Roll No._____ to be filled in by the candidate | **(OLD PATTERN)** | Paper Code | 4 | 4 | 9 | 1

Session:2011-2013

Statistics (Objective Type)

Time: 20 Minutes **Marks: 17**

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

1.1. The normal distribution has _____ parameters.

(A) One (B) Two (C) Three (D) Four

2. In the normal distribution $N(\mu, \sigma^2)$, mean deviation is equal to:

(A) 0.5σ (B) 0.6745σ (C) 0.7979σ (D) 1.5σ

3. For a normal distribution with mean $\mu = 50$ and $\sigma = 10$, the area to the left of X=50 is:

(A) 1.0 (B) 0.4745 (C) 0.5 (D) Zero

4. A sample is a part of:

(A) sampling (B) population (C) unit (D) error

5. The number of possible samples of size 'n' drawn with replacement from a population of size N is:

(A) N-n (B) $\dfrac{N-n}{N-1}$ (C) ^NC_n (D) N^n

6. A value calculated from populaton is called:

(A) statistic (B) parameter (C) sampling error (D) none of these

7. A statistic used to estimate a population parameter is a:

(A) point estimator (B) point estimate (C) Interval estimate (D) None of these

8. The confidence coefficient is denoted by:

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

9. The range of confidence interval is incresed if:

(A) α is incresed (B) α is decreased (C) α is known (D) α is unknown

10. For the regression equation $\hat{Y} = a + bX$, the intercept is:

(A) $\hat{Y}$ (B) a (C) b (D) x

11. The graph obtained by plotting the paired observations (Xi, Yi); i=1, 2,........n, is called:

(A) Frequency polygon (B) Frequency histogram (C) Scatter diagram (D) Ogive

12. The coefficent of correlation will be negative if:

(A) X increases, Y decreases (B) x decreases, Y increases

(C) Both X and Y increase (D) A and B but not C

13. For a contigency table of order rxc, the number of degrees of freedom is equal to:

(A) rc (B) (r-1)c (C) r(c-1) (D) (r-1)(c-1)

14. If the attributes A and B are independent, then the coefficient of association is:

(A) Zero (B) Negative (C) Positive (D) 1

15. A business cycle has:

(A) One phase (B) Two phases (C) Three phases (D) Four phases

16. The graph of time series is called:

(A) Histogram (B) Historigram (C) Trend line (D) none of these

17. The computer programs, in general, are referred to as:

(A) Software (B) Hardware (C) Floppy disk (D) Hard disk

Roll No._____ *to be filled in by the candidate.* **(OLD PATTERN)** | Subject Code | 4 | 4 | 9

Session:2011-2013

Statistics (Essay type)

Time: 2:40 Hours | **SECTION-I** | Marks: 68

2. Write short answers of any eight parts from the following. $2 \times 8 = 16$

i. Define an unbiased estimator.

ii. Differentiate between estimator and estimate.

iii. Distinguish between Type-I error and level of significance.

iv. What is meant by power of the test?

v. Differentiate between software and hardware.

vi. Under which circumstances, we may use (i) Z-test (ii) T-test.

vii. For a standardized normal distribution, find the values of quartile deviation and mean deviation.

viii. The mean deviation of a normal distribution is 16. Find the value of σ.

ix. In a normal distribution $\mu = 5$ and $\sigma^2 = 1$, write down its equation. Also find the value of maximum ordinate.

x. In a normal distribution $\sigma^2 = 15$, then find the values of β_1 and β_2.

xi. What are the parameters of the normal distribution? Which parameter controls the relative flatness of normal curve?

xii. What does D.V.D stands for? What purpose can it serve?

3. Write short answers of any eight parts from the following. $2 \times 8 = 16$

i. What is statistic?

ii. Define bias.

iii. What is sampling without replacement?

iv. Define infinite population.

v. What is sampling?

vi. Define standard error.

vii. What is meant by curve fitting?

viii. Define independent variable.

ix. What is meant by Y-intercept?

x. What is positive correlation?

xi. If $b_{yx} = -0.27$, $b_{xy} = -0.38$, find r_{xy}.

xii. Give properties of correlation coefficient.

4. Write short answers of any six parts from the following. $2 \times 6 = 12$

i. Explain the class frequency?

ii. Define contrary classes.

iii. Differentiate between positive and negative attributes.

iv. Defferentiate between Histogram and Historigram.

v. Give any four examples of seasonal variation.

vi. Give the names of stages involved in bussiness cycle.

vii. Give examples of irregular movement.

viii. Explain the method of semi-average.

ix. Define signal?

SECTION-II

Note: Attempt any three questions from the following. $8 \times 3 = 24$

5. (a) The length of life for a washing machine is approximately normally distributed, with a mean of 4 years and a standard deviation of 1.5 years. If this type of washing machine is guarenteed for 12 months, what percentage of the sales will require replacement?

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

6. (a) A random sample of 36 cases is drawn from a negatively skewed probability distribution with a mean of 2 and a standard deviation of 3. (i) Find the mean and standard error of the sampling distribution of $\overline{X}$. (ii) Variance of sampling distribution of $\overline{X}$.

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

7. (a) If a random sample of size 36 is drawn from a population with known variance $\sigma^2 = 4$ gave $\overline{x} = 25$. Find 95%confidence interval for μ.

(b) If $n_1 = 25$, $n_2 = 36$, $\overline{x}_1 = 81$, $\overline{x}_2 = 76$, $\sigma_1 = 2$, $\sigma_2 = 3$. Test the hypothesis (Null hypothesis) $\mu_1 = \mu_2$ against the alternative hypothesis $\mu_1 \neq \mu_2$ and $\alpha = .05$.

8. (a) Fit a least square line $Y = a + bx$ to the following value of X and Y and show that $\sum e = \sum (Y - \hat{Y}) = 0$.

X	1	2	3	4	5
Y	2	3	6	8	9

(b) Find the co-efficient of correlation of the following data of speed and time.

Speed(Km)	65	90	110	120	130
Time(Sec)	1.5	2.0	2.5	3.0	3.4

9. (a) out of sample of 120 goats in a village, 76 were vaccinated aganinst Anthrax and out of them 24 goats were attacked. Out of those who were not vaccinated 12 goats were not affected by Anthrax, Use chi square test to decide whether the vaccination is effective or not.

(b) Calculate the spearman's rank correlation co-efficient for following data of marks obtained by six students in two subjects, (60,42), (69,48), (64,38), (84,56), (73,59), (89,62).

694-012-A-1000

Statistics (Objective Type)

Time: 20 Minutes   **Marks: 17**

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

1.1. If $X \sim N(100,64)$ then standard deviation (σ) is:

(A) 100   (B) 64   (C) 8   (D) 10

2. If $Z \sim N(0,1)$ then μ_4 is equal to:

(A) Zero   (B) 3   (C) 1   (D) σ^4

3. $P(Z<0)$ is:

(A) 0.6   (B) 1   (C) Zero   (D) 0.5

4. Probability distribution of a statistic is called:

(A) Sampling   (B) Parameter   (C) Sampling distribution   (D) Data

5. In sampling without replacement, an element can be chosen in the sample:

(A) less than one   (B) more than once   (C) only once   (D) difficult to tell

6. In sampling with replacement, the number of samples will be:

(A) N^n (B) n^N (C) N   (D) $\binom{N}{n}$

7. The process of estimating single value of unknown parameter is called:

(A) Interval estimation   (B) Point estimation   (C) Confidence interval   (D) Hypothesis

8. if $\hat{\theta}$ is estimator of θ, then $\hat{\theta}$ is called unbiased if:

(A) $E(\hat{\theta})>\theta$ (B) $E(\hat{\theta})<\theta$ (C) $E(\hat{\theta}) \neq \theta$ (D) $E(\hat{\theta})=\theta$

9. If H_o is true and we reject H_o then it is:

(A) Type-II error   (B) Standard error   (C) Sampling error   (D) Type-I error

10. In regression the sum of errors i.e. $\sum(Y-\hat{Y})$ is:

(A) Zero   (B) < 0 (C) > 0 (D) $\neq 0$

11. If $\hat{Y}=bX$ then 'a' is:

(A) non-negative   (B) negative   (C) zero   (D) slope

12. The sample correlation co-efficient is denoted by:

(A) ρ (B) r   (C) b (D) β

13. Two attributes A and B are independent, if (AB)=

(A) $\dfrac{(A)(\beta)}{N}$ (B) $\dfrac{(\alpha)(\beta)}{N}$ (C) $\dfrac{(A)(B)}{N}$ (D) $\dfrac{(\alpha)(B)}{N}$

14. If $(AB)<\dfrac{(A)(B)}{N}$ then the two attributes are:

(A) Independent   (B) disassociated   (C) positively associated   (D) difficult to tell

15. In time series, seasonal variation is in:

(A) short term   (B) long term   (C) irregular term   (D) none of these

16. If a straight line $\hat{Y}=a+bX$ is fitted to the time series data then:

(A) $\sum Y < \sum \hat{Y}$ (B) $\sum Y = \sum \hat{Y}$ (C) $\sum Y \neq \sum \hat{Y}$ (D) $\sum Y > \sum \hat{Y}$

17. In computer studies DOS stands for:

(A) Data Operating System   (B) Disk of System

(C) Data of Support   (D) Disk Operating System

| Roll No._____ to be filled in by the candidate. | (NEW PATTERN) | Subject Code | 6 | 0 | 1 | 8 |

Sessions: 2012-2014 & 2013-2015

Statistics (Essay type)

Time: 3:10 Hours **SECTION-I** **Marks: 83**

2. Write short answers of any eight parts from the following. $2 \times 8 = 16$

i. Define standard normal distribution.

ii. Write down the density function of normal distribution.

iii. In normal distribution if $\mu_2 = 4$ then find μ_3 and μ_4.

iv. Define estimation.

v. What is statistical inference?

vi. What is interval estimation?

vii. Explain type-II error.

viii. Given $\mu = 5, n = 9, \overline{X} = 2, t = -2$, find s.

ix. What is mini computer?

x. What is software?

xi. What is the relation between mean, median and mode in normal distribution?

xii. How much area of the normal distribution lies between $\mu \pm 3\sigma$?

3. Write short answers of any eight parts from the following. $2 \times 8 = 16$

i. What are sampling and non-sampling errors?

ii. Define Bias. Can it be zero, negative or positive?

iii. Define standard error of $\overline{x}$.

iv. Compare parameter and statistic. Give one example of each.

v. What is mean of sampling distribution of $\overline{X}$?

vi. What is variance of sampling distribtuion of $\overline{X}$?

vii. Define regression and correlation.

viii. What is simple linear regression?

ix. Compare regressor and regressand.

x. What is method of least squares?

xi. Define scatter diagram.

xii. Define a and b in regression line Y=a+bX.

4. Write short answers of any six parts from the following. $2 \times 6 = 12$

i. Define consistence of attributes.

ii. Explain the difference between variable and attributes.

iii. What is the first order frequency?

iv. What is secular trend?

v. Give some advantages of freehand method.

vi. Describe the smoothing of time series.

vii. Explain the difference between histogram and historigram.

viii. Write the first degree curve on equation.

ix. What is time series?

SECTION-II

Note: Attempt any three questions from the following. $8 \times 3 = 24$

5. (a) If X~N(50, σ^2) and P(X<60.6)=0.983. Find the value of σ.

(b) If X~N(24,16), then find (i) P_{33} (ii) D_9.

6. (a) A population consist of values 10, 20, 30, 40 and 50. Form sampling distribution of sample means when samplings is done without replacement.

(b) Fine mean and variance of the sampling distribution formed in part (a) of this question and verify it by suitable relation.

7. (a) Find a 90% confidence interval for the mean of a normal distribution with σ =3, given the sample (2.3, -0.2, -0.4, -0.9).

(b) A coin is tossed 20 times resulting 5 heads. Is this sufficient evidence to reject the hypothesis at 5% level of significance that the coin is balanced in favour of the alternative that heads occur less than 50% of the times?

8. (a) Given the following data:

X	0	1	2	3	4
Y	1.0	1.8	3.3	4.5	6.3

Find the regression equation of Y on X.

(b) For a set of 22 pairs of observations we have: $\sum x = 983, \sum y = 409, \sum x^2 = 61339, \sum y^2 = 8475, \sum xy = 15811$.

Find the co-efficient of correlation.

9. (a) Find rank correlation co-efficient from the following data:

X	118	120	116	130	125
Y	107	117	130	112	122

(b) Fit a straight line from the followings for the year 1995 to 2000 (both inclusive).

$\sum x = 0, \sum y = 264, \sum x^2 = 70, \sum xy = 30$. Find out trend values as well.

Section -III   (Practical)

10. NOTE: Answer any three parts from the following.   5x3=15

                                                                          5
A.   A population consist of 3, 6 and 9. Take all possible sample of size 2 with replacement.

Form a sampling distribution of $\bar{X}$ and show that: $\mu_{\bar{X}} = \mu, \quad \sigma_{\bar{X}} = \dfrac{\sigma}{\sqrt{n}}$

                                                                          5
B.   Following paired obsevations are given:

X	45	58	51	42	38	32	57
Y	47	60	53	46	41	34	59

Test the hypothesis that the means are equal.

                                                                          5
C.   The following table gives the demand and supply of a commodity.

Supply	400	200	700	100	500
Demand	50	60	20	70	40

Find correlation co-efficient.

                                                                          5
D.

	Degree		
Hobby	B1	B2	B3
A1	24	83	17
A2	11	62	28
A3	32	121	34
A4	10	26	44

Discuss the association between the two criteria of classification.

                                                                          5
E.

Week	Sun	Mon	Tus	Wed	Thu	Fri	Sat
I	24	50	30	48	54	55	62
II	28	52	41	42	50	41	42

Calculate 7-days moving average recorded of attendance.

638-012-A-

Sessions: 2012-2014, 2013-2015 & 2014-2016

Statistics (Objective Type)

Time: 20 Minutes | | **Marks: 17**

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

1.1. Dependent variable is also called:

(A) regressor (B) regressand (C) continuous (D) qualitative variable

2. Qualtitative variable is also called:

(A) frequency (B) attribute (C) statistic (D) class

3. Two attributes A and B are independent if:

(A) $(AB) > \dfrac{(A)(B)}{N}$ (B) $(AB) < \dfrac{(A)(B)}{N}$ (C) $(AB) \neq \dfrac{(A)(B)}{N}$ (D) $(AB) = \dfrac{(A)(B)}{N}$

4. the additive model of time series can be written as:

(A) Y=T.C.S.I (B) Y=TS+CI (C) Y=T+S+C+I (D) Y=T+S+CI

5. Systemetic component of time series which follows regular pattern of variation is called:

(A) signal (B) noise (C) model (D) random

6. Which of the following is not an output device?

(A) monitor (B) scanner (C) printer (D) none of these

7. In a normal distribution the fourth central moment is:

(A) σ^2 (B) σ^4 (C) $3\sigma^4$ (D) 3μ

8. Area under the standard normal curve is:

(A) 1 (B) 0 (C) 100 (D) 1/2

9. The curve of normal distribution is:

(A) positively skewed (B) negatively skewed (C) symmetrical (D) none of these

10. If N=6, n=2 then total number of samples W.R. are:

(A) 36 (B) 15 (C) 20 (D) 30

11. The difference between estimated and actual values of parameter is called:

(A) standard error (B) sampling error (C) non-sampling error (D) none of these

12. The mean of all samples means is exactly equal to:

(A) sample means (B) population mean (C) weighted mean (D) un-weighted mean

13. A teacher passed a bad student is an example of:

(A) type-I error (B) type-II error (C) right decision (D) sampling error

14. Level of significance is denoted by:

(A) $3-\alpha$ (B) $1+\alpha$ (C) $1-\alpha$ (D) α

15. The kinds of estimation are:

(A) 2 (B) 3 (C) 4 (D) 5

16. In the regression equation X=a+bY, X is called:

(A) dependent variable (B) independent variable (C) qualitative variable (D) quantitative variable

17. The range of r_{xy} is:

(A) -1 to +1 (B) 0 to +1 (C) -1 to 0 (D) $-\infty$ *to* ∞

| Roll No._____*to be filled in by the candidate.* | Subject Code | 6 | 0 | 1 | 8 |

Sessions: 2012-2014, 2013-2015 & 2014-2016

Statistics (Essay type)

Time: 3:10 Hours   **SECTION-I**   **Marks: 83**

2. Write short answers of any eight parts from the following.   **2 x 8 =16**

i. Write the equation of normal distribution.   ii. The M.D. of normal distribution is 16. Find value of S.D.

iii. Write three properties of normal distribution.   iv. Define estimation.

v. What is meant by confidence interval?   vi. Differentiate between Null and Alternative hypothesis.

vii. Define level of significance.   viii. If t=2.3, n=10, $\mu = 5$,and S=3. Find $\bar{X}$.

ix. Define input and output devices.   x. Explain super computer.

xi. What is mean and variance of standard normal distribution?

xii. What is the relation between Mean, Median and Mode in normal distribution?

3. Write short answers of any eight parts from the following.   **2 x 8 =16**

i. Explain the term sampling frame.   ii. Define sample and sampling.

iii. What is meant by sampling distribution?   iv. Give properties of sampling distribution of mean.

v. Define sampling and non-sampling error.   vi. If $\bar{X}$ =50, $\bar{Y}$ =110 and a=10. Find b in Y=a+bX.

vii. If b_{yx}=1.6 and b_{xy}=0.4. Find value of r_{xy}.   viii. Distinguish between positive and negative correlation.

ix. Given that r_{xy}=0.8 S_x=4, S_{xy}=20. Find S_y.   x. Descirbe the simple linear regression model.

xi. What is meant by co-efficient of correlation?

xii. If mean and variance of population are 5 and 2.15 respectively then find S.E($\bar{X}$) if n=4.

4. Write short answers of any six parts from the following.   **2 x 6 =12**

i. Define the term attribute.   ii. What is meant by negative association?

iii. Define the term Dichotomy.   iv. What is time series?

v. What is historigram?   vi. Define models in time series.

vii. What are the merits of free hand curve method?   viii. Define irregular movements in a time series.

ix. Write down any two examples of seasonal variations.

SECTION-II

Note: Attempt any three questions from the following.   **8x3=24**

5. (a) The mean and S.D. of normal distribution are 100 and 20 respectively.

     Find area: (i) Between 65 and 85 (ii) between 65 and 125.

     (b) Find the two points having 98% of the area between them.

6. (a) (i) Given $\mu = 20, \sigma = 10, \sigma_{\bar{x}} = 0.25$. Find size of sample.

     (ii) Given N$_1$=3, n$_1$=2, P$_1$=1/2, N$_2$=3, n$_2$=2, P$_2$=1/3. Find $\sigma_{(\hat{P}_1 - \hat{P}_2)}$ when sampling is done with replacement.

     (b) A population consists of 2, 4, 6, 8, 10, 12. Draw all possible samples of size 2 without replacement and show that: $\mu_{\bar{x}} = \mu$.

7. (a) A random sample of size n=100 is taken from normal population with σ =40.

     If the sample mean=220, test the hypothesis that $\mu \le 200$ at $\alpha = 0.05$.

     (b) Find the 90% confidence limits for the mean of a normal distribution with σ =3, given the sample values

     as 2.3, -0.2, -0.4 and -0.9.

8. (a) Find the regression equation: $\hat{Y}=a+bx$. Given that n=10, $\sum x=20, \sum y=260, \sum xy=3490, \sum x^2=3144$.

(b) Given the following information: $n=20, \bar{x}=2, \bar{y}=8, \sum x^2=180, \sum y^2=3424, \sum xy=604$.

Calculate the co-efficient of correlation.

9. (a) Given that (A)=304, (AB)=256, $(\alpha\beta)$=144, (αB)=768, $(A\beta)$=48. Show that attributes A and B are independent.

(b) Fit a linear trend by the method of least square to the following data:

Years	1997	1998	1999	2000	2001
Values	1.8	5.1	8.9	14.1	19.8

Section -III (Practical)

5x3=15

10. NOTE: Answer any three parts from the following.

A. A population consists of numbers 2, 5 and 8. Take all possible samples of size 2 with replacement and form the sampling distribution of $\bar{X}$ and verify that: $\mu_{\bar{x}}=\mu$ 5

B. The means of two random samples of sizes 9 and 7 respectively are 196.42 and 198.82 respectively. The sum   5 of squares of the deviation from the mean are 26.94 and 18.73 respectively. Assume that the two samples are drawn from normal populations with identical variance. Test $H_o:\mu_1=\mu_2$ against the alternative hypothesis $H_1:\mu_1<\mu_2$ at 5% level of significance.

C. Determine the regression equation of Y on X to the following data. Also find the difference between the actual   5 values of Y and the values obtained from the fitted line and show that $\sum (Y-\hat{Y})=0$

X	5	10	15	20	25
Y	25	20	15	10	5

5

D. An investigation into colour blindness and sex of persons gave the following results:

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

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

E. Applying the method of semi-averages for the following data, determine the trend values and also write the   5 equation of the trend line.

Years	1987	1988	1989	1990	1991	1992
Values	207	210	216	213	220	218

638-012-A-

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Roll No._____ *to be filled in by the candidate*

Paper Code	8	1	8	1

Sessions:2013-2015&2014-2016

Statistics (Objective Type)

Time: 20 Minutes   **Marks: 17**

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

1.1. The range of normal distribution is:

   (A) 0 to n   (B) o to $+\infty$ (C) -1 to +1   (D) $-\infty$ to$+\infty$

2. The parameters of normal distribution are:

   (A) μ and σ^2 (B) μ and σ (C) nP and nq   (D) n and P

3. The total area under normal curve is:

   (A) one   (B) two   (C) 0.5   (D) 1.5

4. The difference between a statistic and parameter is:

   (A) probability   (B) sampling error   (C) random   (D) non-random

5. The standard deviation of sampling distribution is called:

   (A) standard error   (B) sampling error   (C) random error   (D) non-random error

6. A sample which is free from bias is called:

   (A) biased   (B) un-biased   (C) positively biased   (D) negatively biased

7. Estimate and estimator are:

   (A) same   (B) different   (C) maximum   (D) minimum

8. The P(type-I error) is equal to:

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

9. In testing of hypothesis $\alpha+\beta$ is always equal to:

   (A) one   (B) zero   (C) two   (D) difficult to tell

10. In the regression equation Y=a+bx, b is called:

   (A) Slope   (B) intercept   (C) error   (D) dependent variable

11. The range of correlation co-efficient is:

   (A) $-\infty$ to$+\infty$ (B) -1 to +1   (C) 0 to $+\infty$ (D) 0 to n

12. In correlation problem both variables are:

   (A) equal   (B) unknown   (C) fixed   (D) random

13. For (3x3) contingency table, the number of degree of freedom is:

   (A) 3   (B) 6   (C) 9   (D) 4

14. The shape of chi-square distribution is:

   (A) Symmetrical   (B) positively skewed   (C) negatively skewed   (D) all of these

15. The graph of time series is called:

   (A) histogram   (B) straight line   (C) historigram   (D) ogive

16. A complete cycle passes through:

   (A) two stages   (B) three stages   (C) four stages   (D) difficult to tell

17. function keypad consists of:

   (A) 12 keys   (B) 6 keys   (C) 8 keys   (D) 14 keys

120

Roll No._____to be filled in by the candidate.

Sessions:2013-2015 & 2014-2016

Statistics (Essay type)

Time: 3:10 Hours   **SECTION-I**   Marks: 83

2. Write short answers of any eight parts from the following.   2 x 8 =16

i. Define a normal distribution.   ii. If $x \sim N(80,64)$.find Q_1 and Q_3.

iii. Write a short note on computer history.   iv. In a normal distribution $\alpha^2 = 25$.Find the value of B_1 and B_2.

v. Explain the statistical inferences.   vi. In a normal distribution $Q_1=5$ and $Q_3=17$.find median.

vii. Define an estimation.   viii. Explain the level of confidence.

ix. Define level of significance.   x. Define type I error with an example.

xi. Write down the equation of normal distribution who mean 20 and variance 25.

xii. Describe the types of printers.

3. Write short answers of any eight parts from the following.   2 x 8 =16

i. Explain the finite population.   ii. Define the probability sampling.

iii. What is meant by bias?   iv. Define the simple random sample.

v. Define the standard error.   vi. Given n=25 and $\sigma_{\bar{x}} = 5$ .Find the value of σ^2.

vii. Define the term regressor.   viii. What is meant by residuals?

ix. If b_{xy}=0.9 and b_{yx}=0.4.Find the value of γ_{xy}.   x. Define the positive correlation.

xi. Describe the perfect negative correlation.

xii. Given $\sum(x-\bar{x})(y-\bar{y})$ =400,n=8 and $\delta_y = 10$ .Find b_{xy}.

4. Write short answers of any six parts from the following.   2 x 6 =12

i. Write formula of Co-efficient of rank coorelation.   ii. Interpret the meaning of Q=0.

iii. Define time series.   iv. Define noise.

v. Explain secular trend.   vi. Give two examples of irregular trend.

vii. Define Historigram.   viii. Write name of long term variation of time series.

ix. Discuss association from the following. (AB)=150, $(A\beta) = 272$, $(\alpha B) = 106$, $(\alpha\beta) = 1132$.

SECTION-II

Note: Attempt any three questions from the following.   8x3=24

5. (a) In normal distribution mean is 20 and standard deviation is 5.Find. (i) $P(15 \leq x \leq 22)$ (ii) $P(x \leq 18)$.

    (b) The 90th percentile of a normal distribution is 50 while the 15th percentile is 25.

       (i) Find μ and δ.   (ii) What is the value of 40th percentile?

6. (a) In an infinite population μ =50 and σ^2 =250,find mean and variance of the distribution of $\bar{x}$ if n=100.

    (b) If the size of the simple random sample from an infinite population is 55,the variance of the sample

       mean is 27.What must be the standard error of sample mean if n=165?

7. (a) Given that. n=8, $\sum x$ =261.2, $\sum(x-\bar{x})^2$ =3.22.Compute 95% confidence interval for μ.

    (b) Given that: n=30, $\bar{x}$ =15.2, σ =3.Test that μ =15.8 at 5% level of significance.

8. (a) Given the following results: $\bar{x}=54$, $\bar{y}=28$, $b_{xy}=-0.2$, $b_{y.x}=-1.5$.

   (i) Predict the value of y when x=55. (ii) Predicate the value of x when y=30.

   (b) Given the following results:

   $$\delta_y=8 \quad \sum(x-\bar{x})^2 = 90 \quad \sum(x-\bar{x})(y-\bar{y})=120 \quad \text{r=0.5.Compute the number of items i.e n=?}$$

9. (a) Given that (A)=(α)=(B)=(β)=n/2.Show that:(i) (AB)=($\alpha\beta$) (ii) (Aβ)=(α B)

   (b) Compute the trend values by 3-year moving average method from the following time series.

Year	1990	1991	1992	1993	1994	1995	1996
Values	207	210	216	213	220	218	230

Section -III (Practical)

10. NOTE: Answer any three parts from the following.   5x3=15

A. A population consists of three numbers 3,5 and 9. Take all possible samples of size two with replacement   5

   from this population.Show that E($\bar{x}$)= μ.

B. In a random sample of 1000 homes in a city,it is found that 228 are heated by gas.Find 95% confidence   5
   interval for the proportion of homes in this city that are heated by gas.

C. Compute correlation co-efficient for the following informations: 5

   $$\sum D_x = 5, \quad \sum D_y = 4, \quad \sum D_x^2 = 40, \quad \sum D_y^2 = 50, \quad \sum D_x D_y = 32 \quad \text{n=10}$$

D. Calculate and interpret rank correlation co-efficient for the following data: 5

X	4	2	1	3
Y	3	4	2	1

E. Given $\sum X = 0$, $\sum Y = 245$, $\sum X^2 = 28$, $\sum XY = 66$ years 2001 to 2007.Fit a linear trend.   5

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Roll No._____to be filled in by the candidate | Paper Code | 4 | 4 | 9 | 1

Session; 2015-2017

Statistics (Objective Type)

Time: 20 Minutes   **Marks: 17**

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

1.1. If $Z \sim N(0,1)$ then $Q_3 =$
   (A) 0.7979   (B) .6745   (C) 0   (D) 1

2. In a normal distribution $B_2 =$:
   (A) 3   (B) 0   (C) $\frac{2}{3}$ (D) $\frac{4}{5}$

3. If $x \sim N(40,25)$ then mode is:
   (A) 15   (B) 25   (C) 40   (D) 5

4. A value calculated from population is called:
   (A) population   (B) sample   (C) statistic   (D) parameter

5. If $\bar{x} = 20$ and $\mu = 15$ then sampling error is equal to:
   (A) 5   (B) 20   (C) 15   (D) 35

6. Sampling error can be reduced by:
   (A) Non random sampling   (B) increasing the sample size
   (C) Decreasing the sample size   (D) None of these

7. If n=8, $\sum x = 120$, $\sum(x - \bar{x}) = 302$,then unbiased estimated of the population Mean is:
   (A) 15   (B) 120   (C) 8   (D) 302

8. The complement of the null hypothesis is called:
   (A) Statistical hypothesis   (B) Alternative hypothesis
   (C) Simple hypothesis   (D) Composite hypothesis

9. Rejecting H_o when H_o is false:
   (A) No error   (B) type I error   (C) Type II error   (D) $\propto$

10. In regression $\sum \hat{y}$ is equal to:
   (A) 0   (B) a   (C) b y.x   (D) $\sum y$

11. If y=2+0.6x then value of slope is:
   (A) 0.6   (B) 2   (C) 0   (D) 0.3

12. r_{xy} cannot exceed:
   (A) -1   (B) 0   (C) +1   (D) $\sqrt{-1}$

13. If for a contingency table d.f=6 then the cell frequencies will be:
   (A) 16   (B) 12   (C) 18   (D) 24

14. The formula of rank correlation is:
   (A) $1 + \frac{6\sum d^2}{n(n^2-1)}$ (B) $1 - \frac{6\sum d}{n(n^2-1)}$ (C) $1 - \frac{6\sum d^2}{n(n^2-1)}$ (D) $1 - \frac{6\sum d^2}{n^2(n-1)}$

15. An increase in employment during summer month is:
   (A) Trend   (B) Seasonal   (C) Cyclical   (D) irregular

16. Decomposition of time series is called:
   (A) Analysis of time series   (B) Histogram
   (C) Detrending   (D) Noise

17. Drag and drop is a term associated with:
   (A) Key-board   (B) Printer   (C) Scanner   (D) Mouse

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Roll No._____*to be filled in by the candidate.*

Statistics (Essay type) Session; 2015-2017

Time: 2:40 Hours   **SECTION-I**   **Marks: 68**

2- Write short answers of any eight parts from the following.   **2 x 8 =16**

i. What are parameters of a normal distribution?
ii. What is type-I error?
iii. Define estimation.
iv. In normal distribution Q_1=65, Q_3=75.Find the value of μ.
v. What is meant by test statistic?
vi. What is unbiased estimator?
vii. Define Null hypothesis.
viii. What is function of ALU.
ix. Differentiate between RAM and ROM.
x. If $X \sim N(100,25)$,find value of mode and standard deviation.
xi. Find the equation of a normal distribution with Mean μ and variance= σ^2.
xii. In normal distribution μ =80, σ^2 =36.Find its mode,median and quartiles.

3- Write short answers of any eight parts from the following.   **2 x 8 =16**

i. If μ =5 and σ^2 =2.25,what would be the value of S.E of sample mean($\bar{x}$) if sample of size 4 are drawn with replacement.
ii. Define sampling.
iii. Differentiate between independent and dependent variables.
iv. Define simple random sampling.
v. Differentiate sampling and non sampling error.
vi. Explain the term stratified random sampling.
vii. Define regression.
viii. Enlist any two demerits of sampling.
ix. If b_{xy}=-0.52 and b_{yx}=-1.02 find 'r_{xy}'.
x. Discuss the meaning of r=0.
xi. Enlist any two properties of correlation co-efficient.
xii. Given n=15, S_x=7.933, S_y=16.627, $\sum(x-\bar{x})(y-\bar{y})=148$ .Compute b_{xy}.

4- Write short answers of any six parts from the following.   **2 x 6 =12**

i. Define multinominal population.
ii. Explain the term attributes.
iii. Define class.
iv. Define the term time series.
v. What do you mean by historigram?
vi. Differentiate between positive and negative attributes.
vii. What do you mean by secular trend?
viii. Discuss merits of semi-average method.
ix. Explain the properties of best square line.

SECTION-II

Note: Attempt any three questions from the following.   **8x3=24**

5. (a) In normal distribution μ =20 and σ =5.Find (i) P(x≥24) (ii) P(x≥18)   4
   (b) In a normal distribution 31% items are under 45 and 8% are over 64.Find mean and standard deviation.   4

6. (a) Draw all possible samples of size 2 without replacement from the population.1,2,3,4,5.Find the proportion of even numbers in the sample.Form the sampling distribution of the $\hat{p}$ and verify that: 4
   (i) $\mu\hat{p}=p$ (ii) $\sigma^2\hat{p}=\dfrac{P(1-P)}{n}\cdot\dfrac{N-n}{N-1}$
   (b) Given the following population distribution.   4

x	3	4	5
f(x)	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{1}{4}$

   Find $\sigma_{\bar{x}}$ when x=4 with replacement.

7. (a) Given two random samples of size n_1=8 and n_2=10 from independent populations having normal   4
   distribution with $\bar{x_1}=100$, $\bar{x_2}=70$, $\sum(x_1-\bar{x_1})^2=4600$, $\sum(x_2-\bar{x_2})^2=5400$ .Compute a 80% confidence interval for $\mu_1-\mu_2$ .Assume that population variance are equal.
   (b) Past records show that the average score of students in statistics is 57 with standard deviation 10.A new   4
   method of teaching is employed and a random sample of 70 students is selected.The sample average is 60.Can we conclude on the basis of these result at 5% level of significance that the average score has increased?Table value (z=1.645).

8. (a) Compute the regression co-efficients $\sum(x-\bar{x})(y-\bar{y})=148$, $\delta_x=7933$, $\delta_y=16.627$ n=15.Also find r and   4
   show that r= $\sqrt{bxd}$.
   (b) Compute the co-efficient of correlation between x and y.from the following data after calculating missing value.   4
   The mean of x and y series are 6 and 8 respectively.

x	4	6	?	2	8
y	8	9	5	11	7

9. (a) Find rank correlation co-efficient for the following data.   4

a	4.7	2.9	6.4	2.5	4.9
b	8.6	5.4	6.2	4.8	8.3

   (b) Find 3 year moving average for the following data.   4

Year	1990	1991	1992	1993	1994	1995
Value	170	154.8	156.5	158.9	140.3	154.2

Session:2014-2016

Statistics (Objective Type)

Time: 20 Minutes   **Marks: 17**

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

1.1. Which of the following can never be taken as coefficient of correlation?

    (A) -0.99   **(B)** 0.50   **(C)** -0.50   **(D)** $\sqrt{1.5}$

2. In the regression Equation y=a+bx "b" is the:

    (A) y intercept   **(B)** slope   **(C)** x intercept   **(D)** Trend

3. A characteristic which varies in quality from one individual to another individual is called:

    (A) variable   **(B)** statistic   **(C)** Attribute   **(D)** None

4. The value of x^2 is always:

    (A) -1 to +1   **(B)** zero   **(C)** positive   **(D)** negative

5. If $\sum(x-\bar{x})(y-\bar{y})=0$ the correlation coefficient is:

    (A) Strong positive   **(B)** Strong negative   **(C)** Zero   **(D)** Weak negative

6. Decomposition of time series is called:

    (A) Histogram   **(B)** Historigram   **(C)** Detrending   **(D)** Analysis of time series

7. A business cycle has:

    (A) One phase   **(B)** two phases   **(C)** three phases   **(D)** four phases

8. Function keypad consists of:

    (A) 6 keys   **(B)** 8 keys   **(C)** 12 keys   **(D)** 14 keys

9. Normal Distribution is used when n is:

    (A) Large   **(B)** Small   **(C)** Fixed   **(D)** None of these

10. The curve of normal distribution is:

    (A) Lapto Kurtic   **(B)** Platy Kurtic   **(C)** Meso Kurtic   **(D)** None of these

11. Normal distribution is:

    (A) Unimodal   **(B)** Bimodal   **(C)** Trimodal   **(D)** Multimodal

12. A part of population is called:

    (A) parameter   **(B)** statistic   **(C)** Sample   **(D)** Sampling

13. Study of population is called:

    (A) population   **(B)** statistic   **(C)** error   **(D)** consus

14. The difference between statistic and parameter is called:

    (A) Random error   **(B)** Sampling error   **(C)** Standard error   **(D)** Error

15. A hypothesis which is to be tested for possible rejection is called:

    (A) Simple hypothesis   **(B)** Composite   **(C)** Null   **(D)** Alternative hypothesis

16. Which of the following can be H_1?

    (A) $Q > Q_o$ **(B)** $Q < Q_o$ **(C)** $Q \neq Q_o$ **(D)** All of these

17. In point estimation we get:

    (A) More than one value   **(B)** Value in interval   **(C)** Single value   **(D)** None

Session:2014-2016

Statistics (Essay type)

Time: 3:10 Hours | **SECTION-I** | Marks: 83

2. Write short answers of any eight parts from the following.   **2 x 8 =16**

  i. Enlist any four properties of normal distribution.   ii. If $X \sim N(10,25)$ and Y=2X+5, then find μ_y and σ_y^2.

  iii. What do you understand by fiducial limits?   iv. In a standardized normal distribution,show that Q.D=Q_3.

  v. Define test statistic.   vi. Compute $P(Q_1 \leq X \leq Q_3)$=? for a normal distribution.

  vii. What is super computer?   viii. Name the two approaches of statistical inference.

  ix.- If the Q.D of a normal distribution is 3.3725,find the approximate value of σ.

  x. Differentiate between point estimation and interval estimation.

  xi. Differentiate between null hypothesis and alternative hypothesis.

  xii. Differentiate between soft copy and hard copy in computer studies.

3. Write short answers of any eight parts from the following.   **2 x 8 =16**

  i. Express the meaning of target population.   ii. Elaborate the term sampling.

  iii. Define sample.   iv. Describe sampled population.

  v. What is meant by finite population?   vi. Explain simple random sampling.

  vii. Describe the term intercept.   viii. Express the term residual.

  ix. Explain the terms regressor and regressand.   x. Given n=10, $\bar{x} = 5$, $\bar{y} = 6$, $\sum XY = 350$,S_x=2,S_y=3.Find r.

  xi. Express the term correlation co-efficient.   xii. Interpret the meaning of r=1 and r=-1.

4. Write short answers of any six parts from the following.   **2 x 6 =12**

  i. Define positive classes,negative classes.   ii. What is meant by association of attributes?

  iii. Define the cell frequency.   iv. What is rank correlation?

  v. What is meant by decomposition of a time series?   vi. Define the cyclical movements?

  vii. What are the four phases of a business cycle?   viii. Define the irregular movements.

  ix. List the two examples of secular trend.

SECTION-II

Note: Attempt any three questions from the following.   **8x3=24**

5. (a) Suppose that x is normally distributed with $\mu = 25$ and $\sigma = 5$ .Find

  (i) The lower quartile.   (ii) The mean deviation   (iii) P(x>20)

  (b) The height of boys at a particular age follow a normal distribution with mean 150.3 cm and standard deviation

    5.0 cm.Find the probability that a boy picked at random from this age group has height:

    (i) Less than 150cm   (ii) More than 145 cm.

6. (a) Consider the following population 2,5,8. Take all possible samples of size "2" with replacement and form the

    sampling distribution of $\bar{x}$,also verify. (i) $\mu_{\bar{x}} = \mu$ (ii) $\sigma_{\bar{x}}^2 = \dfrac{\sigma^2}{n}$.

  (b) Draw all possible samples of size "2" letters, with replacement from the following population of letters "RIO"

    Find proportion of letter "O" in each sample and form sampling distribution of proportions and verify $H_{\hat{p}} = P$.

7. (a) A random sample of 400 adults and 600 teenagers who watched a certain T.V program,300 adults and 240

    teenager indicated that they liked it.Construct 99% confidence limits for the difference in proportion of all adults

    and all teenagers who watched the program and like it.

  (b) A sample of size 250 has mean $\bar{x}$ =12.0. can this be regarded as sample drawn from a population with mean

    12.4 inches and standard deviation 2.25 inches use $\alpha = 0.05$.

8. (a) For 9 observation on supply(X) and Price(Y).The following data was obtained.

$\sum(X-90)=25$, $\sum(Y-127)=12$, $\sum(X-90)^2=301$, $\sum(Y-127)^2=1006$, $\sum(X-90)(Y-127)=469$

obtain the line of regression x on y.

(b) Find the co-efficient of correlation between two variable x and y from 7 pairs of observation.The following results

are given $\sum X=220$, $\sum Y=47.56$, $\sum XY=1584.98$, $\sum X^2=7888$, $\sum Y^2=341.1628$.

9. (a) Compute X^2 for the following table at $\alpha=0.05$.

	P_1	P_2
S_1	34	22
S_2	21	18

(b) Fit Y=a+bx taking origin at 1990.

Years	1987	1988	1989	1990	1991	1992	1993
Profit	200	600	500	700	800	600	800

Section -III (Practical)

10. NOTE: Answer any three parts from the following. 5x3=15

A. A population consists of 2,4,6,8. 5

(i) Find Mean,variance and standard deviation of population.

(ii) Make samples of size 3 without replacement and find means of all the samples.

(iii) Make a sampling distribution of $\bar{x}$

(iv) Verify the following results. $\mu_{\bar{x}}=\mu$, $\sigma_{\bar{x}}^2=\dfrac{\sigma^2}{n}\cdot\dfrac{N-n}{N-1}$

B. Given that $\bar{X}_1=75$, $n_1=9$, $\sum(X_1-\bar{X}_1)^2=1482$, $\bar{X}_2=60$, $n_2=16$, $\sum(X_2-\bar{X}_2)^2=1830$ and assuming 5
that two samples were randomly selected from two normal populations in which $\sigma_1^2=\sigma_2^2$ (but unknown).
Calculate an 80% confidence Interval for the difference between two population means.

C. Given the following data, find regression equation of Y on X and of X on Y. 5

X	6	2	10	4	8
Y	9	11	5	8	7

D. In a locality 300 persons were selected and about their educational attainment.The result are given below. 5

Sex	Education		
	Middle	Secondary	College
Male	30	45	75
Female	75	30	45

Can we say education depends on sex?use $\alpha=0.05$

E. From the data given below. 5

Years	1960	1961	1962	1963	1964	1965	1966	1967	1968
Values	318	326	337	340	359	365	372	381	402

Obtain trend values using method of semi-average.

722-012-A-

Statistics (Objective Type)

Marks: 17

Time: 20 Minutes

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

1.1. The weight of a baby is related to his:

(A) Study   (B) Age   (C) Relatives   (D) Height

2. 'r' is zero when one of x or y is:

(A) change   (B) constant   (C) variable   (D) fixed

3. The expenditure of a household is related to its:

(A) House   (B) Demand   (C) Income   (D) Working

4. The attributes and their presence is denoted by:

(A) Greek letters   (B) Capital Latin letters   (C) Roman letters   (D) Small Latin letters

5. $(AB)+(A\beta)$ is equal to:

(A) (B) (B) n   (C) (A) (D) (β)

6. In semi-average method,the data are divided into:

(A) Two parts   (B) Three parts   (C) Four parts   (D) None of these

7. Methods of secular trend are:

(A) 2   (B) 3   (C) 4   (D) 5

8. A computer can store a large amount of:

(A) Numbers   (B) Values   (C) Calculations   (D) Data

9. Normal distribution has parameters:

(A) μ (B) μ,σ^2 (C) σ (D) x,μ,p

10. In a normal distribution,if median=50 then the value of μ is:

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

11. If $X \sim N(24,16)$, the value of μ is:

(A) 16   (B) 24   (C) 4   (D) 8

12. Sampling designs have types:

(A) Three   (B) Two   (C) Four   (D) Five

13. Population mean is denoted by:

(A) $\bar{x}$ (B) π (C) σ (D) μ

14. $\sum \bar{X}p(\bar{X})$ is equal to:

(A) n   (B) μ (C) $\mu_{\bar{x}}$ (D) N

15. A specific value calculated from sample is called:

(A) Estimator   (B) Estimate   (C) Estimation   (D) Bias

16. Rejection region is denoted by?

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

17. Which of the following is simple hypothesis?

(A) $H_1:\mu \neq \mu_o$ (B) $H_1:\mu < \mu_o$ (C) $H_o:\mu = \mu_o$ (D) $H_o:\mu \geq \mu_o$

| Roll No._____to be filled in by the candidate. |

Statistics (Essay type) Sessions;2015-2017&2016-2018

Time: 2:40 Hours   SECTION-I   **Marks: 68**

                                                                    2 x 8 =16

2- Write short answers of any eight parts from the following.

i. Define normal distribution.
ii. Enlist any two properties of normal distribution.
iii. Differentiate between hardware and software.
iv. In normal distribution μ_4 =243.Find μ_2 and μ_3.
v. What is statistical Inference?
vi. What are the types of statistical estimation?
vii. Explain Null Hypothesis.
viii. Define rejection region.
ix. Define ALU.
x. Define level of significance.
xi. In normal distribution mean deviation=3.3725.Find variance i.e σ^2.
xii. What do you understand by standard normal distribution?

                                                                    2 x 8 =16

3- Write short answers of any eight parts from the following.

i. If μ =5 and σ^2 =2.25 what would be the value of S.E($\overline{x}$) if sample of size 4 are drawn with replacement?
ii. Differentiate between parameter and statistics.
iii. Define sampling in short.
iv. What do you understand by sample survey?
v. Explain finite and infinite populations.
vi. Define regression in detail.
vii. Write down two properties of correlation co-efficient r.
viii. What is meant by residual?
ix. Define the term correlation.
x. If $\sigma = 4$,N=6, n=2 then find $\sigma_{\overline{x}}$ for sampling distribution with out replacement.
xi. Given n=10, $\overline{x}$ =5, $\overline{y}$ =6, $\sum xy = 350$,S_x=2,S_y=3.Find the value of r.
xii. Given $\overline{x}$ =150, $\overline{y}$ =68,S_x=2.5,S_y=20,S_{xy}=30.Find the regression line y on x.

                                                                    2 x 6 =12

4- Write short answers of any six parts from the following.

i. Differentiating between attribute and variable.
ii. Define Rank Correlation Co-efficient.
iii. Define the term seasonal variation.
iv. What is meant by business cycle?
v. What is meant by Irregular movement?
vi. Describe the principle of least squares.
vii. Given $\hat{y}$ =128+4x and x=-3,-2,-1,0,1,2,3. Find $\sum \hat{y}$.
viii. Write the formula of x^2 by direct method(without computing the expected frequencies).
ix. When two attributes A and B are said to be negatively associated?

SECTION-II

                                                                    8x3=24

Note: Attempt any three questions from the following.

5. (a) The heights of Boys follow a normal distribution with mean150.3 cm and S.D 5.0 cm.Find probability   4
that a boy picked at random from this age group has height.
   (i) less than 153 cm.   (ii) more than 145 cm.
   (b) In a normal distribution μ =30 and σ =5.Find   4
   (i) a point that has 15% area below it.   (ii) Two points containing middle 95% area.

6. (a) Take all possible samples of size 2 without replacement from a population 4,5,6,7,8.Find mean of each   4
sample and show that: (i) $\mu_{\overline{x}} = \mu$ (ii) $\sigma^2_{\overline{x}} = \dfrac{\sigma^2}{n} \cdot \dfrac{N-n}{N-1}$
                                                                    4
(b) Given the following population distribution.

x	2	4	6
f(x)	$\dfrac{1}{7}$	$\dfrac{2}{7}$	$\dfrac{4}{7}$

Find population mean and variance.

7. (a) Find 90% confidence interval for the mean of a normal distribution if σ =2 and a sample of size 8 gave   4
the values 9,14,10,12,7,13,11,12
   (b) Let $X \sim N(\mu,100)$ and $\overline{X}$ be the mean of a random sample of 64 observations of X,given that $\overline{X}$ =15.   4
      Test H$_o$: $\mu = 12$ H$_1$=$\mu > 12$ use α =0.05 (Table value=2.33).
                                                                    4

8.(a) For 9 observation on supply X and price Y the following data was obtained.
   $\sum (X-90) = -25$, $\sum (X-90)^2 = 301$, $\sum (X-127) = 12$, $\sum (X-127)^2 = 1006$
   $\sum (X-90)(Y-127) = -469$ obtain the estimated line of regression of X on Y.
   (b) For a sample of 20 pair of observations, we have $\overline{X}$ =2, $\overline{Y}$ =8, $\sum X^2$=180, $\sum Y^2$=3424 , $\sum XY$=604 4
   Calculate the Co-efficient Correlation.   4

9. (a) The following table shows the marks of six candidates in two subjects.

Candidate	A	B	C	D	E	F
Math X	38	62	56	42	59	48
Stat Y	64	89	84	60	73	69

(i) Calculate the coefficient of rank correlation   (ii) Comment on the value of your result.
(b) The following table shows the property damaged road accident in Punjab for years 1973-79.   4

Years	1973	1974	1975	1976	1977	1978	1979
Values	201	238	392	507	484	649	742

(i) Obtain the semi-average trend line.   (ii) Find out the Trend values.

Statistics (Objective Type)

Time: 20 Minutes   **Marks: 17**

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

1.1. The sum of squares of residuals is denoted by:

(A) $y - \bar{y}$ (B) $\sum (y - \hat{y})$ (C) $\sum (y - \hat{y})^2$ (D) $\sum \frac{e^2}{n}$

2. If b_{yx}=-2 and r_{xy}=-1 then b_{xy} is equal to:

(A) -1   (B) -2   (C) 0.5   (D) -0.5

3. If r_{xy}=0.75 then r_{yx} will be:

(A) 0.25   (B) 0.50   (C) 0.75   (D) -0.75

4. The range of the Co-efficient of Rank correlation lies between:

(A) 0 and 1   (B) 0 and 0.5   (C) -1 and 0   (D) -1 and +1

5. An rxc contingency table has degrees of freedom:

(A) rxc   (B) r-c   (C) rxc-1   (D) (r-1)(c-1)

6. The best fitted trend is one for which the sum of squares of error is always:

(A) zero   (B) least   (C) maximum   (D) negative

7. There are____main components of a time series:

(A) three   (B) four   (C) two   (D) five

8. CPU stands for_____processing unit:

(A) Complete   (B) Central   (C) Computer   (D) Copy

9. In a normal distribution,the value of β_1 is:

(A) 3   (B) 0   (C) 1   (D) 2

10. If X is N(μ, σ^2),the percentage of the area contained within limits $\mu \pm 3\sigma$ is:

(A) 50%   (B) 68.27%   (C) 95.45%   (D) 99.73%

11. The area above the third quartile in a normal curve:

(A) 25%   (B) 75%   (C) 30%   (D) 70%

12. In Sampling without replacement an element can be chosen:

(A) more than twice   (B) more than once   (C) less than one   (D) only once

13. A complete list of all the sampling units are called:

(A) Sampling design   (B) Sampling frame   (C) Population frame   (D) Cluster

14. Population parameters are usually:

(A) Roman   (B) Greek   (C) Latin   (D) English

15. The point estimator of population mean μ is:

(A) Sample mean   (B) Sample variance   (C) Sample S.D   (D) Sample Size

16. Probability of rejecting H_o when it is true is called:

(A) Type-I error   (B) Type-II error   (C) Standard error   (D) Best error

17. The level of Confidence is denoted by:

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

Roll No._____ to be filled in by the candidate.

(For all Sessions)

Statistics (Essay type)

Time: 2:40 Hours · **SECTION-I** · **Marks: 68**

2- Write short answers of any eight parts from the following. 2 x 8 =16

i. Enlist any four properties of Normal distribution.
ii. If Q.D=10 and x is normally distributed.Find Mean Deviation.
iii. Discuss the importance of normal distribution.
iv. Write down the equation of the standard normal distribution.
v. Explain the term unbiasedness.
vi. What do you understand by level of Confidence?
vii. Discuss the term Power of the test.
viii. Differentiate between Acceptance and Rejection region.
ix. Given μ_o =5, n=9, $\bar{x}$ =2 and t=-2.Find value of s.
x. Describe the types of printers.
xi. Write down the relationship between Binomial distribution and Normal distribution.
xii. What are Computer hardwares?

3- Write short answers of any eight parts from the following. 2 x 8 =16

i. Differentiate between population and sample.
ii. Define sampling frame.
iii. Define the term simple random sampling.
iv. Define independent variable.
v. Define regression.
vi. Define correlation.
vii. Enlist three properties of correlation coefficient.
viii. If μ =5 and σ^2 =2.25,what would be the value of S.E($\bar{x}$) if samples of size 4 are drawn with replacement?
ix. Find μ and σ^2 if sample of size 2 with replacement give mean and variance of $\bar{x}$ as 10 and 2.5 respectively.
x. If the regression lines are, y=15-1.96x(y on x) and Y=15.91-2.22x (x on y) then find b_{yx} and b_{xy}.
xi. What do you understand by sampling error and how it can be reduced?
xii. From the given regression lines find 'r'. $\hat{x}$ =16.2-0.785y, $\hat{y}$ =20.8-0.219x

4- Write short answers of any six parts from the following. 2 x 6 =12

i. Define Coefficient of association.
ii. Define contingency table.
iii. Write down the applications of chi-square test.
iv. What is negative association?
v. Explain the term historigram.
vi. Give two merits of free hand curve method.
vii. What is signal?
viii. If n=100 (A)=60 (B)=40, find (AB) when A and B are independent attributes.
ix. If n=10, $\sum x = 0$, $\sum x^2 = 330$, $\sum y = 222$, $\sum xy = 233.6$ then find b.

SECTION-II

Note: Attempt any three questions from the following. 8x3=24

5. (a) Suppose that the length of time it takes one variety of plant seeds to germinate is normally distributed with a mean of 15 days and a standard deviation of 4 days.What proportion of the seeds should germinate. 4
   (i) before 19 days. (ii) after 12 days.
   (b) In a normal distribution, 25% of the items are under 50 and 10% of items are over 100.Find mean and standard deviation of the distribution. 4

6. (a) Draw all possible samples of size 2 with replacement from a population consisting of 2,4,6 construct sampling distribution of sample means and show that (i) $\mu_{\bar{x}} = \mu$ (ii) $\sigma_{\bar{x}}^2 = \dfrac{\sigma^2}{n}$ 4
   (b) Suppose that 80% 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 error of the sample proportion favouring this issue? 4

7. (a) Find 95% confidence interval for population mean(μ) from the following samples.
     x=5 , 7 , 9 , 11 , 13 , 15 , 17 and 19.
   (b) A random sample of 25 values gives average Q3. Can this sample be regarded as drawn from Normal population with μ =80 and σ =7 at 5% level of significance? 4

8.(a) Determine the estimated regression equation $\hat{y} = a + bx$ 4
     n=10; $\sum x = 20$; $\sum y = 260$; $\sum xy = 3490$; $\sum x^2 = 3144$
   (b) For a set of 20 pairs of observations we have. $\bar{x} = 2$; $\bar{y} = 8$; $\sum x^2 = 180$; $\sum y^2 = 3424$; $\sum xy = 604$
     Calculate coefficient of correlation.

9. (a) Test at 0.05 level of significance that there is no association between sex and influenza. 4

Attributes	Boy	Girl
Influenza	15	8
Not Influenza	7	20

   (b) Find three year moving average from the following data. 4

Year	1920	1921	1922	1923	1924
Production	80	74	83	91	70

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Roll No._____ *to be filled in by the candidate* **(For all sessions)** | Paper Code | 8 | 1 | 8 | 7

Statistics (Objective Type)

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1.1. The smallest individuals that constitute the whole population is called:

    (A) Sampling frame   **(B)** Sampling units   **(C)** Sampled population   **(D)** Target population

2. Confidence coefficient is denoted by:

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

3. $E(\hat{\theta}) - \theta =$

    (A) Sampling error   **(B)** Non Sampling error   **(C)** Bias   **(D)** Standard Error

4. A Sample size "n" is called large when:

    (A) $n>30$ **(B)** $n=30$ **(C)** $n \geq 30$ **(D)** $n \leq 30$

5. A test statistic $Z = \dfrac{\bar{x}-4}{\sigma/\sqrt{n}}$ has degrees of freedom:

    (A) n   **(B)** n-1   **(C)** n-2   **(D)** none

6. In regression, if $b_{xy}=-1$ and $b_{yx}=-1$ then r_{xy} is equal to:

    (A) -1   **(B)** 0   **(C)** +1   **(D)** 0.5

7. In regression $\sum(y-\hat{y})$ is equal to:

    (A) zero   **(B)** -1   **(C)** +1   **(D)** 2

8. If both correlated variables move in same direction,then correlation will be:

    (A) zero   **(B)** Negative   **(C)** Positive   **(D)** None

9. The strength of relationship between two attributes is called:

    (A) Correlation   **(B)** Regression   **(C)** Interdependence   **(D)** Association

10. Presence of attributes is denoted by:

    (A) Greek letters   **(B)** Capital letters   **(C)** Small letters   **(D)** Latin letters

11. If numerical data is arranged in the order of occurance,then resulting data is called:

    (A) Arithmatic series   **(B)** Geometric series   **(C)** Time series   **(D)** Random series

12. Recession in business is:

    (A) Cyclical movements **(B)** Irregular variations   **(C)** Secular trend   **(D)** Seasonal variations

13. If $X \sim N(40,25)$, then mode of the distribution is:

    (A) 15   **(B)** 25   **(C)** 40   **(D)** 5

14. Range of the normal distribution is:

    (A) 0 to ∞ **(B)** $-\infty$ to 0 **(C)** 0 to n **(D)** $-\infty$ to $+\infty$

15. In normal distribution,all odd order moments are equal to:

    (A) 1   **(B)** 2   **(C)** zero   **(D)** 3

16. No. of observations falling in a sample is called:

    (A) population size   **(B)** sampling frame   **(C)** Sample size   **(D)** Sample design

17. If $\sum X = 18$ and $N=3$, then mean of sampling distribution of means $\mu_{\bar{X}}$ is:

    (A) 6   **(B)** 9   **(C)** 3   **(D)** 54

Roll No._____ *to be filled in by the candidate.*   **(For all sessions)**

Statistics (Essay type)

Time: 2:40 Hours   **Marks: 68**

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SECTION-I   **2 x 22 = 44**

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2- Write short answers of any eight parts from the following.   **2 x 8 =16**

i. What is normal probability density function?   ii. Write two properties of standard normal distribution.

iii. Define standard normal variation.   iv. In a normal distribution, Q_1=15, Q_3=25. Find μ and σ.

v. What is the range of a normal distribution?   vi. Define interval estimation.

vii. What is biased estimator?   viii. Define estimate.

ix. What is null hypothesis?   x. Define Test Statistics.

xi. Define Type-I error with an example.

xii. Write down the theoretical equation of normal distribution for $\mu = 16$ and $\sigma^2 = 64$

3- Write short answers of any eight parts from the following.   **2 x 8 =16**

i. What is population?   ii. What is random sampling?

iii. What is Statistics?   iv. Write the properties of sampling distribution of a sample mean.

v. If n=25 and σ =2.7 then find $\sigma_{\bar{X}}$.   vi. Define simple random sampling.

vii. Define simple regression.   viii. Given $\bar{x}$ =1, $\bar{y}$ =8 and b_{XY}=2. Find the value of a_{YX}.

ix. Explain the term residual.   x. Given S_{xy}=36; S_x=8; S_y=9, find r.

xi. What is co-variance?   xii. Give any two properties of correlation coefficient.

4- Write short answers of any six parts from the following.   **2 x 6 =12**

i. Define association of attributes.   ii. If A=20, B=10, N=40, find (AB).

iii. Define rank correlation.   iv. Differentiate between positive and negative association.

v. Define multiplicative model in time series.   vi. Define moving averages method.

vii. What is irregular variation in time series? viii. Define analysis of time series.

ix. Given $\sum X = 0, \sum Y = 245, \sum X^2 = 28, \sum XY = 66$ and n=7, fit a linear trend.

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SECTION-II   **8x3=24**

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Note: Attempt any three questions from the following.

5. (a) Given a normal distribution with $\mu = 40$ and $\sigma = 6$, Find: **(i)** The area below 32. **(ii)** The area above 27.   4

  (b) A random variable X is normally distributed with mean=40 and standard deviation=4. Find **(i)** P_{20}. **(ii)** P_{95} 4

6. (a) Take all possible samples of size 2 with replacement from the population 1,3,5,7. Show that: 4

$$\text{(i) } \mu_{\bar{X}} = \mu. \quad \text{(ii) } \sigma_{\bar{X}} = \frac{\sigma}{\sqrt{n}}$$

  (b) A family has 5 children with 3 boys and 2 girls as given below.   4

Child	I	II	III	IV	V
Sex	B	G	G	B	B

Select all possible sample of size 3 children without replacement. Form sampling distribution of proportion of boys.

Verify: **(i)** $\mu_p = \pi$ **(ii)** $\text{Var(p)} = \frac{\pi(1-\pi)}{n} \cdot \frac{N-n}{N-1}$

7. (a) Compute 95% confidence interval for μ if n=50, $\sum X = 2163$ and $\sum X^2 = 144949$.

  (b) A random sample of 10 from a population gave $\bar{X} = 20$ and $\sum (X - \bar{X})^2 = 144$.   4

  Test H_0: μ =19.5 against H_1: μ >19.5 at α =0.05.

8. (a) Fit a least squares line to following data taking "Y" as dependent variable.   4

X	1	3	4	6	8	9	11	14
Y	1	2	4	4	5	7	8	9

  (b) For a set of 50 pairs of observations, The standard deviation of X and y are 4.5 and 3.5 respectively. If the   4

  sum of products of deviations of 'X' and 'Y' values from their respective means be 420. Find the

  Karl Pearson's co-efficient of Correlation.

9. (a) Calculate coefficient of association from the following data.   4

	Attacked	Not Attacked
Given quinine	20	780
Without quinine	220	2180

  (b) Fit a straight line to the following data.   4

Years	1987	1988	1989	1990	1991
Values	10	17	28	43	62