

"ज्ञान विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार"

-शिक्षणमहर्षी डॉ. जापूजी भाळुंबे

**Vivekanand College, Kolhapur**

**Department of Statistics**

**B.Sc. I**

**Notice**

Date: 09/09/2019

All students of B.Sc. - I are hereby informed that, there will be continuous internal examination for semester-I, 2019-20 of 20 marks will be held as follows

Sr. No.	Date	Time	Paper No.	Section	Title of the Paper
01	19/09/2019	11.00 to 12.00	I	I	Descriptive Statistics I
02	21/09//2019	2.00 to 3.00	I	II	Discrete Probability Distribution



*V. Pawar*  
Ms. V. V. Pawar  
Associate Professor

Department of Statistics  
Vivekanand College, Kolhapur

Day & Date: Thursday 19/09/2019  
Time: 11.00 am - 12.30 am

Total Marks: 20

Instructions: 1) All questions are compulsory.

Q. 1. Select the correct alternative

5

1. Sampling is ....

- a. not always useful  
 b. not always possible  
 c. has number of advantages over census  
 d. the census

2. Attributes are measured using ....

- a. nominal scale only  
 b. ordinal scale only  
 c. both a and b.  
 d. neither a nor b

3. Which one of the following is not a measure of central tendency?

- a. Mean Deviation  
 b. Mean  
 c. Median  
 d. Mode

4. Which one of the relation is true?

- a.  $\text{Mean} = \frac{1}{2}(3Me - Mo)$   
 b.  $\text{Mean} - 3(3Me - Mo) = 2 Mo$   
 c.  $Me = Mo + \frac{2}{3}(Mo - \bar{x})$   
 d.  $Mo = 2Me - 3\bar{x}$

5. Secondary data is ....

- a. Already collected by some other agency  
 b. a processed data  
 c. A finished data  
 d. All of these

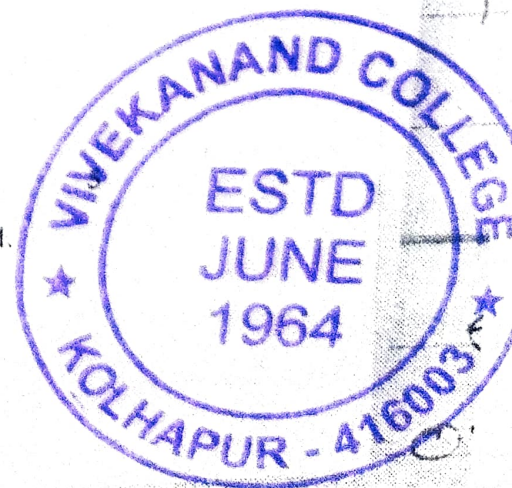
5\*2=10

Q2. Attempt any Two

1. Define A.M and state properties of A.M.  
2. Explain i. SRSWR ii. SRSWOR  
3. Define i. Mode ii. G.M. iii. H.M.

Q3. Attempt any One

1. Derive the formula of Median. 2. Prove that  $A.M \geq G.M \geq H.M.$



"ज्ञान विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार"

-शिक्षणमहर्षी डॉ. आपूजी भाळूंखे

Vivekanand College, Kolhapur

Department of Statistics

B.Sc. II

Notice

Date: 09/09/2019

All students of B.Sc. – II are hereby informed that, there will be continuous internal examination for semester-III, 2019-20 of 20 marks will be held as follows

Sr. No.	Date	Time	Paper No.	Section	Title of the Paper
01	26/09/2019	4.15 to 5.15	III	I	Statistical method-I
02	28/09/2019	3.30 to 4.30	III	II	Probability Distribution-I



*V. Pawar*  
Ms. V. V. Pawar  
Associate Professor

Department of Statistics  
Vivekanand College, Kolhapur

VIVEKANAND COLLEGE (Autonomous), KOLHAPUR.

B. Sc. (Part – II) Sem.: III Internal Examination, 2019

STATISTICS (Paper –III)

Roll No.:

Probability Distribution - I

Day and Date:

Total Marks: 20

Q.1. Choose the correct alternative. (05)

1. For continuous bivariate r. v. (X, Y) the value of  $E[E(Y/X=x)] = \dots\dots\dots$   
a)  $\text{Var}(X)$       b)  $\text{Var}(Y)$       c)  $E(Y)$       d)  $E(X)$
2. The correct relation between fourth cumulant and central moment is .....  
a)  $K_4 = \mu_4$       b)  $K_4 = \log \mu_4$       c)  $K_4 = \mu_4 + 3 \mu_2^2$       d)  $K_4 = \mu_4 - 3 \mu_2^2$
3. If  $M_x(t)$  is the mgf of r. v. X then  $M_{3X}(t)$  is .....  
a)  $3 M_x(t)$       b)  $M_x(3t)$       c)  $e^{3t} M_x(t)$       d)  $M_x\left(\frac{3}{t}\right)$
4. If  $f(x) = kx^2, 0 \leq x \leq 3$ , is p.d.f. then the value of k is .....  
a)  $\frac{1}{4}$       b)  $\frac{2}{3}$       c)  $\frac{1}{3}$       d)  $\frac{1}{9}$
5. The value of  $F(x, y)$  lies in the interval.....  
a)  $(-1, 0)$       b)  $(0, 1)$       c)  $(-1, 1)$       d)  $(-\infty, \infty)$

Q.2. Attempt any One (10)

1. Define the following terms for continuous r. v. X

- i) Mean      ii) Median      iii) Mode      iv) Variance      v) G.M.

2. The joint p. d. f. of bivariate r. v. (X, Y) is  $f(x, y) = 4xy; 0 < x < 1, 0 < y < 1$   
 $= 0$  ; otherwise

Find i) Marginal p. d. f. of X      ii) Marginal p. d. f. of Y

iii) Mean of X and Mean of Y

iv) Conditional distribution of X given Y

v) Conditional distribution of Y given X

Q. 3. Attempt any One (5)

1. Define c.d.f. of continuous r. v. X and state its properties.

2. If X is a r. v. with pdf  $f(x) = 3(1-x)^2; 0 \leq x \leq 1$  then find the pdf of  $Y = \frac{x}{1-x}$ .

3. For continuous bivariate r. v. (X, Y) show that  $E(X-Y) = E(X) - E(Y)$ .



VIVEKANAND COLLEGE, KOLHAPUR.(Autonomous)

Department of Statistics

Semester: III Paper No. : Statistical Methods-I

Internal Examination 2019/2020

Roll No.:

Date: 26/09/2019 Time: - 4.15pm to 5.00pm

Max marks: 20

Q1. Select correct alternative.

(5 Marks)

1. Purchasing power of money increases if.....

- a. Price index increases  
b. Price index decreases  
c. cost of living Index number decreases  
d. both b and c

2. Which of the following Index number does not satisfies unit test——

- a. Simple average of price relative  
b. Laspeyre's  
c. simple aggregative  
d. Paasche's

3. Laspeyre's price Index number uses weights as....

- a. Base year quantities  
b. Current year quantities  
c. Base year prices  
d. current year prices.

4. If  $X$  is a passion variate with mean 5 then by chebychev's Inequality we have

$P[|X-5| < 5] \geq \dots\dots$

- a. 0.2  
b. 0.4  
c. 0.6  
d. 0.8

5. If  $X \sim B(4, \frac{1}{2})$  then by chebychev's Inequality  $p[|X - \mu| \leq 2] \geq \dots\dots\dots$

- a.  $\frac{1}{4}$   
b.  $\frac{1}{7}$   
c.  $\frac{3}{4}$   
d. 1

Q2 Attempt any ONE

(5 Marks)

1. Define Index number. What are the problems in the construction of Index number? Explain these problems.

2. Define cost of living Index number. Explain methods of constructions of cost of living Index numbers.

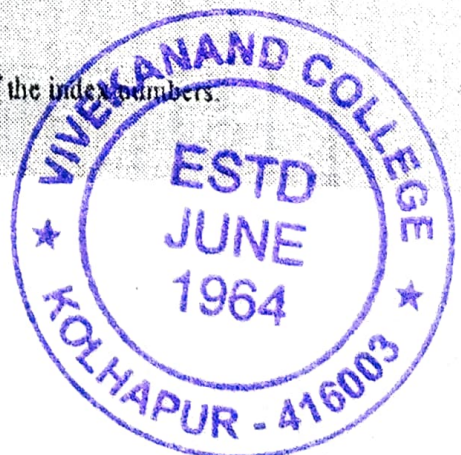
Q3. Attempt any two

(10 Marks)

1. State and prove chebychev's inequality for discrete random variable.

2. A fair die is tossed 720 times, use chebychev's inequality to find lower bound for probability of getting 100 to 140 sixes.

3. Explain the type of the Index numbers. Give four uses of the index numbers.



"ज्ञान विज्ञान त्राणि सुसंस्कार यात्राठी शिक्षण प्रसार"

-शिक्षणमहर्षी डॉ. जापूजी भाळूंबरे

Vivekanand College, Kolhapur  
Department of Statistics

**B.Sc. III**

Notice

Date: 09/09/2019

All students of B.Sc. - III are hereby informed that, there will be mid semester examination for 2019-20 will be held as follows

Sr. No.	Date	Time	Paper No.	Title of the Paper
01	23/09/2019	12.00 to 12.15	IX	Probability Distribution I
02	24/09//2019	12.00 to 12.15	X	Statistical Inference I
03	25/09/2019	12.00 to 12.15	XI	Design of Experiment
04	26/09/2019	12.00 to 12.15	XII	Operation research



*V. Pawar*  
Ms. V. V. Pawar  
Associate Professor

Q1) Select correct alternative:

1) Laplace distribution is

- a) Positively skew    b) Negatively Skew     c) Symmetric    d) None of these

2) If  $X_i \sim LN(\mu, \sigma^2), i = 1, 2, \dots, n$  and they are independent then distribution of  $G = (X_1 X_2 \dots X_n)^{1/n}$  is

- a)  $LN(\mu, \sigma^2)$     b)  $N(\mu, \sigma^2)$     c)  $LN(\mu, \sigma^2/n)$     d)  $N(\mu, \sigma^2/n)$

3) If X follows truncated normal distribution with parameters  $\mu = 0, \sigma = 1$ , truncated to the above  $b=5$  then p.d.f of X is

$f(x) = ke^{-\frac{x^2}{2}}, x < 5$  then  $k = \dots\dots\dots$

- a)  $\frac{1}{\sqrt{2\pi}[1-\Phi(5)]}$     b)  $\frac{1}{\Phi(5)}$      c)  $\frac{1}{\sqrt{2\pi} \Phi(5)}$     d) none of these

4) Following distribution is particular case of Weibull distribution

- a) Exponential    b) Laplace    c) Gamma     d) Both (a) and (c)

5) If X is a continuous random variable with pdf.  $f(x)$  then pfd. Truncated random variable truncated to the left at  $x = a$  is

- a)  $f(x)/P(X > a)$     b)  $f(x)P(X > a)$     c)  $f(x)/P(X < a)$     d)  $f(x)/P(X \neq a)$

6) If X and Y are i.i.d exponential variates with mean  $\theta$  then distribution of X-Y has distribution(d)

- a) Lognormal     b) Laplace    c) Uniform    d) Exponential

7) Mean of lognormal distribution is

- a)  $\mu$      b)  $e^\mu$      c)  $e^{\mu + \frac{\sigma^2}{2}}$     d)  $\mu + \frac{\sigma^2}{2}$

8) If  $X \sim U(-\pi/2, \pi/2)$  then  $\mu + \lambda \tan(x)$  has distribution

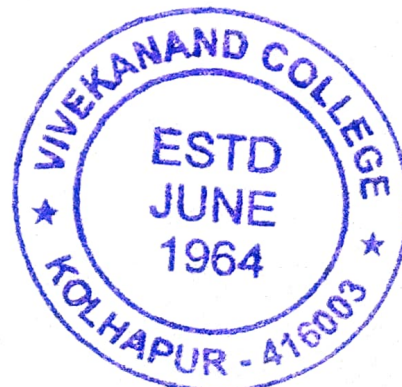
- a)  $L(\mu, \lambda)$      b)  $C(\mu, \lambda)$     c)  $C(0, 1)$     d) Both (b) and (c)

9) Mode of logistic distribution is

- a)  $\mu$     b)  $e^\mu$     c)  $\log(\mu)$     d)  $\log(\mu + \frac{\sigma^2}{2})$

10) If X has truncated exponential truncated to the left at  $x = a$  then its variance is

- a)  $a + \frac{1}{\theta}$      b)  $\frac{1}{\theta^2}$     c)  $\frac{a}{\theta^2}$     d)  $\frac{1}{\theta^2} + a$



Q. Choose the correct alternative. (10)

- i) In sampling from a  $N(\mu, 100)$  population consistent estimator of  $\mu$  is....
  - a) Sample mean
  - b) Sample median
  - c) Sample variance
  - d) All the above
- ii) An estimator T based on a sample of size n is said to be negatively biased estimator of  $\theta$  if
  - a)  $E(T) = \theta$
  - b)  $E(T) > \theta$
  - c)  $E(T) < \theta$
  - d)  $E(T^2) > \theta$
- iii) An unbiased estimator  $T_1$  of the parameter  $\theta$  is said to be more efficient than any other unbiased estimator of  $\theta$  if....
  - a)  $E(T_1) < E(T_2)$
  - b)  $V(T_1) > V(T_2)$
  - c)  $V(T_1) < V(T_2)$
  - d)  $E(T_1) > E(T_2)$
- iv) The point estimator of the parameter is
  - a) Constant
  - b) Any numerical value
  - c) A function of sample observations
  - d) None of these
- v) If  $X_1, X_2, \dots, X_n$  is a random sample taken from a population having  $U(0, \theta)$  distribution, then unbiased estimator of  $\theta$  is....

- a)  $\bar{X}$
- b)  $\frac{\bar{X}}{2}$
- c)  $2\bar{X}$
- d)  $X_{(n)}$

vi) If 15, 16, 18, 17, 14, 10 is a sample taken from a population having exponential distribution with parameter  $\theta$ , then moment estimator of  $\theta$  is

- a) 90
- b)  $\frac{1}{15}$
- c)  $\frac{1}{90}$
- d) 30

vii) If a family receives 1, 0, 2, 3, 2, 4 wrong telephone calls on six randomly selected days, and wrong calls follow  $P(\lambda)$  then the moment estimate of  $\lambda$  will be

- a) 0
- b) 2
- c) 4
- d) 3

viii) The MLE of parameter  $\theta$  based on the r. s.  $X_1, X_2, \dots, X_n$  is that value of  $\theta$  which

- a) Maximizes the likelihood function
- b) Maximizes the information function
- c) Maximizes the distribution function
- d) None of these

ix) Let -2, 0, 8, 1, -1, 6, -3 be a r.s. of size 7 from  $f(x, \theta) = \frac{1}{2} e^{-|x-\theta|}$ ;  $-\infty < x < \infty$ . Then MLE for  $\theta$  is...

- a) 9/7
- b) 0
- c) 9

x) If  $X \sim N(\mu, \sigma^2)$  then maximum likelihood estimator for parameter  $\mu$  is.....

- a) sample mean
- b) sample median
- c) sample variance
- d) None of these





Q.1 Choose a correct alternative

1) The number of replications in an experiment is based on -----

- a) the precision required                      b) experiment material available  
c) heterogeneity of experimental material       d) all the above

2) The formula for obtaining standard error in RBD with  $v$  treatments and  $r$  blocks and mean sum of square due to error is  $S_E^2$  is ----

- a)  $S_E \sqrt{2/r}$                       b)  $S_E \sqrt{2/t}$                       c)  $S_E \sqrt{2/v}$                       d)  $S_E \sqrt{2/n}$

3) The analysis of CRD is analogous to ANOVA for -----

- a) one way classification      b) two way classification      c) Three way classification      d) none of these

4) The Principle of repetition of treatments over the experimental material in design of experiments is -

- a) randomization                       b) replication                      c) both a) and b)                      d) none of these

5) In analysis of data of RBD with  $r$  blocks and  $t$  treatments, the error degrees of freedom are -----

- a)  $r(t-1)$                       b)  $t(r-1)$                        c)  $(t-1)(r-1)$                       d)  $(t-1)r-1$

6) In analysis of RBD with 5 treatments and 4 blocks with one missing observation, error degrees of freedom are .....

- a) 12                      b) 20                       c) 11                      d) None of these

7) In  $5 \times 5$  Latin square design degrees of freedom for error sum of squares and total sum of squares are -----

- a) 4, 24                       b) 12, 24                      c) 24, 12                      d) 4, 12

8) Suppose there are two designs D1 and D2 with same replications then efficiency of design D2 with respect to design D1 is-----

- a)  $\delta_1^2 / \delta_2^2$                       b)  $\delta_2^2 / \delta_1^2$                       c) 1                      d)  $\delta_1^2 = \delta_2^2$

9) In analysis of RBD with usual notations the estimate of missing observation is ----

a)  $\frac{T+rB-G}{(r-1)(t-1)}$

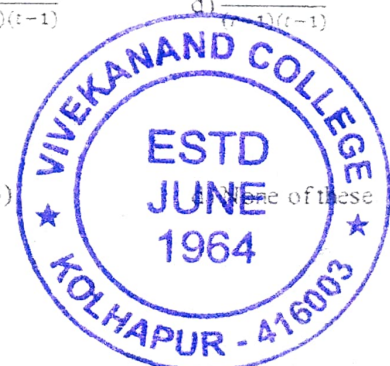
b)  $\frac{rT+tB-G}{(r-1)(t-1)}$

c)  $\frac{rT+tB-2G}{(r-1)(t-1)}$

d)  $\frac{rT+rB-2G}{(r-1)(t-1)}$

10) Latin Square Design is..... three way layout.

- a) Complete                      b) Incomplete                      c) Both a) & b)                      d) None of these

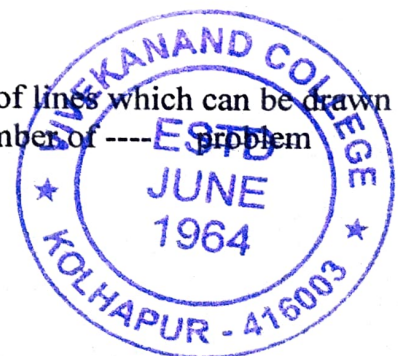


08/10 ✓

Date: 26/09/2019

Q.1 Choose a correct alternative

- 1) The algorithm used to find an optimal sequence of n jobs through two machines is known as -  
 -----  
 a) Hungarian method      b) MODI method      c)  Johnson's method      d) none of these
- 2) If the dual has unbounded solution , then primal has-----  
 a) Feasible solution      b)  Unbounded solution      c) No solution      d) alternative solution
- 3) In transportation problem degeneracy occurs when number of non-negative allocations are----  
 a) equal to m+n-1      b)  less than m+n-1  
 c) less than m+n-1 & at independent positions.      d) less than m+n-1 & at dependent positions
- 4) For maximization L.P.P. model Simplex method is terminated when all values-----  
 a)  $Z_j - C_j \leq 0$       b)   $Z_j - C_j \geq 0$       c)  $Z_j - C_j = 0$       d) none of these
- 5) Any solution to general L.P.P. which satisfies the non-negative restrictions of the problem is known as-----  
 a) Optimal solution      b) unbounded solution  
 c) Feasible solution      d) degenerate solution  $(t-1)(r-1)-1$
- 6) To formulate a problem for solution by the Simplex method, we must add artificial variable to----  
 a) Only equality constraints      b)  only greater than constraints  
 c) Both a) and b)      d) None of these
- 7) The dual of primal maximization L.P.P. having m constraints and n variables should----  
 a) Have n constraints and m non-negative variables.      b) Be a minimization L.P. problem  
 c)  both a) and b)      d) None of these.
- 8) In a T.P> with minimization of objective function net evaluation  $\Delta_{ij} = C_{ij} - (u_i + v_j)$  for each empty cell is greater than or equal to zero , then the solution is-----  
 a) Optimum      b) solution can be improved  
 c)  optimum but alternative solution may exists      d) none of these
- 9) If there are n workers and n jobs , there would be -----  
 a) n!      b) (n-1)!      c)  (n!)<sup>n</sup>      d) n solutions
- 10) An optimum assignment requires that the maximum number of lines which can be drawn through squares with zero opportunity cost be equal to the number of -----  
 a) rows or columns      b) rows and columns  
 c) rows and columns -1      d)  None of these



"ज्ञान विज्ञान आणि अनुसंधान यासाठी शिक्षण प्रसार"

-शिक्षणमहर्षी डॉ. ज्ञापूजी भाळूंबे

125

**Vivekanand College, Kolhapur**

**Department of Statistics**

**B. Sc. I**

**Notice**

Date: 25/02/2020

All students of B.Sc.-I are hereby informed that, there will be a internal examination for semester-II , 2019-20 of 20 marks will be held as follows

Sr. No.	Date	Time	Paper No.	Section	Title of the Paper	Topic
01	02/03/2020	2.00 to 3.00	II	I & II	Descriptive Statistics II	Unit-3, 4
					Discrete probability distributions	Unit-3, 4



*V. Pawar*  
Ms. V. V. Pawar

Associate Professor

Department of Statistics  
Vivekanand College Kolhapur

Vivekanand College(Autonomous), Kolhapur  
Department of Statistics  
B. Sc. I

126

Continuous Internal Evaluation (CIE) 2019 -2020

Time: 2.00pm – 03.00 pm

Date: 02/03/2020

Total Marks: 20

Q. 1 Choose the correct alternative.

[04]

i) Multiple correlation coefficient lies between.....

- a)  $(-\infty, \infty)$       b)  $(0, \infty)$       c)  $(0, 1)$       d)  $(-1, 1)$

ii) An additive model of time series with the components T, S, C, and I is.....

- a)  $Y = T + S + C + I$       b)  $Y = T + S \times C \times I$   
c)  $Y = T + S + C + I$       d)  $Y = T \times S + C \times I$

iii) If X is a r.v. having negative binomial distribution then .....

- a) Mean  $\geq$  Variance      b) Mean  $\leq$  Variance  
c) Mean = Variance      d) None of these

iv) If X and Y are independent r.vs then .....

- a)  $\text{Cov}(X, Y) = 0$       b)  $\text{Corr}(x, Y) = 0$   
c)  $E(XY) = E(X).E(Y)$       d) All of these

Q.2 Attempt any one of the following.

[08]

i) Define Partial correlation coefficient. If  $r_{12} = r_{13} = r_{23} = \rho$  then show that

i)  $R_{1.23}^2 = \frac{2\rho^2}{(1+\rho)}$       ii)  $r_{12.3} = \frac{\rho}{(1+\rho)}$

ii) Define negative binomial distribution and find its mean and variance using p.g.f.

iii) Define Time Series. State its component. Explain one of them.

Q. 3 Attempt any Two of the following.

[08]

i) Define Residual and state properties of residual.

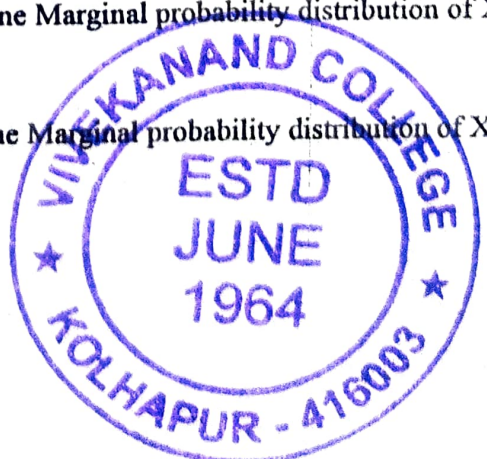
ii) Explain the method of Moving Averages.

iii) Prove that  $E(X+ Y) = E(X) + E(Y)$

iv) Define a) conditional Mean b) Define Marginal probability distribution of X and Y

iii) Prove that  $E(X+ Y) = E(X) + E(Y)$

iv) Define a) conditional Mean b) Define Marginal probability distribution of X and Y.



198

"ज्ञान विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार"

-शिक्षणमहर्षी डॉ. आपूजी भाळूखे

**Vivekanand College, Kolhapur**

**Department of Statistics**

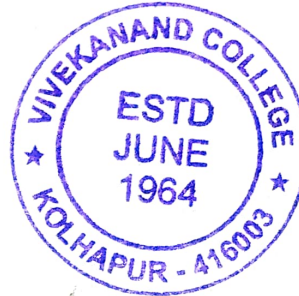
**B.Sc. II**

**Notice**

Date: 25/02/2020

All students of B.Sc. – II are hereby informed that, there will be internal examination for semester-IV, 2019-20 of 20 marks will be held as follows

Sr. No.	Date	Time	Paper No.	Section	Title of the Paper	Topic
01	05 /03/2020	4.15 to 5.15	III	I & II	Statistical method-II	Unit 3,4
					Probability Distribution-II	Unit 2,3



*V. Pawar*  
Ms. V. V. Pawar  
Associate Professor

Department of Statistics  
Vivekanand College Kolhapur

**Vivekanand College (Autonomous), Kolhapur**  
**Department of Statistics**  
**B. Sc. II SEM IV**  
**Continuous Internal Evaluation (CIE) 2019 – 2020**  
**Subject: Probability Distribution II**

**Time: 4.15pm – 5.15 pm**

**Date: 05/03/2020**

**Total Marks: 20**

**Q. 1 Choose the correct alternative.**

**[04]**

i) If X has chi-square distribution then its variance is.....

- a) 0                                      b) n                                      c) 2n                                      d) None of these

ii) Which function is used to create data frames?

- a) data.frame( )                      b) data.sets ( )                      c) function ( )                      d) C ( )

iii) Alternative hypothesis decides following type of. .... test.

- a) One sided                                      b) Two sided  
c) Both a) & b)                                      d) Neither a) nor b)

iv) Area of critical region depends on .....

- a) size of type I error                                      b) size of type II error  
c) Both a) & b)                                      d) Neither a) nor b)

**Q.2 Attempt any one of the following.**

**[08]**

i) Define t variate and drive its p.d.f.

ii) Explain a) F test for difference of variances.

b) Large sample test for testing  $H_0: P = P_0$  against  $H_1: P < P_0$

**Q. 3 Attempt any Two of the following.**

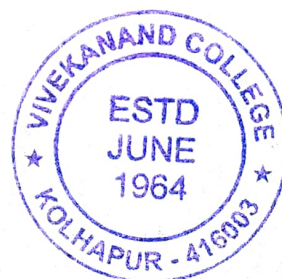
**[08]**

i) Define a) Power of the test      b) Level of significance

ii) Explain Chi - square test of independence of attributes for 2 x 2 contingency table.

iii) Explain with example a) scan function      b) combine function

iv) Obtain mode of F- distribution with  $(n_1, n_2)$  d. f.



**Vivekanand College, Kolhapur (Autonomous)**  
**Department of Statistics**  
**B.Sc – III Internal Examination (2019-20)**

**Notice**

**Date: 10/02/2020**

All the students of B.Sc. – III are hereby informed that, the Internal Examination of Semester – VI will be held as per following time table.

Sr.No.	Date	Time	Paper No.
1	17/02/2020	11:30 am to 11.45am	Paper – XIII : Probability Theory
2	18/02/2020		Paper – XIV : Statistical Inference-II
3	20/02/2020		Paper – XV : Sampling Theory
4	22/02/2020		Paper – XVI : Quality Management and Data Mining

**Nature of Question Paper (Total Marks = 10)**

10 MCQ's each carrying 1 mark



*V. Pawar*  
( Ms. Pawar V. V. )  
**HEAD**  
DEPARTMENT OF STATISTICS  
VIVEKANAND COLLEGE, KOLHAPUR  
(AUTONOMOUS)

SHRI SWAMI VIVEKANAND SHIKSHAN SANSTHA'S  
VIVEKANAND COLLEGE (Autonomous), KOLHAPUR.

Department of Statistics

Statistical Inference -II (Paper No. XIV)

Roll No.:

Date: - 18/02/2020

Time: 11:30 a.m. -11:45 a.m.

Total Marks- 10

09/10  
MBOSEA

Q. Choose the correct alternative

(10 marks)

1. If  $(-1.96 < \mu < 1.96) = 0.95$  then which of the following statement is correct.

- a) Length of Confidence interval is 3.92 units.  
 b) The confidence coefficient is 0.95.  
 c) The probability that  $\mu$  lies between  $(-1.96, 1.96)$  is 0.95.  
 d) All the above.

2. The quantities  $C1$  &  $C2$  within which the unknown value of the parameter is expected to lie such that  $P(C1 < \theta < C2) = 1 - \alpha$  are known as

- a) Confidence limits     b) C.I.     c) Confidence coefficient     d) confidence levels

3. Interval estimate of parameter  $\theta$  of exponential distribution can be obtained by use of:

- a) Chi-square Distribution     b) F-distribution  
 c) Normal distribution     d) t-distribution.

5. A random variable  $T$  which is a function of r. s., a parameter  $\theta$  & its distribution is independent of  $\theta$  is known as

- a) a statistic     b) a pivot     c) a likelihood function     d) None of them

5. The probability of rejecting the null hypothesis when it is true is called as .....

- a) P- value     b) Size of the test     c) Power of the test     d) Type II error

6. If  $X_1, X_2, \dots, X_n$  is a r. s. of size  $n$  taken from  $N(\theta, 100)$  population a UMP test exists for testing  $H_0: \theta = \theta_0$  against

- a)  $H_1: \theta \neq \theta_0$      b)  $H_1: \theta > \theta_0$      c)  $H_1: \theta < \theta_0$      d) Either (ii) or (iii)

7. Which of the following is most appropriate for testing simple  $H_0$  against simple  $H_1$

- a) UMP level  $\alpha$  test exists     b) MP level  $\alpha$  test exists  
 c) UMP level  $(1 - \alpha)$  test exists     d) MP level  $(1 - \alpha)$

8. In a SPRT of strength  $(\alpha, \beta)$

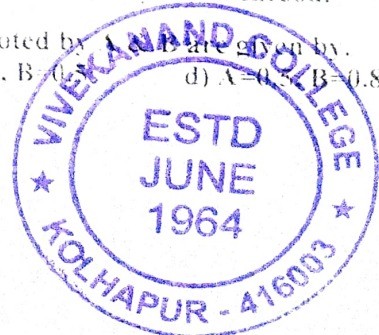
- a) Sample size is fixed,  $\alpha$  &  $\beta$  are minimized  
 b) Sample size &  $\alpha$  are fixed,  $\beta$  is minimized  
 c) Sample size &  $\beta$  are fixed,  $\alpha$  is minimized  
 d) Sample size is random,  $\alpha$  &  $\beta$  are fixed

9. The theory of SPRT was developed by

- a) Karl Pearson     b) A Wald     c) Fisher     d) Neyman Pearson.

10. In SPRT of strength  $(0.5, 0.2)$  the stopping bounds denoted by  $A$  &  $B$  are given by.

- a)  $A=1.6, B=0.4$      b)  $A=1.5, B=0.4$      c)  $A=1.6, B=0.8$      d)  $A=0.5, B=0.8$





Date: 20/02/2020

Total Marks: 10

Instructions: 1) All questions are compulsory.

2) Use of calculations and statistical tables is allowed.

Q1) Select correct alternative:

[8]

1) When frame is not available or costly----- scheme helps in reducing cost of survey.

- a) SRSWR      b) SRSWOR      c) Stratified Sampling       d) Cluster Sampling

2) A systematic sample of size 20 is drawn from a population of size 120, then probability of getting any sample out of all possible systematic samples of same size is -----

- a) 1/20       b) 1/6      c) 6/20      d) None of these

3) If the population is in a linear trend then ratio  $V(\bar{y})_{st} : V(\bar{y})_{sy} : V(\bar{y})_{wor}$  is-----

- a)  $n:1/n:1$       b)  $1:n:1/n$        c)  $1/n:1:n$       d)  $1/n:n:1$

4) The probability of not selecting a specified unit in SRSWOR of  $n$  units from population of  $N$  units is-----

- a)  $1/n$       b)  $1-(1/n)$       c)  $n/N$        d)  $1-n/N$

5) In stratified random sampling with stratum sizes  $N_1=800$ ,  $N_2=300$  and stratum variances  $S_{12}=144$ ,  $S_{22}=400$  under Neyman allocation, the ratio of sample sizes  $n_1/n_2$  is given by ----

- a) 12.50      b) 9       c) 11.94      d) 11.10

6) In sampling for proportion, if  $N$  is large and samples are large then  $V(p) =$  -----

- a)  $p/q$        b)  $(N-n)PQ/n$       c)  $(N-1)PQ/n$       d) None of these.

7) Error committed in presentation of data are categorized as-----

- a) Sampling error      b) population error      c) Non-sampling error      d) standard error

8) Systematic sampling becomes more precise than SRSWOR if intra-class correlation becomes-----

- a) Positive      b) Negative      c) zero      d) None of these

9) In optimum allocation sample size from each stratum is proportional to-----

- a) Stratum size      b) Stratum variability       c) both a) and b)      d) either a) or b

10) Which of the following statement is not true?

- a) Standard error cannot be zero      b) standard error can not one  
c) Standard error can be negative.       d) All the above.

