STATISTICS	12 CLASS – 1 Annual 2024	TIME: 20 MINUTES
	OBJECTIVE	**MARKS: 17**

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 marks in that question.

QUESTION NO. 1

1 A value calculated from population is called
(A) Statistic (B) Mean (C) Proportion (D) Parameter

2 The difference between a statistic and parameter is called
(A) Sampling error (B) Standard error (C) Systematic error (D) Non-sampling error

3 The statistical inference can be divided into ---------- approaches.
(A) 4 (B) 3 (C) 2 (D) 5

4 The point estimate of μ is
(A) σ (B) $\bar{x}$ (C) σ^2 (D) μ

5 A hypothesis which is to be tested for possible rejection is called
(A) Null (B) Composite (C) Simple (D) Alternative

6 Simple linear regression model contains
(A) Four variables (B) Three variables (C) One variable (D) Two variables

7 For the least squares regression line : $\hat{y} = a + bx$, the slope is
(A) x (B) Zero (C) b (D) a

8 Co-efficient of correlation lies between
(A) 0 and +1 (B) -1 and +1 (C) -1 and 0 (D) -2 and +2

9 Eye colour of 100 men is
(A) Variable (B) Constant (C) Numerical value (D) Attribute

10 If $(AB) > \frac{(A)(B)}{n}$, then association is
(A) Negative (B) Perfect (C) Positive (D) No association

11 Decomposition of time series is called
(A) Analysis of time series (B) Histogram (C) Historigram (D) Detrending

12 A rise in prices before eid is an example of
(A) Secular trend (B) Seasonal variations
(C) Cyclical variations (D) Irregular variations

13 A set of instructions that runs the computer is called
(A) Printers (B) Hardware (C) Monitors (D) Software

14 In a normal distribution , $N(\mu, \sigma^2)$ mean deviation is equal to
(A) 0.5 σ (B) 0.6745 σ (C) 0.7979 σ (D) 1.5 σ

15 Normal distribution is
(A) Uni-modal (B) Bi-modal (C) Tri-modal (D) Multimodal

16 For the standard normal variable , $P(0 \leq Z \leq 1)$ = ----------
(A) 0.3413 (B) 0.4772 (C) 0.4986 (D) 0.3372

17 A sample is a subpart of the
(A) Sampling (B) Population (C) Unit (D) Error

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

(i)	In Normal Distribution; $Q_1 = 8$ and $Q_3 = 17$ Find S.D	(ii)	Write equation of normal distribution if mean is 10 and variance is 9
(iii)	Write at least 2 properties of normal distribution.	(iv)	What is point of inflection in normal curve ?
(v)	Write a short note on importance of normal distribution.	(vi)	Confidence Interval for mean is given as : $12.18 < \mu < 20.56$ Find $\bar{x}$
(vii)	Explain the concept of confidence Interval.	(viii)	What is test statistic ?
(ix)	Write a short note on testing of hypothesis.	(x)	If $\mu = 5$, $t = 3$, $\bar{x} = 14$, $n = 9$ then find $\hat{s}$
(xi)	Differentiate between ROM and RAM.	(xii)	Describe the function of modem.

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

(i)	What is meant by " Sampling " ?	(ii)	Define finite population. Also give an example.
(iii)	Given $\sigma = 6$, and $n = 30$ find $\sigma_{\bar{x}}$.	(iv)	If $n = 25$ and $\sigma_{\bar{x}} = 5$, Find σ^2
(v)	Given $b_{xy} = 0.82$, $r_{xy} = 0.97$, Find b_{yx}	(vi)	Define Sampling with replacement.
(vii)	Given $r_{xy} = 0.8$, $S_x = 4$, $S_{xy} = 20$, Find standard deviation of y i.e S_y.	(viii)	Given $y = 6, 8, 10$ and $x = 0, 1, 2$. Find regression coefficient of y on x
(ix)	Given $p_1 = {}^2/_3$, $n_1 = 200$, $p_2 = {}^1/_2$, $n_2 = 200$, Find $\mu_{\hat{p}_1 - \hat{p}_2}$	(x)	Given : $\bar{y} = 1.87$, $b = 0.25$, $\bar{x} = 12.45$ Find value of y-intercept ie " a "
(xi)	Define positive correlation. Also give an example.	(xii)	Given $\hat{y} = 45 - 10x$, Find $\hat{y}$ when $x = 3, 4$

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

(i)	Explain contrary class.	(ii)	Define contingency table.
(iii)	Given $\sum d^2 = 440$ and $n = 11$. Find Spearman's coefficient of rank correlation.	(iv)	Name the methods used to estimate secular trend.
(v)	Explain analysis of time series.	(vi)	Define Irregular movements with example.
(vii)	Write two examples of seasonal variations.	(viii)	Given $\hat{y} = 13 + 8x$ and $x = -2, -1, 0, 1, 2$ Find trend values.
(ix)	If $Y'_2 = 160$, $Y'_1 = 100$, $x_2 = 6$, $x_1 = 2$ Find Semi-Average trend line. $Y' = a + bx$		

SECTION-II

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

Q. 5(a) If $X \sim N(25, 16)$, find Q_1 and Q_3

(b) Find the two points containing the middle 95 % area of standard normal distribution.

Q. 6(a) Draw all possible of size 2 without replacement from the letters of word " KASHM ". Find the proportion of vowel letters in each sample and show that. $\mu_p = \pi$ and $\sigma_p^2 = \frac{\pi(1-\pi)}{n} \times \frac{N-n}{N-1}$

(b) Given $\mu_1 = 4500$, $\mu_2 = 4000$, $\sigma_1 = 200$, $\sigma_2 = 250$, $N_1 = 400$, $N_2 = 300$, $n_1 = 100$ and $n_2 = 50$ Determine the expected mean and standard deviation of the sampling distribution of difference of the means if sampling is done (i) with replacement (ii) without replacement

Q. 7(a) A random sample of 25 values gives the average of 83. Can this sample be regarded as drawn from the normal population with mean 80 and S.D 7 ?

(b) Given that : $n_1 = 150$, $\bar{x}_1 = 1400$, $\sigma_1^2 = 120$, $n_2 = 200$, $\bar{x}_2 = 1200$, $\sigma_2^2 = 80$ Calculate 95% confidence interval for $\mu_1 - \mu_2$

Q. 8(a) Obtain regression line y on x from the following data

X	3	5	9	12
Y	15	20	26	35

(b) Find co-efficient of correlation from following information

$\Sigma xy = 3467$, $\bar{x} = 13$, $\bar{y} = 22$, $s_x = 7.73$, $s_y = 8.04$, $n = 10$

Q. 9(a) Compute the value of Chi-Square from the following data

	Parents			
Off spring	**Very Tall**	**Tall**	**Medium**	**Short**
Very Tall	20	30	20	2
Tall	14	125	85	12
Medium	3	140	165	125
Short	3	37	68	151

(b) Fit a straight line $y = a + bx$, from the following results

$n = 11$, $\Sigma x = 0$, $\Sigma x^2 = 110$, $\Sigma x^4 = 1958$, $\Sigma y = 438.9$, $\Sigma xy = -84.4$

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

STATISTICS **SUBJECTIVE** **TIME: 2.40 HOURS**

SECTION-I **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 $8 \times 3 = 24$

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

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 β_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 σ 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:	β	α	$1-\beta$	$1-\alpha$
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 ∞	-1 and $+1$	0 and ∞
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

Intermediate Part Second

Roll No. _____

STATISTICS (Subjective)

Time: 02:40 Hours Marks: 68

SECTION – I

2. **Write short answers to any EIGHT parts.** 16

(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 μ and σ.
(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.

3. **Write short answers to any EIGHT parts.** 16

(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 σ^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 $b_{xy} = 2.18$.

4. **Write short answers to any SIX parts.** 12

(i) Define ultimate class frequencies.
(ii) Define χ^2 distribution.
(iii) When Yates correction is used in χ^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.

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 $P(x < a) = 0.95$. 04

(b) In a normal distribution $Q_1 = 8$ and $Q_3 = 17$, find mean and standard deviation. 04

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

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

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

   (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

PAPER CODE - 8181

(12th CLASS – 12018)

STATISTICS (NEW COURSE)
ACADEMIC SESSION : 2015 - 2017 TO 2016 - 2018

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	In a Normal distribution x lies between (A) - ∞ and 0 (B) - ∞ and + ∞ (C) 0 and + ∞ (D) - 1 and + 1
2	Normal distribution has parameters (A) μ (B) μ , σ^2 (C) σ (D) x , μ , p
3	The value of π is equal to (A) 1.1415 (B) 2.1415 (C) 4.1415 (D) 3.1416
4	Which one of the following is not probability sampling (A) Simple random sampling (B) Systematic sampling (C) Stratified sampling (D) Judgment sampling
5	A complete list of elements in a population is called (A) Population (B) Sampling design (C) Sampling frame (D) Sampling unit
6	In sampling with replacement the no of possible samples are (A) N^n (B) N_{en} (C) N_{pn} (D)N_{pr}
7	In interval estimation we always get (A) A single value (B) Two values (C) Range of values (D) Three values
8	Usually a null hypothesis is denoted by (A) H_o (B) H_1 (C) H_b (D) H_a
9	If R.R(region of rejection) is $Z < Z_\alpha$ then the test is (A) Right tailed (B) Left tailed (C) Two tailed (D) None of these
10	In regression $\hat{Y} = a + bx$ independent variable is denoted by (A) Y (B) X (C) a (D) b
11	Independent variable is also called (A) Regressor (B) Regressand (C) Predictand (D) Explained
12	If both the variables move in the same direction then r is (A) Zero (B) Negative (C) Positive (D) One
13	The Chi-square curve always ranges from (A) - ∞ to + ∞ (B) 0 to ∞ (C) - ∞ to 0 (D) 0 to 1
14	(A) + (α) is equal to (A) n (B) α (C) B (D) A
15	A time series has ..... components (A) Two (B) Three (C) Four (D) Five
16	The graph of time series is called (A) Histogram (B) Straight line (C) Historigram (D) Ogive
17	The " CPU " of the computer is (A) Output device (B) Software (C) Hardware (D) Input device

STATISTICS (NEW COURSE) — **12th CLASS - 12018** — **(SUBJECTIVE)**

ACADEMIC SESSION : 2015 - 2017 TO 2016 – 2018

TIME: 2.40 HOURS

MARKS: 68

SECTION-I

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

(1) Define a normal distribution
(2) Enlist any four properties of a normal distribution
(3) In a normal distribution the value of S.D.= 4. Find the values of second and fourth moments about Mean
(4) In normal distribution $Q_1 = 65$ and $Q_3 = 75$. Find the value of Mean and Median
(5) In normal distribution $\mu = 80$, $\sigma^2 = 36$. Find quartiles
(6) Differentiate between Estimator and Estimate.
(7) What do you understand by confidence interval ?
(8) What is meant by testing of hypothesis?
(9) Define the terms null and alternative hypothesis
(10) Define the term test statistic
(11) Write down the main categories of computers
(12) Differentiate between hardware and software

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

(1) What is sampling design ?
(2) What is sampling with replacement ?
(3) Define parameter
(4) Define probability sampling
(5) If $\mu = 7$, $\sigma^2 = 3.15$, $n = 6$, $N = 10$, find S.E($\bar{x}$) if sampling is without replacement
(6) What do you understand by " Standard error " ?
(7) What is meant by scatter diagram ?
(8) What is least square principle ?
(9) Write two properties of the least square regression line
(10) Define negative correlation
(11) Describe any two properties of correlation co-efficient " r "
(12) If $b_{yx} = 0.11$ and $b_{xy} = 0.22$ find value of correlation co-efficient " r "

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

(1) What is meant by positive association ?
(2) Define Chi-square distribution
(3) When two attributes are said to be associated ?
(4) Interpret the meaning of co-efficient of association Q when Q = 0 , Q = + 1
(5) Given (B) = 50 and (AB) = 30. Find ($\propto$ B).
(6) Define seasonal variations
(7) What are long term variation ?
(8) Explain moving average method
(9) Write down multiplicative time series model

SECTION-II

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

5.(a) The 90th percentile of a normal distribution is 50 while the 15th percentile is 25. Find μ and σ

(b) If $X \sim N(\mu, 144)$ and $P(X > 92) = 4.78\%$ Find the value of the mean μ

6.(a) A population consists of two values 0 and 3 . Take all possible samples of size n = 3 with replacement. Show that $\sigma_{\bar{x}}^2 = \sigma^2/3$

(b) A small society has N = 4500 members. The president take n = 400 questionnaires to a random sample without replacement. If P = 0.7 then find mean and variance of sampling distribution of sample proportion ($\hat{P}$) . Here P = population proportion and $\hat{P}$ = sample proportion

7.(a) A sample poll of 100 voters chosen at random from all voters in a given district indicated that 55 % of them were in favour of a particular candidate. Find 95 % confidence limits for the proportion of all the voters in favour of this candidate

(b) A random sample of size 36 is taken from a normal population with known variance $\sigma^2 = 25$, If the mean of the sample is $\bar{x} = 42.6$. Test the null hypothesis $\mu \geq 45$ using $\propto = 0.05$

8.(a) Fit a least square line $\hat{Y} = a + bx$ for the following data

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

(b) Find correlation Co-efficient for the data given below

X	4	2	7	1	5
Y	5	6	2	7	4

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

	Colourblindness	
Sex	Colourblind	Not colourblind
Male	36	964
Female	19	981

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

(b) Fit a straight line $\hat{y} = a + bx$ from the following results , for the years 1985 – 95 (both inclusive) Find out the trend values of y as well $\Sigma x = 0$, $\Sigma y = 438.9$, $\Sigma x^2 = 110$ and $\Sigma xy = -84.4$