2017

Time : 3 hours

Full Marks : 75

Pass Marks : 26

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

*Answer **five** questions, selecting at least **one** from each Group.*

Group – A

1. What is meant by central tendency of data ? What are its measures ? Critically examine the merits and demerits of such measures.

2. Show your acquaintance with skewness and kurtosis of a frequency distribution. Discuss the methods for measuring them.

3. Derive the formula for computing Spearman's rank correlation coefficient.

4. Obtain the regression lines of y on x and x on y. Why do we need always two regression lines ?

Group – B

5. (a) Explain the following terms with suitable examples :
   (i) Mutually Exclusive Events
   (ii) Independent Events
   (b) If A and B are independent events, then show that $\bar{A}$ and $\bar{B}$ are also independent.

6. (a) Under what conditions binomial distribution can be approximated to normal distribution ?
   (b) Discuss the chief characteristics of a normal probability curve.

7. Obtain Poisson distribution as a limiting case of binomial distribution. Find its mean and variance.

Group – C

8. (a) Evaluate $\left(\frac{\Delta^2}{E}\right) e^x \times \frac{Ee^x}{\Delta^2 e^x}$; internal of differencing being h.

(b) Show that $\Delta^n u_x = U_{x+n} - \binom{n}{1} U_{x+n-1} + \binom{n}{2} U_{x+n-2} \text{ --- } + (-1)^n U_x$.

9. Prove that divided differences of order n of polynomial of n^{th} degree are constants.

10. When do we need numerical integration techniques ? Establish Simpson's $3/8^{th}$ rule for numerical integration.

Voc(B-1) — BCA – Stat (Sub)

2016

Time : 3 hours

Full Marks : 75

Pass Marks : 26

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

*Answer **five** questions, selecting at least **one** from each Group.*

Group – A

1. What is dispersion ? What are its measures ? Describe them critically.

2. What are moments ? Obtain an expression for central moments in terms of raw moments. Given $\mu'_1 = 1, \mu'_2 = 2, \mu'_3 = 3$; find μ_2, μ_3 and β_1.

3. (a) Obtain the limits of correlation coefficient.

(b) Show that the correlation coefficient is independent of the change of origin and scale.

4. Obtain an expression for multiple correlation coefficient in terms of total correlation coefficients.

Group – B

5. (a) Prove that $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

(b) From a full pack of playing cards, a card is drawn. Find the probability that the card is king or spade.

6. What is mathematical expectation of a random variable x ?

Show that for two independent random variables x and y :

$$E(x \cdot y) = E(x)\, E(y).$$

7. Define binomial distribution. Show that in this distribution mean is greater than variance. Show that sum of two independent binomial variates is a binomial variate.

Group – C

8. Establish the relation between Δ, ∇, E and D. Establish Newton's backward interpolation formula for equal intervals.

9. Express $x^4 + 3x^2 + 1$ into factorial rotation. Obtain its successive differences.

10. Derive Simpson's $\frac{1}{3}$ rule.

Voc(B-1) — BCA –
Stat (Sub)

2015

Time : 3 hours

Full Marks : 75

Pass Marks : 26

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

*Answer **five** questions, selecting at least **one** from each Group.*

Group – A

1. (a) Show that sum of squares of deviations is least when deviations are taken from mean.

   (b) Find the mean and variance of a series which consists of the first n natural numbers.

2. (a) Write a note on Skewness and Kurtosis of a frequency distribution.

(b) Find the coefficient of variation of a distribution given that its mean is 120, mode is 123 and Pearson's Coefficient of Skewness is – 0.3.

3. (a) Define product-moment correlation coefficient and examine the effect of change of origin and scale on it.

(b) If r is the correlation coefficient between X and Y, show that $|r| \leq 1$ and that $|r| = 1$ iff X and Y are linearly related.

4. Write notes on any **two** of the following :

(a) Moments

(b) Properties of regression coefficients

(c) Comparative measures of dispersion

(d) Advantages of making a frequency distribution

Group – B

5. (a) Explain the terms "mutually exclusive" and "independent" events. Can the two events be mutually exclusive as well as independent ?

(b) If A and B are independent events, show that $\bar{A}$ and $\bar{B}$ are also independent.

6. Define expected value of a random variable. Show that $E(X + Y) = E(X) + E(Y)$.

7. (a) Define Poisson distribution with parameter λ. Obtain its mean and variance.

   (b) In a Poisson distribution the frequency corresponding to 3 successes is $\frac{2}{3}$ times the frequency corresponding to 4 successes. Find the mean and variance.

Group – C

8. (a) Define the operators Δ and E and estab-lish their relationship.

   (b) If f(x) is any polynomial of degree n in x, show that $\Delta^r f(x)$ = constant if r = n
   = 0 if r > n

9. (a) Show that divided differences are symmetric functions of their arguments.

   (b) Establish Lagrange's formula for inter-polation.

10. (a) Explain the utility of numerical integration techniques.

(b) Use an approximate integration formula to find the value of $\int_0^6 u_x \, d_x$, given :

x	u_x
0	·146
1	·161
2	·176
3	·190
4	·204
5	·217
6	·230

2012

STATISTICS

Full Marks : 75
Pass Marks : 26

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting at least **one** from each Group

Candidates are required to give their answers in their own words as far as practicable

GROUP—A

1. *(a)* Discuss the problems in the construction of a frequency distribution from raw data, with particular reference to the choice of number of classes and class limits.

   (b) Explain the graphical method of obtaining the median of a frequency distribution.

2. *(a)* Obtain the expression for the variance of a combined series in terms of the means and variances of the component series.

 (Turn Over)

(b) Goals are scored by two teams A and B in a football season were as follows :

No. of Goals Scored	No. of Matches	
	Team A	Team B
0	27	17
1	9	9
2	8	6
3	5	5
4	4	3

Find out which team is more consistent.

3. (a) Examine the effect of change of origin and scale on correlation coefficient.

(b) Show that $-1 \leq r \leq 1$ and give the interpretation when $r_{(x, y)} = 0$.

4. Write short notes on any *three* of the following :

(a) Skewness

(b) Moments of a frequency distribution

(c) Properties of regression coefficients

(d) Rank correlation coefficient

(e) Statistical averages

(Continued)

GROUP—B

5. (a) Critically examine the mathematical and statistical definitions of probability.

   (b) Show that if A and B are independent events, then $\overline{A}$ and $\overline{B}$ are also independent.

6. (a) Show that the mathematical expectation of the sum of random variables is equal to the sum of their mathematical expectations.

   (b) Two unbiased dice are thrown. Find the expected value of the sum of points on them.

7. (a) Discuss the conditions under which the binomial probability model is appropriate. Find the mean and variance of this distribution.

   (b) If on an average 1 ship in every 10 is sunk, find the chance that out of 5 ships expected at least 4 will arrive safely.

GROUP—C

8. (a) Prove that for any polynomial of nth degree in x, the nth difference, i.e., $\Delta^n f(x)$ is always a constant and the differences greater than n are all zeros.

(b) Evaluate :

(i) $\Delta^n [ax^n + bx^{n-1}]$

(ii) $\Delta \log x$

9. (a) State and prove Lagrange's interpolation formula.

(b) Find the value of $f(a, b, c)$ and $f(a, b, c, d)$ for $f(x) = \frac{1}{x^2}$.

10. (a) Explain the situations where numerical integration techniques are used.

(b) Derive Simpson's $\frac{3}{8}$th rule and apply that for evaluating $\int_0^6 u_x \, dx$ using the following data :

x :	0	1	2	3	4	5	6
u_x :	·146	·161	·176	·190	·204	·217	·230

★ ★ ★

2011

STATISTICS

Full Marks : 75
Pass Marks : 26

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting at least **one** from each Group

Candidates are required to give their answers in their own words as far as practicable

GROUP—A

1. *(a)* Define median and mode, and discuss their relative merits and demerits. Also discuss the cases where these are generally used.

   (b) The mean weight of 150 students in a certain class is 60 kg. The mean weight of boys in the class is 70 kg and that of girls in the class is 55 kg. Find the number of boys and girls in the class.

2. *(a)* Explain the concept of dispersion in a set of data. Define the various measures of dispersion.

(b) Explain the concept of skewness and its different kinds. Also define the various measures of skewness.

3. (a) What do you mean by regression lines? Show that correlation coefficient is the geometric mean of two regression coefficients.

(b) The equations of two regression lines are

$$3x + 12y = 19 \text{ and } 3y + 9x = 46$$

Find the means of x and y and the correlation coefficient between x and y.

4. Write notes on any *three* of the following :

(a) Frequency table

(b) Moments

(c) Kurtosis

(d) Method of least squares

(e) Correlation coefficient

GROUP—B

5. (a) State and prove the total theorem of probability for three events.

(b) The probability that A can solve a problem is 80% and that B can solve a problem is 90%. Both attempt to solve a problem independently. What is the probability that the problem would be solved?

6. (a) If $P(A) = 0 \cdot 25$, $P(B) = 0 \cdot 60$ and $P(A \cup B) = 0 \cdot 75$, then find $P(A|B')$ and $P(A' | B)$.

(b) Define mathematical expectation of a random variable. Find the expected number of heads if three fair coins are thrown.

7. (a) Show that binomial distribution tends to Poisson distribution under certain conditions which are to be mentioned by you.

(b) Prove the additive property of Poisson distribution.

GROUP—C

8. (a) Evaluate :

(i) $\Delta^4 (ae^x)$

(ii) $\dfrac{\Delta^2 x^3}{Ex^3}$

(b) Represent the function

$$f(x) = x^4 - 21x^3 + 42x^2 - 30x + 8$$

in factorial notation.

9. (a) Show that the divided differences are symmetrical in all their arguments.

(b) Derive the Newton's divided difference interpolation formula.

10. *(a)* Derive Simpson's one-third rule for numerical integration.

(b) Obtain the value of $\log_e 2$ using Simpson's three-eighth rule of integration.

★ ★ ★

VOC—Stat (Sub)–Part–I

2010

STATISTICS

Full Marks : 75
Pass Marks : 26

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting at least **one** from each Group

Candidates are required to give their answers in their own words as far as practicable

GROUP—A

1. *(a)* Define :

(i) Arithmetic mean

(ii) Geometric mean

(iii) Harmonic mean

For grouped and ungrouped data

(b) Prove that variance (standard deviation) is independent of change of origin and scale.

2. Establish the relationship between the central moments of order r in terms of the raw moments. Show that for a discrete distribution $\beta_2 > 1$.

3. Prove that Spearman's rank correlation coefficient (in case of no tie) is given by

$$r = 1 - \frac{6\sum_{i=1}^{n} d_i^2}{n(n^2 - 1)}$$

and show that $-1 \leq r \leq 1$.

4. Write notes on any *three* of the following :

(a) Multiple correlation

(b) Regression coefficients

(c) Mean deviation

(d) Positive and negative correlation

(e) Grouped and ungrouped frequency distribution

GROUP—B

5. (a) Explain the following terms with suitable examples :

(i) Random experiment

(ii) Mutually exclusive events

(iii) Independent events

(b) If two dice are rolled, what is the probability that sum is neither '7' nor '11'?

6. Define the random variable and its mathematical expectation. State and prove the multiplication theorem of mathematical expectation.

7. Define the binomial distribution and obtain its moment generating function. Hence or otherwise obtain its mean, variance and skewness.

Or

Write notes on any *two* of the following :

(a) Moment generating function

(b) Poisson distribution

(c) Multiplicative law of probability

(d) Chief characteristics of normal distribution

GROUP—C

8. (a) If u_x is a polynomial of degree n in x, then show that $\Delta^n u_x$ is a constant and $\Delta^{n+1} u_x$ is zero.

(b) Prove that

$$e^x = \left(\frac{\Delta^2}{E}\right) e^x \cdot \frac{Ee^x}{\Delta^2 e^x}$$

9. (a) Distinguish between interpolation and extrapolation with suitable examples.

(b) Establish Lagrange's interpolation formula for unequal intervals.

10. *(a)* Derive Simpson's three-eighth rule for numerical integration.

(b) Evaluate the following integral using six values by Simpson's one-third rule

$$\int_0^6 \frac{dx}{(1+x)}$$

★ ★ ★

2018

Full Marks : 75
Pass Marks : 26

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting at least **two** from each Group

Group—A

1. What is standard error? Find the standard error of sample mean. Discuss the role of standard error in tests of significance.

2. Define gamma distribution. Find its mean and variance. State and prove the additive property of this distribution.

3. Define student's t-statistic and obtain its sampling distribution.

4. Obtain the moment generating function of χ^2-distribution and hence obtain its moments and other descriptive constants.

5. Describe the maximum likelihood method of estimation and obtain the ML estimate of λ in case of Poisson distribution.

Group—B

6. What is meant by analysis of variance technique? Discuss in detail the one-way ANOVA.

7. Discuss the layout and analysis of randomised block design.

8. Show that sample mean square is an unbiased estimator of population mean square in case of SRSWOR.

9. Describe the procedure of stratified random sampling and explain its advantages over simple random sampling.

10. Write notes on the following :

(a) Factorial experiment

(b) Sampling vs Complete enumeration.

★★★

2017

Time : 3 hours

Full Marks : 75

Pass Marks : 26

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

*Answer **five** questions, selecting at least **two** from each Group.*

Group – A

1. Define the Beta variate of first kind. Obtain its mean and variance. Show that Beta variate of 2nd kind can be obtained by a transformation in Beta variate of 1st kind.
2. Define F – statistic and obtain its sampling distribution.
3. Discuss various applications of χ^2 – statistic in hypothesis testing.
4. Explain the following terms :
   (a) Type I and Type II errors

(b) Critical region

(c) Level of significance

(d) Simple and composite hypothesis

5. What is problem of estimation ? Discuss the characteristics of a good estimator.

Group – B

6. Explain the basic principles of design of experiment along with their advantages.

7. Discuss the layout and analysis of Latin Square Design.

8. Define simple random sampling technique. Show that $V(\bar{y}_n) = \frac{N-n}{N}\frac{S^2}{n}$, where the symbols have their usual meanings.

9. Discuss the conditions under which stratified sampling is mone suitable to simple random sampling. Describe its procedure and obtain the estimate of the population mean by this method.

10. Write notes on the following :

(a) Sampling and Non-sampling Errors

(b) Main effects and Interaction effects

2016

Time : 3 hours

Full Marks : 75

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

*Answer **five** questions, selecting at least **two** from each Group.*

Group – A

1. Define Gamma distribution with parameter λ and obtain its first four moments using its moment generating function. State and prove its additive property.

2. Obtain the sampling distribution of student's t-statistic and show that for large degree of freedom it tends to normal distribution.

3. Define χ^2-statistic with n degree of freedom and obtain its sampling distribution.

4. Discuss the procedure of testing (a) $H_o : P_1 - P_2 = 0$ and (b) $P_1 - P_2 = \Delta_0$ where $\Delta_0 \neq 0$ on the basis of large samples taken from the two populations independently.

5. Write short notes on any **two** of the following :
   (a) Application of F-statistic
   (b) Errors in testing
   (c) Testing the independence of attributes
   (d) Maximum likelyhood method

Group – B

6. Show your acquaintance with analysis of variance technique and discuss it in case of one-way classification.

7. Give the layout of a randomised block design and explain its analysis along with the situation when it is preferred to a completely randomised design.

8. Define the simple random technique without replacement and show that in this case :
   (a) $E(\bar{y}n) = \bar{Y}_N$
   (b) $E(s^2) = S^2$

   where s^2 and S^2 are the sample and population mean squares respectively.

9. Discuss the advantages of stratified random sampling technique over simple random sampling. Explain the term proportional allocation and show that $V(\bar{y}_{st})_{prop} \leq V(\bar{y}_n)_R$.

10. Write notes on the following :

(a) Replication and local control

(b) Planning of a sample survey

2015

Time : 3 hours

Full Marks : 75

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

*Answer **five** questions, selecting at least **two** from each Group.*

Group – A

1. Define beta distribution of first and second kind. If X and Y are two independent gamma variates with parameters l and m respectively, show that X/Y is a beta variate of 2nd kind. Obtain its mean and variance.

2. Define Fisher's 't' statistic and obtain β_1 and β_2.

3. Obtain the sampling distribution of Snedecor's F-statistic. Derive its mean and mode.

(Turn over)

4. (a) Explain the following terms used in hypothesis testing :

Null Hypothesis, Alternative Hypothesis, Type I and Type II Errors and Cirtical Region

(b) Discuss the general procedure of testing a given hypothesis.

5. Write short notes on any **two** of the following :

(a) Properties of a good estimator

(b) Estimator and Estimate

(c) Goodness of fit test

(d) Applications of a t-statistic

Group – B

6. Explain, in detail, the analysis of variance in case of two-way classification.

7. Define a Latin square design and show how you split up the total sum of squares into different components for this design. Present the ANOVA table.

8. Give the layout of a completely randomised block design and explain the situations in which it is used. Discuss its merits and demerits.

9. Define simple random sampling technique without replacement and show that

$$V(\bar{y}_n) = \frac{N-n}{N}\frac{s^2}{n}$$

10. Write a note on the following :

(a) Sampling and Non-sampling errors

(b) Sampling technique Vs Complete enumeration technique

2014

Full Marks : 75

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting at least **two** from each Group

Group—A

1. Define student's t-statistics and obtain its sampling distribution.

2. Obtain moment generating function of a gamma variate with parameter λ.

   If X and Y are two independent gamma variates with parameter l and m respectively, the prove that $(X+Y)$ is a gamma variate with parameter $(l+m)$.

3. Define χ^2-statistics with n.d.f. and discuss its various properties.

4. State the various properties of a goal estimator. What is the difference between an estimator and an estimate?

   Show that in case of normal population $N(\mu, \sigma^2)$, σ^2 known, sample mean is an unbiased estimate of population mean.

5. Write notes on *any two* of the following :

   (a) Maximum likelihood method

   (b) Sampling distribution

   (c) Large and small sample tests

   (d) χ^2-test for independence of two attributes

   (e) Application of F-distribution.

Group—B

6. Show your acquaintance with analysis of variance technique. Derive the analysis of variance for one-way classification under fixed effects model.

7. Explain the terms *(a)* replication, *(b)* randomisation and *(c)* local control.

   Give the layout of randomised block design and mention its advantages and disadvantages.

8. What do you mean by factorial experiment? Derive the expressions for main effects and all the interaction effects in case of 2^3-factorial experiment.

9. How does sampling with replacement differ from that without replacement?

Show that in Srswor, the probability of selecting a specified unit of the population at any given draw is equal to the probability of selecting it at the first draw.

10. Explain the method of stratified random sampling. Discuss its advantages over simple random sampling. Describe the different types of allocation of sample sizes used in stratified random sampling.

★★★

2013

Full Marks : 75

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting at least **two** from each Group

Group—A

1. Define gamma function, beta function of the 1st kind and beta function of the second kind. Show that

$$B(m, n) = \frac{\Gamma(m)\,\Gamma(n)}{\Gamma(m+n)}$$

Hence or otherwise show that

$$\Gamma\left(\tfrac{1}{2}\right) = \sqrt{\pi}$$

2. Show that in case of normal population sample mean and variance are independently distributed.

3. Show that for Student's t distribution with ν degrees of freedom

$$\mu_{2r} = \frac{1.3.5.\cdots(2r-1)}{(u-2)(u-4)\cdots(u-2r)} \cdot \nu^r$$

4. What are the criteria of a good estimate? Explain them with suitable examples.

5. Write notes on *any two* of the following :

   (a) Skewness of chi-square distribution

   (b) Relation between t and F

   (c) Test based on chi-square distribution

   (d) Confidence interval.

Group—B

6. *(a)* Discuss the advantages of sampling over complete enumeration.

   (b) Show that in case of simple random sampling

$$E(s^2) = S^2$$

where $s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$ and

$$S^2 = \frac{1}{N-1}\sum_{i=1}^{N}(x_i - \mu)^2.$$

7. Show that in stratified random sampling if f.p.c. is ignored $V_{opt} \leq V_{prop} \leq V_{ran}$.

(Continued)

8. Explain two-way classification of analysis of variance technique.

9. Define Latin square design. Give its layout and analysis.

10. Define 2^n-factorial experiment. Write down treatment combinations of 2^4-factorial experiment. Identify 2nd and 3rd order interactions.

★★★

BCA–VOC—Stat (Sub)–Part–II (Old)

2012

STATISTICS

Full Marks : 75

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting at least **two** from each Group

Candidates are required to give their answers in their own words as far as practicable

GROUP—A

1. Define gamma distribution and obtain its moment generating function. Hence or otherwise, prove that mean and variance are equal for this distribution.

2. Derive the chi-square distribution and obtain its mode.

3. Define *F*-statistic and derive its distribution.

4. Explain the technique of confidence interval for estimating a parameter. Obtain $100(1-\alpha)\%$ confidence intervals for estimating the mean of the normal distribution.

5. Write short notes on any *two* of the following :
   (a) Standard error of sample mean
   (b) Student's t-statistic and its applications
   (c) Maximum likelihood method of estimation
   (d) Fisher's z-transformation
   (e) Unbiasedness of an estimator

GROUP—B

6. Define simple random sampling and show that the sample mean is an unbiased estimator of the population mean.

7. Describe stratified random sampling and obtain an unbiased estimator of the population mean under the sampling method. Also, derive an expression for the variance of the estimator.

8. Define analysis of variance technique and describe the method for one-way classification.

9. Describe the principles of design of experiments.

10. Explain randomised block design with its layout and analysis.

★ ★ ★

2011

STATISTICS

Full Marks : 75

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting at least **two** from each Group

Candidates are required to give their answers in their own words as far as practicable

GROUP—A

1. Obtain the relation between gamma function and beta function. Show that $\Gamma(\frac{1}{2})=\sqrt{\pi}$.

2. Define Student's *t*. Who did discover it? Derive its sampling distribution.

3. Obtain the distribution of sample mean and sample variance.

4. Explain unbiasedness, consistency, efficiency and sufficiency with suitable examples.

5. Distinguish between :

   (a) Simple hypothesis and composite hypothesis

   (b) Null hypothesis and alternative hypothesis

   (c) Type I error and Type II error

GROUP—B

6. Define sample, population, census, simple random sample and stratified random sample.

7. Show that

$$V_{opt} \leq V_{prop} \leq V_{ran}$$

if f.p.c is ignored.

8. Define analysis of variance. Describe two-way classification.

9. What are CRD, RBD and LSD? Give the layout of CRD.

10. What is factorial experiment? Write down the treatment combinations of 2^5-factorial experiment.

★ ★ ★

2010

STATISTICS

Full Marks : 75
Pass Marks : 26

Time : 3 hours

The questions are of equal value

Answer **five** questions, selecting at least **two** from each Group

Candidates are required to give their answers in their own words as far as practicable

GROUP—A

1. *(a)* Define a simple gamma variate with parameter n and obtain the mean and variance of its distribution.

   (b) If X_1 and X_2 are two independent gamma variates with parameters n_1 and n_2 respectively, show that $U = X_1 + X_2$ and $V = \dfrac{X_1}{X_1 + X_2}$ are independently distributed.

2. Define a chi-square statistic with n degree of freedom and derive its sampling distribution. State and prove its reproductive property.

3. Obtain the sampling distribution of the Snedecor's F-statistic and discuss its application in testing $H_0 : \sigma_1^2 = \sigma_2^2$ where σ_1^2 and σ_2^2 are the variances of two normal populations.

4. *(a)* Explain the following terms :

   (i) Type I and Type II errors

   (ii) Level of significance

   (iii) Critical region

   (b) Discuss the procedure of testing any statistical hypothesis.

5. Write notes on any *two* of the following :

   (a) Test of 'goodness of fit'

   (b) Testing the independence of attributes

   (c) Unbiasedness and consistency

   (d) ML method of estimation

GROUP—B

6. Define simple random sampling technique. Show that in case of SRS (without replacement)

   (i) $E(\bar{y}_n) = \bar{Y}_N$

   (ii) $E(s^2) = S^2$

   where the symbols have their usual meanings.

(Continued)

7. Discuss the situations where stratified random sampling is preferred to simple random sampling technique and obtain the expression for the variance of the estimate of population mean in case of proportional allocation in stratified sampling.

8. What is meant by analysis of variance? Discuss, in detail, the analysis of data in case of one-way classification.

9. What is Randomised Block Design? Give the layout of this design.

10. Write notes on any *two* of the following :

(a) Randomisation and Local Control

(b) Completely Randomised Design

(c) Errors in Sampling

(d) Sampling Technique vs. Complete Enumeration Technique

★ ★ ★