B.Sc. (Part – II) (Semester – IV) Examination, 2012
STATISTICS (Paper – VIII)
Statistical Methods
Sub. Code : 49996

Day and Date : Thursday, 19-4-2012
Time : 11.00 a.m. to 1.00 p.m.

Max. Marks : 40

Instructions : 1) All questions are compulsory.
2) Figures to the right indicate full marks.

1. Choose the correct alternative :

8

i) Level of significance is
   a) proportion of wrong decisions
   b) proportion of wrong decisions regarding H_0 when it is true
   c) proportion of wrong decisions regarding H_1
   d) proportion of correct decisions

ii) A production process is said to be in a state of statistical control if it is governed by
   a) chance causes
   b) assignable causes
   c) both a and b
   d) none of these

iii) The long term regular movement in a time series is called as
   a) seasonal variations
   b) cyclical variations
   c) secular trend
   d) irregular variations

iv) Base year of index number is
   a) preceding year
   b) succeeding year
   c) any convenient year
   d) year of stability

v) The variance of the fraction defectives is obtained by the variance of _____ distribution.
   a) Poisson
   b) Binomial
   c) Hypergeometric
   d) Geometric

P.T.O.

vi) Suppose $x_1, x_2, \ldots x_n$ is a random sample from $N(\mu, \sigma^2)$, σ^2 known. To test $H_0 : \mu = 0$, the test statistic is

a) $\dfrac{\bar{x} - \mu}{s/\sqrt{n}}$

b) $\dfrac{\bar{x}}{s/\sqrt{n}}$

c) $\dfrac{\bar{x}}{\sigma/\sqrt{n}}$

d) none of these

vii) An index number is said to satisfy factor reversal test if

a) $P_{01} \times Q_{01} = 1$

c) $P_{01} = Q_{01}$

b) $P_{01} \times Q_{01} = V_{01}$

d) $P_{01} \times P_{10} = 1$

viii) The degrees of freedom of test statistic for testing independence of two attributes each at two levels is

a) one

c) four

b) two

d) none of these

2. Attempt **any two** of the following :   16

a) Define time series and explain the different components of a time series.

b) Explain the control chart for number of defects. When standards are not given. Give two situations where such a chart can be used.

c) Explain briefly the methods of constructing index numbers by
   i) Simple aggregative method
   ii) Weighted aggregative method
   iii) Simple average of price relative method.

3. Attempt **any four** of the following :   16

a) Define :
   i) Simple hypothesis   ii) Type – I error.

b) Write short note on weighted price index number.

c) Explain the procedure to test significance of difference between two population proportions.

d) State control limits for $\bar{X}$ and R chart when standards are specified and explain briefly the method of constructing R - chart.

e) Explain with examples :
   i) Seasonal variation   ii) Cyclical variation.

f) How will you test the independence of two attributes each at 2 levels ?

B.Sc. (Part - II) (Semester - IV) Examination, 2013
STATISTICS (Paper - VIII)
Statistical Methods
Sub. Code : 49996

Day and Date : Tuesday, 30-04-2013
Time : 11.00 a.m. to 1.00 p.m.

Total Marks : 40

Instructions : 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q1) Choose the correct alternative: [8]

i) Periodic change in values of time series is _____ .
  a) seasonal variation
  b) cyclical variation
  c) both a and b
  d) irregular variations.

ii) A null hypothesis is a _____ .
  a) hypothesis of interest
  b) hypothesis of no difference
  c) hypothesis which is simple
  d) hypothesis which assigns value zero to the parameter

iii) Laspeyre's price index number uses weight as _____ .
  a) base year quantity
  b) current year quantity
  c) base year value
  d) none of these

iv) The maximum and minimum allowable dimensions of quality characteristic decided by manufacturer are known as _____ .
  a) specification limits
  b) control limits
  c) tolerance limits
  d) none of these

v) Probability of rejecting Ho when it is true is equal to _____ .
  a) Level of significance
  b) Probability of type I error
  c) Both a & b
  d) Power of the test

vi) If all four components of time series operate independently then we use _____ .
  a) additive model
  b) multiplicative model
  c) exponential model
  d) none of these

P.T.O.

vii) The discovery and development of control chart was made by _____

    a)   R.A. Fisher   b)   Dodge and Roming

    c)   Karl Pearson   d)   W.A. Shewhart

viii) Index numbers measure the average _____

    a)   relative changes   b)   absolute changes

    c)   percentage increase   d)   proportionate changes

[16]

Q2) Attempt any **two** of the following :

    a)   Define

         i)   Laspeyre's Index Number.

         ii)   Paasche's Index Number.

         iii)   Fisher's Index Number.

         State and prove the relation between above Index Numbers.

    b)   Explain the construction of $\bar{X}$ chart when.

         i)   standards are given.

         ii)   standards are not given.

    c)   Explain the test procedure for testing.

         i)   the goodness of fit.

         ii)   the independence of attributes in case of m×n contingency table.

[16]

Q3) Attempt any **four** of the following :

    a)   Describe the moving average method for determining trend.

    b)   Explain time reversal test and factor reversal test in Index Number.

    c)   Explain the construction of control chart for number of defects.

    d)   Explain paired-t test for difference of means.

    e)   State different components of time series and explain any one of them.

    f)   Explain the construction of Index Number by Family budget number.

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B.Sc. (Part-II) (Semester -IV) (Pre-revised)
Examination, May - 2015
STATISTICS
Statistical Methods - II (Paper -VIII)
Sub. Code: 49996

Day and Date : Saturday, 23 - 05 - 2015
Time :12.00 noon to 2.00 p.m.

Total Marks : 40

Instructions :
1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q1) Choose the correct alternative: [8]

a) In a time series values are arranged in _____ order.

i) ascending

ii) descending

iii) cronological

iv) geographical

b) The variation in the production due to strike in a company is _____.

i) seasonal variation

ii) cyclical variation

iii) secular trend

iv) irregular variation

c) The variation in the quality of a product due to negligence of operator is _____ variation.

i) chance

ii) assignable

iii) random

iv) none of these

P.T.O.

d) The control chart for proportion of defectives in the sample is
_____.

   i) $\bar{x}$ - chart   ii)   R - chart

   iii)   p - chart   iv)   C - chart

e) Time reversal test is satisfied by _____ Index Number.

   i)   Laspexre   ii)   Paasche

   iii)   Fisher   iv)   all of these

f) In time series analysis, the method of simple average is used to estimate
_____.

   i)   trend   ii)   seasonal variations

   iii)   cyclical variations   iv)   irregular variations

g) A null hypothesis is a _____.

   i)   hypothesis of interest

   ii)   hypothesis that assigns value zero to parameters

   iii)   hypothesis of 'no difference'

   iv)   hypothesis which is simple

h) Testing $H_0: \mu_1 = \mu_2$ against $H_1: \mu_1 < \mu_2$ is a _____.

   i)   one sided left tailed test

   ii)   one sided right tailed test

   iii)   two sided test

   iv)   none of these

Q2) Attempt any two of the following:

[16]

a) Explain the construction of $\bar{X}$ and R charts in a production process when standards are not given.

b) Define price relative and discuss how it is used in construction of index numbers.

c) Describe the moving average method and least square method used for estimation of trend.

Q3) Attempt any four of the following:

[16]

a) What is time series? State the four components of time series.

b) Explain paired -t test for difference of means.

c) Explain the terms:

   i) Critical region,

   ii) Level of significance.

d) Explain the construction and working of a control chart for number of defects.

e) Explain the construction of Index Number by family budget method.

f) Distinguish between chance and assignable causes of variation.

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B.Sc. (Part - II) (Semester - IV) Examination, December - 2015
STATISTICS (Pre-revised) (Paper - VIII)
Statistical Methods - II
Sub. Code : 49996

Day and Date : Thursday, 17 - 12 - 2015
Time : 12.00 noon. to 02.00 p.m.

Total Marks : 40

Instructions : 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q1) Choose the correct alternative :

[8]

a) Which of following is not a method of measuring trend.

   i) simple average
   ii) moving average
   iii) least square
   iv) progressive average

b) A production process is said to be in state of statistical control if it is governed by _____.

   i) assignable causes
   ii) chance causes
   iii) both i & ii
   iv) none of these

c) Base year of index number is _____.

   i) any convenient year
   ii) preceding year
   iii) succeeding year
   iv) year of stability

d) If all four components of a time series operate independently, then we use

   i) additive model
   ii) multiplicative model
   iii) exponential model
   iv) none of these

e) Testing $H_0 : \mu = 0$ against $H_1 : \mu > 0$ is a _____.

   i) one sided left tailed test
   ii) one sided right tailed test
   iii) two sided test
   iv) none of these

P.T.O

f) For fraction defective _____ chart is suitable.

   i) $\bar{X}$ – chart   ii) R – chart

   iii) P – chart   iv) C – chart

g) The index number of base year is _____

   i) 0   ii) 100

   iii) 1   iv) cannot be obtained

h) Reject H_0 when it is true leads to _____.

   i) type I error   ii) type II error

   iii) power of the test   iv) none of these

Q2) Attempt any two of the following :   **[16]**

  a) Explain the construction of $\bar{X}$ – chart when

    i) Standards are given,

    ii) Standards are not given.

  b) Discuss the four components of time series.

  c) Define time reversal test and factor reversal Test for index numbers and show that fisher's ideal price index number satisfies both these tests.

Q3) Attempt any four of the following :   **[16]**

  a) Describe the moving average method for determining trend.

  b) Explain the two types of errors in testing of hypothesis.

  c) Explain the construction of control chart for fraction defectives.

  d) Explain paired-t test for difference of means.

  e) Define

    i) Laspeyre's Index number.

    ii) Paasche's Index number.

  f) Explain the construction of Index Number bx family budget method.

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Q1) Choose correct alternative: [10]

a)   The chi-square test is used to test _____.

   i)   goodness of fit

   ii)   hypothetical value of population variance

   iii) both (i) & (ii)

   iv)   none of these

b)   Critical region is a region of _____.

   i)   accepting H_0 ii)   rejecting H_0

   iii) accepting H_1 iv)   rejecting H_1

c)   For a parallel system of two components having reliability 0.6 each, the reliability of system is _____.

   i)   0.16   ii)   0.6

   iii) 0.84   iv)   0.4

                                                                        P.T.O.

d) If $X \sim U(-3, 3)$ then the lower bound of $p\left[|X - \mu| < \sqrt{2}\sigma\right]$ is _____

    i)   0   ii)   0.5

    iii)   0.25   iv)   1

e) Reliability of a system always lie between _____.

    i)   0 and 1   ii)   -1 and 1

    iii)   0 and ∞   iv)   -∞ and ∞

f) Probability of rejecting H_0 when it is true is _____.

    i)   level of significance   ii)   probability of type-I error

    iii)   both (i) and (ii)   iv)   none of these

g) Fishers z- transformation is used to test the equality of two _____.

    i)   means   ii)   regression coefficients

    iii)   variances   iv)   correlation

h) When X follows exponential distribution with mean 1, the upper bound for $p[|X - 1| \geq \sigma]$ is _____.

    i)   1   ii)   0

    iii)   0.5   iv)   0.25

i) The reliability of a series system of n Independent components with reliability p each is _____.

    i) $1 - (1 - p)^n$ ii) p^n

    iii) p^{n-1} iv) $1 - (1 - p^n)$

j) Power of a test is probability of _____.

    i)   rejecting H_0 when it is false

    ii)   accepting H_0 when it is true

    iii)   rejecting H_0 when it is true

    iv)   accepting H_0 when it is false

Q2) Attempt any two: [20]

a) Explain the terms:
   i) Parameter
   ii) Statistic
   iii) One tailed test
   iv) Two tailed test
   v) Power of the test

b) A system consisting of five Independent components functions. If both components 1 and 2 function and at least one of remaining three components functions. Find the reliability of the system.

c) Explain any two tests of significance based on chi-square statistic.

Q3) Attempt any four: [20]

a) Explain paired t test for testing difference of means.

b) Explain the procedure to test the equality of population proportion when sample size is large.

c) Draw a block diagram and obtain structure function of a 2 out of 3 system.

d) An unbiased coin is tossed 100 times. Show that the probability that the number of heads will be between 30 and 70 is greater than $\frac{15}{16}$.

e) Describe the procedure to test the population proportion $P = P_0$.

f) Write a note on Yate's correction for continuity.

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B.Sc. (Part - II) (Semester - IV) Examination, November - 2017
STATISTICS
Statistical Methods-II (Paper-VIII)
Sub. Code : 63706

Day and Date : Saturday, 25 - 11 - 2017
Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

Instructions :
1) All questions are compulsory.
2) Figures to the right in the bracket indicate full marks.
3) Use of claculators and statistical tables is allowed.

Q1) Choose the most correct alternative: [10]

a)   By using Chebychev's inequality one can find _____ for the probability of random variable X deviating from its mean absolutely.

   i)   Lower bound   ii)   Upper bound

   iii)   Both (i) and (ii)   iv)   None of these

b)   If $X \sim B(4, 0.5)$ then by Chebychev's inequality $P[|X - 2| \geq 2] \leq$ _____ .

   i)   0.5   ii)   0.25

   iii)   0.75   iv)   1

c)   A null hypothesis is a _____ .

   i)   Hypothesis of interest

   ii)   Hypothesis of no difference

   iii)   Hypothesis which is simple

   iv)   Hypothesis which assigns value zero to the parameter

d)   Probability of rejecting Ho when it is true is equal to _____ .

   i)   Level of significance   ii)   Probability of type I error

   iii)   Both (i) and (ii)   iv)   Type I error

P.T.O.

B.Sc. (Part - II) (Semester - IV) Examination, November - 2017
STATISTICS
Statistical Methods-II (Paper-VIII)
Sub. Code : 63706

Day and Date : Saturday, 25 - 11 - 2017
Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

Instructions :
1) All questions are compulsory.
2) Figures to the right in the bracket indicate full marks.
3) Use of claculators and statistical tables is allowed.

Q1) Choose the most correct alternative:

[10]

a) By using Chebychev's inequality one can find _____ for the probability of random variable X deviating from its mean absolutely.

i) Lower bound

ii) Upper bound

iii) Both (i) and (ii)

iv) None of these

b) If $X \sim B(4, 0.5)$ then by Chebychev's inequality $P[|X - 2| \geq 2] \leq$ ____.

i) 0.5

ii) 0.25

iii) 0.75

iv) 1

c) A null hypothesis is a _____.

i) Hypothesis of interest

ii) Hypothesis of no difference

iii) Hypothesis which is simple

iv) Hypothesis which assigns value zero to the parameter

d) Probability of rejecting Ho when it is true is equal to _____.

i) Level of significance

ii) Probability of type I error

iii) Both (i) and (ii)

iv) Type I error

P.T.O.

e) By taking a level of significance of 5% it is the same as saying

   i)   We are 5% confident the results have not occured by chance

   ii) We are 95% confident that the results have not occured by chance

   iii) We are 95% confident that the results have occured by chance

   iv) None of these

f) Rejecting a lot of good quality & accepting a lot of bad quality are respectively--

   i)   Consumer's risk & producer's risk

   ii) Producer's risk & consumer's risk

   iii) Type II error & type I error

   iv) None of these

g) The total number of the path vectors in the system of n components are.

   i) 2^{n-1} ii) 3^n

   iii) 2^n iv) 3^{n-1}

h) Reliability of a system is always lies between _____.

   i)   0 and 1   ii) -1 and 1

   iii) 0 and ∞ iv) $-\infty$ and ∞

i) The reliability of series system of n components is _____.

   i) p^{n-1} ii) $1-(1-p)^n$

   iii) $1-(1-p)^{n-1}$ iv) p^n

j) For a parallel system of two components having 0.6 reliability each, the reliability of a system is _____.

   i)   0.16   ii) 0.6

   iii) 0.84   iv) 0.4

Q2) Attempt any two of the following three: [20]

a) Explain the following terms with illustrations:

i) Type I error

ii) Level of significance

iii) Power of the test

iv) p value

v) One tailed (sided) test

b) Describe the small sample tests for testing $H_0: \mu = \mu_0$ and $H_0: \mu_1 = \mu_2$.

c) Obtain the minimal path and cut representations of the 2 out of 3 coherent system.

Q3) Attempt any four of the following: [20]

a) State and prove Chebychev's inequality for discrete distribution.

b) Write a short note on Fisher's Z - transformation.

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

d) Explain the appropriate test to test equality of two population proportions.

e) If hazard rate $h(t) = 5$ for $t \geq 0$, find the reliability function.

f) Explain the concept of positive ageing and negative ageing of component.

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B.Sc. (Part - II) (Semester - IV) Examination, May - 2018
STATISTICS
Statistical Methods - II (Paper - VIII)
Sub. Code: 63706

Day and Date : Thursday, 17 - 05 - 2018
Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

Instructions :
1) All questions are compulsory.
2) Figures to the right in the bracket indicate full marks.
3) Use of calculator and statistical table is allowed.

Q1) Choose the most correct alternative:

[10]

a) Identify correct statement_____.

i) P (Type I error) = P (Reject H_0 / H_0 is true)

ii) P (Type II error) = P (Reject H_0 / H_0 is true)

iii) P (Type I error) = 1 - Level of significance

iv) P (Type II error) = Powr of the test

b) If X is a poisson variate with mean 5 then by Chebychev's inequality we have $P (|x - 5| < 5) \geq$ _____.

i) 0.2

ii) 0.4

iii) 0.6

iv) 0.8

c) Hazard rate can be evaluated by _____.

i) $\dfrac{f(t)}{R(t)}$

ii) $\dfrac{f(t)}{1 - f(t)}$

iii) $-\dfrac{R'(t)}{R(t)}$

iv) All are true

P.T.O.

d) The chisquare test is used for testing _____.

    i)   independence of attributes

    ii)   goodness of fit

    iii)   both (i) and (ii)

    iv)   neither (i) nor (ii)

e) Fisher's Z transformation is used to test equality of two population _____.

    i)   means   ii)   variances

    iii)   correlation coefficients   iv)   regression coefficients

f) Assuming components on independent and identically distributed, the reliability of 2 out of 3 good system is _____.

    i) $3p^2 + 2p^3$ ii) $3p^2 - 2p^3$

    iii) $2p^3 + 3p^2$ iv) $2p^3 - 3p^2$

g) For testing $H_0 : p_1 = p_2$ against $H_1 : p_1 < p_2$ _____ test is used.

    i)   one sided left tailed   ii)   one sided right tailed

    iii)   two tailed   iv)   none of these

h) Total number of cut vectors in the system of n components are _____.

    i) 2^{n-1} ii) 2^n

    iii) 3^{n-1} iv) 3^n

i) Paired t test is used for testing difference of two population _____.

    i)   means   ii)   variances

    iii)   proportions   iv)   correlation coefficients

j) Two components have reliability 0.7 each. The reliability of series system is _____.

    i)   0.7   ii)   0.14

    iii)   0.49   iv)   none of these

Q2) Attempt any two of the following:

a) Explain following terms:

i) Structure function of a system

ii) survival function

iii) Minimal path set

iv) Hazard function

v) Hazard rate.

b) Describe large sample tests for testing.

i) $H_0 : \mu = \mu_0$ against $H_1 : \mu < \mu_0$

ii) $H_0 : \rho = \rho_0$ against $H_1 : \rho \neq \rho_0$

c) Describe small sample tests for.

i) $H_0 : \mu = \mu_0$ against $H_1 : \mu \neq \mu_0$

ii) $H_0 : \mu_1 = \mu_2$ against $H_1 : \mu_1 \neq \mu_2$, for independent samples

Q3) Attempt any four of the following:

[20]

a) Define following terms.

i) hypothesis

ii) level of significance

iii) power of the test

b) Draw block diagrams for systems having structure functions.

i) $\phi(\underline{x}) = \left[1 - (1 - x_1)(1 - x_2)\right]x_3$

ii) $\phi(\underline{x}) = x_1 x_2 \left[1 - (1 - x_3)(1 - x_4)\right]$

c) Explain the concept of positive ageing and negative ageing of a component.

d) If X is exponential variate with mean $\frac{1}{2}$, compute lower bound for

$$p\left(\left|x - \frac{1}{2}\right| \leq 2\right).$$ Compare this with actual probability.

e) Describe test procedure for testing equality of two population variances.

f) Explain pair t test.

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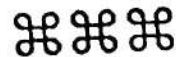
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B.Sc. (Part - II) (Semester - IV) Examination, May - 2017
STATISTICS (Paper - VIII)
Statistical Methods - II
Sub. Code : 63706

Day and Date : Wednesday, 17 - 05 - 2017   Total Marks : 50
Time : 12.00 noon to 02.00 p.m.

Instructions : 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of calculators and statistical tables is allowed.

Q1) Choose correct alternative : [10]

a) A state vector $\underline{x}$ is called as path vector if $\Phi\left(\underline{x}\right) = $ _____.

    i)   0   ii)   1

    iii)   2   iv)   none of these

b) Let $x \rightarrow u (-2, 2)$. By chebycher's inequality $p\left(1 x - \mu 1 < \sqrt{2} 6\right) \geq$ _____.

    i)   0   ii)   ¼

    iii)   ½   iv)   ¾

c) Structure function $\Phi\left(\underline{x}\right)$ of parallel system of n independent components is given by _____.

    i)   Min $[x_1, x_2, ...x_n]$ ii) $\prod_{i=1}^{n}(1 - xi)$

    iii) $\prod_{i=1}^{n} xi$ iv) $\coprod_{i=1}^{n} xi$

P.T.O.

d) If x → B (4, ½) then by chebycher's inequality $p\left(1\times-\mu1\le2\right)\ge$

_____.

   i) ¼   ii) ½

   iii) ¾   iv) 1

e) Structure function $\Phi\left(\underline{x}\right)$ of series system of n independent components is given by _____.

   i) $\prod_{i=1}^{n}(1-xi)$ ii) Max $[x_1, x_2, ...x_n]$

   iii) $\coprod_{i=1}^{n} xi$ iv) $\prod_{i=1}^{n} xi$

f) If r is the sample correlation coefficient then Fisher's Z transformation gives _____.

   i) $Z=\log_e\dfrac{1-r}{1+r}$ ii) $Z=\log_e\dfrac{1+r}{1-r}$

   iii) $Z=\dfrac{1}{2}\log_e\dfrac{1-r}{1+r}$ iv) $Z=\dfrac{1}{2}\log_e\dfrac{1+r}{1-r}$

g) Whether a test is one-sided or two-sided depends on _____.

   i) null hypothesis   ii) alternative hypothesis

   iii) composite hypothesis   iv) simple hypothesis

h) Test statistic to test $H_0 : P_1 = P_2$ is _____.

i) $\dfrac{P_1 - P_2}{\sqrt{\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)\hat{P}\hat{Q}}}$

ii) $\dfrac{P_1 - P_2}{\sqrt{\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)\hat{P}}}$

iii) $\dfrac{P_1 - P_2}{\sqrt{\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)\hat{Q}}}$

iv) $\dfrac{P_1 - P_2}{\hat{P}\hat{Q}\sqrt{\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}}$

i) In a k out of n system there are _____ minimal path sets.

i) 1

ii) n

iii) 2^n

iv) $^{n}C_k$

j) By using chebycher's inequality one can find _____ for the probability of random variable X deviating from its mean absolutely.

i) lower bound

ii) upper bound

iii) both i and ii

iv) none of these

Q2) Attempt any two of the following. [20]

a) Describe the procedures for testing $H_0 : \mu = \mu_0$ and $H_1 : \mu_1 = \mu_2$ based on normal distributions.

b) Explain test procedures for testing

i) the goodness of fit

ii) the independence of two attributes.

c) Explain following terms with illustrations :

    i) Component

    ii) System of components

    iii) Series system

    iv) Parallel system

    v) Reliability of system

Q3) Attempt any <u>four</u> of the following.   [20]

a) State and prove chebycher's inequality for continuous distribution.

b) State expressions for p.d.f., survival function and hazard rate if distribution function is known.

c) Determine minimal path sets for following system.
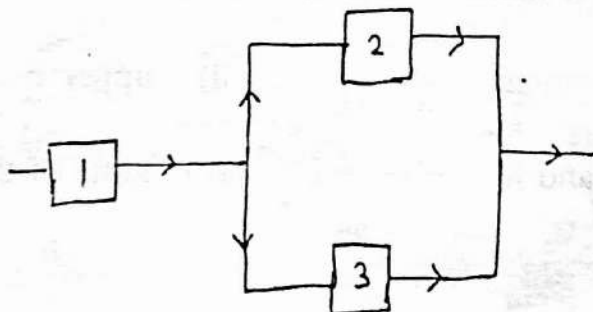
    state its structure function.

d) Write short note on paired t test.

e) Explain suitable test for testing equality of two population variances.

f) Describe the procedure of test population proportion $P = P_0$.

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Seat
No.

B.Sc. (Part - II) (Semester - IV) Examination, April - 2016
STATISTICS
Statistical Methods - II (Paper - VIII)
Sub. Code : 63706

Day and Date : Friday, 29 - 04 - 2016   Total Marks : 50
Time : 12.00 noon to 2.00 p.m.

Instructions :   1)   All questions are compulsory.
                  2)   Figures to the right indicate full marks.

Q1) Choose correct alternative: [10]

a)   If $X \rightarrow P(4)$ then by Chebychev's inequality $P[|X - 4| < 4] \geq$ _____.

   i)   0.5   ii)   0.25

   iii)   0.75   iv)   1

b)   In k out of n system there are _____ minimal path sets.

   i) n ii)   1

   iii) 2^n iv) ^nC_k

c)   P-value is also known as _____.

   i)   level of significance   ii)   size of test

   iii)   observed level   iv)   power of the test

d)   In testing of hypothesis, type II error is

   i)   reject H_0 when it is true

   ii)   accept H_0 when it is false

   iii)   reject H_0 when it is false

   iv)   accept H_0 when it is true

e) Chebychev's inequality is applicable for _____.

  i)   continuous distributions   ii)   discrete distributions

  iii)   both (i) and (ii)   iv)   none of these

f)   Testing $H_0 : \mu_1 = \mu_2$ against $H_1 : \mu_1 < \mu_2$ is a _____ test.

  i)   one sided left tail   ii)   one sided right tail

  iii)   two tailed   iv)   none of these

g)   The degrees of freedom of t-statistic for paired t-test based on n pairs of observations is _____.

  i) $2(n-1)$ ii) $2n-1$

  iii) $n-1$ iv) n

h)   The chisquare test is not used for

  i)   testing goodness of fit

  ii)   testing independence of attributes

  iii)   testing equality of two population variances

  iv)   testing goodness of fit of regression lines

i)   The structure function of series system of n components is $\Phi(\underline{x}) = $ ___.

  i) $\max \{X_1, X_2, ..., X_n\}$ ii) $\prod_{i=1}^{n} X_i$

  iii) $\coprod_{i=1}^{n} X_i$ iv) $\prod_{i=1}^{n} (1-X_i)$

j)   F-test is used to test _____.

  i)   equality of two population variances

  ii)   equality of two population means

  iii)   equality of two population proportions

 iv)   none of these

Q2) Attempt any TWO of the following: [20]

    a)   Explain the terms with illustration:

        i)   system of components,

        ii)   series system

        iii) parallel system

        iv) k out of n system

        v)   reliability of a component

    b)   Describe the large sample tests for testing $H_0 : \mu = \mu_0$ and $H_0 : \mu_1 = \mu_2$.

    c)   Describe following tests:

        i)   test for goodness of fit.

        ii)   test for independence for two attributes.

Q3) Attempt any FOUR of the following: [20]

    a)   Find structure functions of systems with following block diagrams:

        i)

        ii)
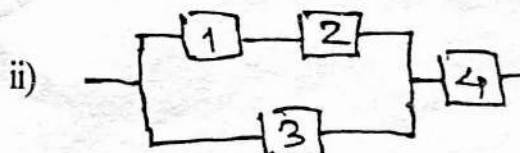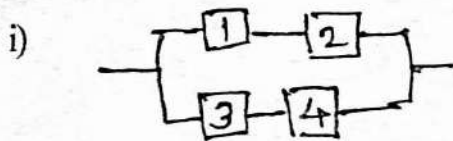
b) State and prove Chebychev's inequality for continuous distribution.

c) Write short note on Fisher's Z-transformation.

d) Describe the small sample-test for testing $\mu_1 = \mu_2$.

e) For a component having hazard rate 2 find p.d.f., c.d.f. and survival function.

f) Define following terms:

i) level of significance.

ii) power of test.