Seat
No.

B.C.S. (Part - I) (SEM-II) Examination, 2013
STATISTICS
Continuous Probability Distributions
and Testing of Hypothesis (Paper -IV)
Sub. Code : 48218

Day and Date : Friday , 26 - 04 - 2013

Total Marks : 40

Time : 3.00 p.m. to 5.00 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 the correct alternatives.   [8]

i)   If $f(x) = \begin{cases} K x^3 & 0 < x < 1 \\ 0 & ow \end{cases}$

is a pdf, then the value of K is _____

a) $\dfrac{1}{4}$ b) 4   c) 1   d) none of these

ii)   Which of the following continuous distribution has lack of memory property

a) normal   b) uniform   c) exponential   d) none of these

iii) If r. v. x has t distribution with 5 degrees of freedom, then mean and uariance of x are_____

a) 0 and $\dfrac{5}{3}$ b) 5 and 10   c) $\dfrac{5}{3}$ and 0   d) none of these

iv)   F variate has range

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

v)   Reject Ho when Ho is true is _____

a) Type I error   b) Type II error

c) Not committing error   d) None of these

P.T.O

vi) A null hypothesis is a _____

    a) Hypothesis of interest   b) Hypothesis of no difference

    c) Hypothesis which is simple   d) None of these

vii) If X has expohential variate with mean $\frac{1}{\theta}$, then variance of X is _____

    a) θ b) θ^2 c) $1/\theta$ d) $1/\theta^2$

viii) If $X \sim N(0,1)$ then X^2 has the distribution _____

    a) chi-square   b) t   c) F   d) none of these

Q2) Attempt any two   [16]

  a) Explain the terms

    i) Continuous random variable

    ii) Expectation of continuous random variable

    iii) Probability density function of continuous random variable

    iv) Cumulative densify function of continuous random variable.

  b) Define students t distribution. State mean and variance of t distribution. Also state the normal approximation of t distribution.

  c) Explain large sample test for testing

    i) $H_0 : \mu = \mu_0$ v/s $H_1 : \mu \neq \mu_0$

    ii) $H_0 : P = P_0$ v/s $H_1 : P \neq P_0$

Q3) Attempt any four   [16]

  a) Let x be continuous random variable having pdf

$$f(x) = \begin{cases} Kx(1-x) & 0 < x < 1 \\ 0 & ow \end{cases}$$

    Find K and mean of X

b)   Define normal distribution . State important properties
of normal distribution

c)   Define chi-square distribution . State its mean and variance.

d)   State merits and demerits of simulation .

e)   Define the terms parameter and statistic

f)   Let $X_i \sim$ iid N $(0,1)$, $i = 1,2, ...,6$. Then find the distribution of

$$\frac{X_1^2 + X_2^2 + X_3^2}{X_4^2 + X_5^2 + X_6^2}$$

■■■

Seat No.

B.C.S. (Part - I) (Semester - II) Examination, 2013
STATISTICS (Paper - IV)
Continuous Probability Distribution and Testing of Hypothesis
Sub. Code : 58181

Total Marks : 50

Day and Date : Monday, 06 - 05 - 2013

Time : 3.00 p.m. to 5.00 p.m.

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

[10]

Q1) Choose the correct alternative :

a) Cumulative distribution function (c.d.f.) is _____.
   i) non decreasing
   ii) constant
   iii) decreasing
   iv) none of these

b) If X is a random variable following uniform distribution over [a, b] then the Var(X) = _____.
   i) $\dfrac{b-a}{12}$
   ii) $\dfrac{b+a}{12}$
   iii) $\dfrac{(b-a)^2}{12}$
   iv) $\dfrac{(b+a)^2}{12}$

c) If the pdf of variable X is $f(x) = Kx(2-x)$; $0 \leq x < 2$ then the value of K is _____.
   i) 3/4
   ii) one
   iii) 1/4
   iv) 3/2

d) The range of t-distribution is _____.
   i) $(-\infty, \infty)$
   ii) $(0, 1)$
   iii) $(-1, 1)$
   iv) $(0, \infty)$

e) If $X \sim N(-60, 25)$, then the N(0, 1) variate is _____.
   i) $\dfrac{X+60}{5}$
   ii) $\dfrac{X-60}{5}$
   iii) $\dfrac{X-60}{25}$
   iv) $\dfrac{X+60}{25}$

f) If X and Y are independent Chisquare variable with 5 and 10 degrees of freedom respectively then X + Y follows _____.
   i)   N (5, 10)
   ii) x^2 with 5
   iii) x^2 with 10
   iv) x^2 with 15

g) Critical region is also known as _____.
   i)   level of significance
   ii) acceptance region
   iii) rejection region
   iv) all the above

h) In RAND ( ) function generates random numbers from _____.
   i)   U (0, 1)
   ii) N (0, 1)
   iii) U (–1, 1)
   iv) none of these

i) For large sample test for testing population mean, test statistic follows

   _____.
   i)   Chi-square
   ii) t_n
   iii) normal
   iv) exponential distribution

j) Box-Muller transformation is used to generate a random sample from

   _____.
   i)   binomial distribution
   ii) normal distribution
   iii) exponential distribution
   iv) uniform distribution

Q2) Attempt any two of the following three :   [10 + 10 = 20]

a) Define the terms :
   i)   Critical Region.
   ii) Type I and II errors.
   iii) Continuous random variable
   iv) Variance of continuous random variable
   v)   c.d.f. of continuous random variable

b) Define:
   i) Normal distribution ii) Standard normal distribution. The life time of a certain battery have an average of 300 hours with standard deviation of 35 hours. Assuming the distribution of lifetime is normal, find the probability that lifetime lies from 225 hours to 355 hours.

c) Explain:
   i)   Large sample test for testing $H_0: \mu = \mu_0$ against $H_1: \mu \neq \mu_0$.
   ii) Chisquare test for goodness of fit.

Q3) Attempt any Four of the following :   [5 + 5 + 5 + 5 = 20]

a) Find the constant, so that the following function can be taken as a p.d.f. of X,

$$f(x) = K(3 - x), \quad 0 \le x \le 3$$
$$= 0 \qquad \text{otherwise}$$

Hence find Mean of X.

b) What is simulation? State its merit.

c) If a continuous r.v. X follows u (0, 1). Find

i) $P\left[|X| < \dfrac{1}{3}\right]$

ii) $P\left[\left(\dfrac{4X + 1}{2}\right) \le 2\right]$

d) Define Chi-square, t and F distribution. Also state the interrelation between normal, Chi-square, t and F distribution.

e) If the random variable X has the pdf

$$f(x) = \dfrac{1}{2}(x + 1) \quad -1 < x < 1$$
$$= 0 \qquad \text{otherwise}$$

Find distribution function of X and hence Find $P\left[-\dfrac{1}{2} < X < \dfrac{1}{3}\right]$

f) A random variable X has an exponential distribution with mean 5. Find $P[X > 8 \mid X > 4]$.

✳ ✳ ✳

Seat No.

B.C.S. (Part - I) (Semester - II) Examination, November - 2017
STATISTICS (Paper - IV)
Continuous Probability Distributions and Testing of Hypothesis
Sub. Code : 59711

Day and Date : Wednesday, 08 - 11 - 2017   Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

Q1) Choose the correct alternative.   **[10]**

a) If X has chi square distribution with n degrees of freedom, then variance of distribution is _____.

   i) n ii) $2n$

   iii) n^2 iv)   None of these

b) For normal distribution, the value of coefficient of kurtosis $\gamma_2 =$ _____.

   i)   0   ii)   3

   iii)   less than 3   iv)   More than 3

c) P (Rejecting H_o when H_o is true) is _____.

   i)   Type I error   ii)   Type II error

   iii)   Level of significance   iv)   None of these

d) If $X \rightarrow F(n_1, n_2)$ then, $1/X$ _____ distribution.

   i)   Normal   ii) t

   iii)   chi square   iv) $F(n_2, n_1)$

e) If Y is a continuous random variable with p.d.f. f(y) then $\int_{-\infty}^{+\infty} f(y)dy = $ _____.

    i)   1   ii)   -1

    iii) 0.5   iv)   0

f) The hypothesis of no difference is _____.

    i)   Alternative hypothesis   ii)   Null hypothesis

    iii) Composite hypothesis   iv)   None of these

g) If X has exponential distribution with mean θ then, its distribution function [F(X)] is _____.

    i) $e^{-x\theta}$ ii) $1-e^{-x\theta}$

    iii) $e^{-x/\theta}$ iv) $1-e^{-x/\theta}$

h) If X→U (4, 16) then mean is _____.

    i)   10   ii)   12

    iii) 20   iv)   8

i) Ratio of two independent chi square variate is _____ variate.

    i)   Normal   ii)   F

    iii) t iv)   chi square

j) _____ distribution is symmetric about mean.

    i)   F   ii)   Normal

    iii) t iv)   Both (ii) and (iii)

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

    a) Explain the terms:

        i)   Hypothesis

        ii)   Type I error

        iii) Type II error

        iv) Critical region

        v)   Level of significance

b) Define normal distribution. State its mean, variance and additive property. Also state theorem on approximation to binomial and poisson.

c) State p.d.f., mean and variance of exponential distribution. Prove the lack of memory property of exponential distribution.

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

a) Define distribution function and state its properties.

b) In a radio listener's survey, 120 persons were interviewed and their opinions about preference to Hindi or English music and preference to classical or light music were asked. The results are as follows:

	English Music	Hindi Music
Classical music	13	45
Light Musis	39	23

Examine at 5% los whether to music language is independent of type of music.

c) If mean and variance of U (a, b) are 5 and 3 respectively. Determine values of a, b.

d) State relation between chi square, t and F variate.

e) If X_1, X_2, X_3 and X_4 are iid N(0,1) variates and $Y = \dfrac{3X_4^2}{X_1^2 + X_2^2 + X_3^2}$ find c such that $P(Y \le C) = 0.01$.

f) A company producing spark plugs claimed that there would be 10% defective spark plugs. When a sample of 500 was taken 62 were found defective. Test correctness of company's claim.

🖤 🖤 🖤

**B.Sc. (Computer Science) (Entire) (Part - I) (Semester - II)
Examination, April - 2018
STATISTICS
Continuous Probability Distributions and Testing of Hypothesis
(Paper - IV)
Sub. Code : 59711**

Day and Date : Thursday, 26 - 4 - 2018   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.
                   3)   Use of calculator and statistical table is allowed.

Q1) Choose the correct alternative.   **[10]**

a)   If X follows chi square distribution with variance 6 then mean of the distribution is _____.

   i)   4   ii)   12

   iii)   2   iv)   3

b)   Testing $H_o : \mu = 50$ against $H_1 : \mu \neq 50$ is a _____.

   i)   one sided left tailed test   ii)   two sided test

   iii)   one sided right tailed test   iv)   none of these

c)   If $X \rightarrow N(-80, 81)$ then $N(0, 1)$ variate is _____.

   i) $\dfrac{X + 80}{9}$ ii) $\dfrac{X - 80}{9}$

   iii) $\dfrac{X + 80}{81}$ iv) $\dfrac{X - 80}{81}$

P.T.O.

d)   If $X \to t_n$ then E(X) is _____.

   i) n ii) $\dfrac{n}{n-2}$

   iii)   0   iv) $2n$

e)   If $X \to U$ (4, 16) then variance is = _____.

   i)   10   ii)   12

   iii)   20   iv)   8

f)   Lack-of memory property is satisfied by _____ distribution.

   i)   chi square   ii)   exponential

   iii)   normal   iv)   none of these

g)   Rejecting H_o when it is true is _____.

   i)   Type I error   ii)   Type II error

   iii)   level of significance   iv)   none of these

h)   Life length of a tube is example of _____ variable.

   i)   discrete   ii)   continuous

   iii)   ungrouped   iv)   none of these

i)   Let X_1, X_2, X_3 and iid N(0, 1) variates. Then the distribution of $\dfrac{2X_3^2}{X_1^2 + X_2^2}$

   is _____.

   i) $F_{2, 1}$ ii) $F_{1, 2}$

   iii) $F_{2, 2}$ iv) $F_{1, 1}$

j)   Square of standard normal variate is _____ variate.

   i)   F   ii) t

   iii)   chi square   iv)   none of these

B.Sc. (Computer Science) (Entire) (Part - I) (Semester - II) Examination, April - 2018
STATISTICS
Continuous Probability Distributions and Testing of Hypothesis (Paper - IV)
Sub. Code : 59711

Day and Date : Thursday, 26 - 4 - 2018
Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

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

Q1) Choose the correct alternative. [10]

a) If X follows chi square distribution with variance 6 then mean of the distribution is _____.

   i) 4   ii) 12

   iii) 2   iv) 3

b) Testing $H_o : \mu = 50$ against $H_1 : \mu \neq 50$ is a _____.

   i) one sided left tailed test   ii) two sided test

   iii) one sided right tailed test   iv) none of these

c) If $X \rightarrow N(-80, 81)$ then $N(0, 1)$ variate is _____.

   i) $\dfrac{X + 80}{9}$ ii) $\dfrac{X - 80}{9}$

   iii) $\dfrac{X + 80}{81}$ iv) $\dfrac{X - 80}{81}$

P.T.O.

d) If $X \to t_n$ then $E(X)$ is _____.

i) n

ii) $\dfrac{n}{n-2}$

iii) 0

iv) $2n$

e) If $X \to U(4, 16)$ then variance is = _____.

i) 10

ii) 12

iii) 20

iv) 8

f) Lack of memory property is satisfied by _____ distribution.

i) chi square

ii) exponential

iii) normal

iv) none of these

g) Rejecting H_o when it is true is _____.

i) Type I error

ii) Type II error

iii) level of significance

iv) none of these

h) Life length of a tube is example of _____ variable.

i) discrete

ii) continuous

iii) ungrouped

iv) none of these

i) Let X_1, X_2, X_3 and iid $N(0, 1)$ variates. Then the distribution of $\dfrac{2X_3^2}{X_1^2 + X_2^2}$ is _____.

i) $F_{2, 1}$

ii) $F_{1, 2}$

iii) $F_{2, 2}$

iv) $F_{1, 1}$

j) Square of standard normal variate is _____ variate.

i) F

ii) t

iii) chi square

iv) none of these

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

a) Define uniform distribution over (a, b). Find its mean, variance and distribution function.

b) Explain chi square test for :

   i) Testing goodness of fit.

   ii) Independence of attributes.

c) Define continuous random variable. Explain the terms:

   i) probability density function

   ii) mean

   iii) variance

   iv) distribution function.

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

a) State properties of standard normal curve.

b) State relation between chi square, t, and F distribution.

c) Suppose that the life time of a certain make of T.V. tube is exponentially distributed with a mean life 1600 hrs. What is probability that

   i) tube will work upto 2400 hrs?

   ii) tube will survive after 1000 hrs?

d) If t_n follows Student's t distribution with n d.f. find

   i) $P(|t_{10}| > 1.812)$

   ii) $P(|t_8| < 2.306)$

   iii) $P(t_{26} < 0.531)$

   iv) $P(t_{30} > 1.697)$

e) Two random samples size 9 and 11 d.f. are drawn from two normal populations, The following information is given:

$$n_1 = 9, n_2 = 11, \ \Sigma x = 9.6, \ \Sigma x^2 = 61.52, \ \Sigma y = 16.5 \ \Sigma y^2 = 73.26$$

Test whether two population have same variance. Use $\alpha = 0.01$.

f) A sample of 400 males students is found to have mean weight of 50.47 kg. Can it be regarded as a sample from a large population with mean weight 52 kg given that population standard deviation is 1.2 kg? Use $\alpha = 5\%$.