The value of e is:	2.7184	2.1783	2.8173	3.1416
3	The maximum ordinate of normal curve is at:	$X = \sigma$	$X = \mu$	$X = \mu + \sigma$	$X = \mu - \sigma$
4	A value calculated from the population is:	Parameter	Mean	Statistic	Mode
5	If $\sigma\bar{x} = 20$ , $n = 25$ then the value of $\sigma$ is:	1000	20	500	100
6	If $\bar{x} = 20$ and $\mu = 20$ , then sampling error is:	Zero	20	100	10
7	If $1 - \alpha = 0.95$ then value of $Z_{1 - \frac{\alpha}{2}}$ is:	2.575	1.96	1.645	2.326
8	The following statistics are unbiased estimators:	Sample mean	Sample proportion	Both A and B	None of these
9	The probability associated with type-I error is:	$\beta$	$\alpha$	$1 - \beta$	$1 - \alpha$
10	If $r_{xy} = 0.5$ , then $r_{yx}$ will be:	Zero	1	0.5	-0.5
11	The correlation co-efficient is _____ of regression co-efficients.	A.M	H.M	Mode	G.M
12	The independent variable is also called:	Regressor	Regressand	Estimated	Both A and B
13	If $(AB) = \frac{(A)(B)}{n}$ , the attributes A and B are:	Independent	Dependent	Correlated	Both B and C
14	The co-efficient of association always lies between:	0 and 1	$-\infty$ and $\infty$	-1 and +1	0 and $\infty$
15	If a straight line is fitted to time series, then:	$\Sigma y = \Sigma \hat{y}$	$\Sigma y < \Sigma \hat{y}$	$\Sigma y > \Sigma \hat{y}$	$\Sigma (y - \hat{y})^2 = 0$
16	The most widely used model of time series is:	$Y = T + S + C + I$	$Y = T.S.C.I$	$Y = T - S - C - I$	$Y = \frac{T.S.C.I}{T}$
17	Printer output is a:	Soft copy	Software	Hard copy	Hardware

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Intermediate Part Second  
STATISTICS ( Subjective )

Roll No. \_\_\_\_\_

FBD-12-23

Time: 02:40 Hours

Marks: 68

SECTION – I

2. Write short answers to any EIGHT parts.

- (i) What is the relationship between the binomial distribution and the normal distribution?
- (ii) Explain standard normal variable.
- (iii) Write the equation of normal curve with mean 30 and standard deviation 10.
- (iv) In a normal distribution  $Q_1 = 20$  and  $Q_3 = 40$ . Find  $\mu$  and  $\sigma$ .
- (v) If  $x$  is  $N(50, 100)$ , find  $P(x < \mu)$ .
- (vi) What are the types of statistical inference?
- (vii) Explain what is meant by confidence interval?
- (viii) What is meant by composite hypothesis?
- (ix) Given  $H_0: \mu = 12$ ,  $n = 64$ ,  $\bar{X} = 15$ ,  $\sigma = 10$ , find the value of "Z".
- (x) What is meant by type-II error?
- (xi) What is compiler?
- (xii) Describe the types of printers.

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3. Write short answers to any EIGHT parts.

- (i) Define sample and sampling.
- (ii) Define target population.
- (iii) Differentiate between parameter and statistic.
- (iv) Given that  $n=25$  and  $\sigma_{\bar{x}} = 5$ , find  $\sigma^2$ .
- (v) Find S.E. ( $\bar{X}$ ), if the sampling is done without replacement for the data given as:  $N=300$ ,  $n=100$  and  $\sigma^2 = 200$ .
- (vi) Define probability random sampling.
- (vii) What is dependent variable?
- (viii) Describe the principle of least squares.
- (ix) Given  $\sum X = 0$ ,  $\sum Y = 41172$  and  $n=10$ , find the value of  $a$  for  $Y=a + bx$ .
- (x) Distinguish between positive and negative correlation.
- (xi) Interpret the value of  $r$  when  $r = -1$  and  $r = +1$ .
- (xii) Find  $b_{yx}$ , if  $r_{xy} = 0.27$  and  $b_{xy} = 2.18$ .

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4. Write short answers to any SIX parts.

- (i) Define ultimate class frequencies.
- (ii) Define  $\chi^2$  distribution.
- (iii) When Yates correction is used in  $\chi^2$ ?
- (iv) Write mathematical definition of time series.
- (v) What is meant by components of time series?
- (vi) What are two models used in time series?
- (vii) Define secular trend.
- (viii) Write the normal equations of 2nd degree parabola.
- (ix) Define irregular movements.

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SECTION – II Attempt any THREE questions. Each question carries 08 marks.

5. (a) If  $X \sim N(100, 64)$  find the value of "a" such that  $P(x < a) = 0.95$ .

(b) In a normal distribution  $Q_1 = 8$  and  $Q_3 = 17$ , find mean and standard deviation.

04

04

( Continued P/2 )

6. (a) Take all possible samples of size 3 without replacement from 2, 4, 6, 8. Find sampling distribution of  $\bar{X}$  and verify that:  $\sqrt{n(N-1)}(\sigma_{\bar{X}}) = \sigma\sqrt{N-n}$  04

(b)  $\sigma_{\bar{X}}^2 = 29$  for  $n = 3$ ,  $N = 8$ , what will be  $\sigma_{\bar{X}}^2$  for  $n = 2$ ,  $N = 8$ ? 04

7. (a) In 40 tosses of a coin, 24 heads were obtained. Find 95% confidence interval for the proportion of heads. 04

(b) In a random sample of 1000 houses in a certain city, 618 own colour T.V. sets. Is this sufficient evidence to conclude that  $\frac{2}{3}$  of the houses in this city have colour T.V. sets? Use  $\alpha = 0.02$  04

8. (a) Compute r: 04

X	5	10	15	20	25
Y	12	14	20	18	16

(b) Find regression equation of x on y of the following data: 04

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

9. (a) Given the following data, determine the nature of association between the attributes A and B, i.e. find whether A and B are independent, positively associated or negatively associated. 04

$$(A) = 30, \quad (B) = 60$$

$$(AB) = 12, \quad n = 150$$

(b) Compute 4 months centered moving averages from the following: 04

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Value	23	26	28	30	31	35	37	32

سال سے کاٹ کر تقسیم کیجئے