Seat No.	

G-337

Total No. of Pages : 2

B.Sc. (Part - II) (Semester - IV) Examination, 2013
STATISTICS (Paper - VII)
Continuous Probability Distributions - II
Sub. Code : 49996

Day and Date : Monday, 29-04-2013

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 correct alternative. **[8]**

a) Which one of the following is symmetric distribution?

i) $\beta_1(m, n)$ ii) $\beta_2(m, n)$

iii) $F(n_1, n_2)$ iv) t_n

b) A r. v. takes values in the interval (0,1). Its possible distribution can be ______.

i) $r(\theta, n)$ ii) $\beta_1(m, n)$

iii) $\beta_2(m, n)$ iv) $F(n_1, n_2)$

c) Moment generating function of X is given as $M_x(t) = (1-t)^{-3}$ Identify probability distribution of X.

i) $r(1,3)$ ii) $\beta_1(1,3)$

iii) $\beta_2(1,3)$ iv) $F(1,3)$

d) Let $X \to \beta_1(m,n)$. The probability distribution of $Y = \frac{X}{1-X}$ will be ______.

i) $\beta_1(m, n)$ ii) $\beta_1(n, m)$

iii) $\beta_2(m, n)$ iv) $\beta_2(n, m)$

e) In case of normal distribution which one of the following is true?

i) $r_1 = 0$ ii) $r_2 = 0$

iii) Mean = Mode = Median iv) All are true

P.T.O.

f) For gamma distribution with parameters θ and n the ratio of mean to variance is ______.

i) θ ii) θ^2

iii) n iv) n^2

g) If X and Y are independent standard normal variates, probability distribution of X^2+Y^2 will be ______.

i) beta ii) normal

iii) chi square iv) none of these

h) Suppose $X \to F(n_1, n_2)$ and $n_2 \to \infty$ then n_1 X has ______ distribution.

i) beta ii) normal

iii) chi square iv) t

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

a) Define chi square variate with n $d.f.$ and derive its p.d.f. using m.g.f.

b) If X and Y are independent gamma variates with parameters (θ, n_1) and (θ, n_2) respectively, show that $\frac{X}{Y} \to \beta_2(n_1, n_2)$.

c) Let $X \to N(\mu, \sigma^2)$. Find m.g.f. , c.g.f. and first two cumulants of X .

Q3) Attempt any FOUR of the following : [16]

a) Calculate mean and variance of t variate with n $d.f.$

b) Obtain H.M. of beta distribution of first kind.

c) Find mode of gamma distribution having parameters θ and n.

d) State and prove relationship between t and F distributions.

e) If X is F variate with n_1 and n_2 $d.f.$, obtain probability distribution of $\frac{1}{X}$.

f) Let $X \to N(\mu_1, \sigma_1^2)$ and $Y \to N(\mu_2, \sigma_2^2)$. If X and Y are independent, show that $X-Y \to N(\mu_1 - \mu_2, \sigma_1^2 + \sigma_2^2)$.

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Seat No.	

B.Sc. (Part - II) (Semester - IV) Examination, December - 2015

STATISTICS (Pre-revised) (Paper - VII)

Continuous Probability Distributions - II

Sub. Code : 49996

Day and Date : Wednesday, 16 - 12 - 2015 **Total Marks : 40**

Time : 12.00 noon. to 02.00 p.m.

Instructions : 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q1) Choose correct alternative : **[8]**

a) If $x \rightarrow N(a, b)$ then $p(x < a) =$ ________.

i) 0 ii) $\frac{1}{4}$

iii) $\frac{1}{2}$ iv) 1

b) If $x \rightarrow N(0, 1)$ then $E(4x^2 + 2x) =$ ________.

i) 2 ii) 4

iii) 6 iv) 8

c) ________ distribution is symmetric.

i) Normal ii) Gamma

iii) Chisquare iv) F

d) A Random Variable X take values in the range $(0, \infty)$.

Statement I : It may be gamma variate.

Statement II : It may be beta second kind variate.

i) I is true ii) II is true

iii) both are true iv) both are false

P.T.O

e) ________ distribution satisfy reciprocal property.

i) Normal ii) Gamma

iii) t iv) F

f) Let $X \rightarrow N(0, 2)$ and $Y \rightarrow N(0, 2)$. If X and Y are independent, X–Y has normal distribution with parameters ________

i) (0, 0) ii) (0, 1)

iii) (0, 2) iv) (0, 4)

g) If $X \rightarrow \beta_1(m, n)$ then probability distribution of $1 - X$ is ________

i) $\beta_1(m, n)$ ii) $\beta_1(n, m)$

iii) $\beta_2(m, n)$ iv) $\beta_2(n, m)$

h) Chi-square distribution is a particular case of ________ distribution.

i) normal ii) first kind beta

iii) gamma iv) second kind beta

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

a) Let $X \rightarrow N(\mu, \sigma^2)$. Obtain m.g.f. and c.g.f. of X. Hence obtain first four cumulants of X.

b) Define Chi-square variate with n d.f. and derive its p.d.f. using m.g.f.

c) Let $X \rightarrow r(\theta, n_1)$ and $Y \rightarrow r(\theta, n_2)$. If X and Y are independent, obtain probability distribution of $\frac{X}{Y}$.

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

a) State important properties of normal distribution.

b) State relationship between χ^2, t and F distributions.

c) Calculate H.M. of beta distribution of first kind.

d) If $X \rightarrow \beta_1(m, n)$, find probability distribution of $\frac{X}{1-X}$.

e) Find mean and variance of gamma distribution with parameters θ and n.

f) Obtain mean and mode of t distribution with n d.f.

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Total No. of Pages :3

Seat No.	

B.Sc. (Part-II) (Semester -IV) (Pre-revised) Examination, May - 2015

STATISTICS

Continuous Probability Distributions (Paper -VII)

Sub. Code: 49996

Day and Date : Friday, 22 - 05 - 2015 **Total Marks : 40**

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: **[8]**

a) Identify symmetric distribution.

i) $\beta_1(m, m)$ ii) $N(\mu, \sigma^2)$

iii) t_n iv) all of these

b) If X is a chi-square variate with n d.f., its second cumulant is ____________.

i) n ii) 2n

iii) log n iv) log 2n

c) If $X \to F(n_1, n_2)$ and $n_2 \to \infty$ then $n_1 X$ has __________ distribution.

i) chi-square ii) normal

iii) t iv) F

P.T.O.

d) A r.v. X take values in the range $(-\infty, \infty)$.

Statement I : It may be normal variate.

Statement II : It may be t variate.

i) I is true ii) II is true

iii) both are true iv) both are false

e) If X and Y are independent standard normal variates then X – Y has normal distribution with parameters.

i) (0, 0) ii) (0, 1)

iii) (1, 0) iv) (0, 2)

f) A r.v. X has m.g.f. $e^{10t+50t^2}$. Its probability distribution is ________.

i) $N(10,10)$ ii) $N(10, 10^2)$

iii) $N(50, 50)$ iv) $N(50, 10^2)$

g) Identify the distribution that satisfy reciprocal property.

i) t_n ii) $\beta_1(m,n)$

iii) $\gamma(\theta, n)$ iv) $F(n_1, n_2)$

h) If $X \rightarrow \beta_1(m,n)$ then $\frac{X}{1-X} \rightarrow$ ________.

i) $\beta_1(m,n)$ ii) $\beta_1(n,m)$

iii) $\beta_2(m,n)$ iv) $\beta_2(n,m)$

Q2) Attempt <u>any</u> <u>two</u> of the following: **[16]**

a) Let $X \rightarrow \gamma(\theta, n_1)$ and $Y \rightarrow \gamma(\theta, n_2)$. If X and Y are independent, show that $\frac{X}{X+Y} \rightarrow \beta_1(n_1, n_2)$.

b) Obtain mean, mode and median of normal distribution with parameters μ and σ^2.

c) Define t variate with n d.f. and derive its p.d.f.

Q3) Attempt <u>any</u> <u>four</u> of the following: **[16]**

a) Calculate H.M. of beta distribution of second kind.

b) Find mode of F distribution with n_1 and n_2 d.f.

c) If $X \rightarrow \beta_1(m, n)$, obtain probability distribution of $1 - X$.

d) State and prove additive property of gamma variates.

e) Obtain c.g.f. of normal distribution with parameters μ and σ^2.

f) State relationship between λ^2, t and F distributions.

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D-771

Total No. of Pages : 3

B.Sc. (Part - II) (Semester - IV) Examination, April - 2016
STATISTICS
Probability Distributions - II (Paper - VII)
Sub. Code : 63706

Day and Date : Thursday, 28 - 04 - 2016
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.

Q1) Choose the most correct alternative: **[10]**

a) If X ~ U (a,b) with mean 1 and variance 3 then________.

i) $a=-1, b=3$ ii) $a=-2, b=4$

iii) $a=0, b=2$ iv) $a=-3, b=5$

b) Exponential distribution is____________

i) Leptokurtic ii) Mesokurtic

iii) Platykurtic iv) None of these

c) If X ~ G (θ, n) then distribution of CX is________.

i) $G\left(\frac{\theta}{C}, n\right)$ ii) $G(\theta, n)$

iii) $G(C\theta, n)$ iv) $G(n, \theta)$

d) If $X \sim \beta_1(m,n)$ then distribution of Y= 1–X is ________.

i) $\beta_2(m,n)$ ii) $\beta_2(n,m)$

iii) $\beta_1(m,n)$ iv) $\beta_1(n,m)$

e) If $X \sim \beta_2(m,n)$ then mean of X is________.

i) $\frac{m}{n-1}$ ii) $\frac{n}{m-1}$

iii) $\frac{n-1}{m}$ iv) $\frac{m-1}{n}$

f) If $X \sim N(\mu,\sigma^2)$ then approximate value of mean deviation about mean is__________.

i) $\frac{2}{3}\sigma$ ii) $\frac{4}{5}\sigma$

iii) $\frac{3}{2}\sigma$ iv) None of these

g) If all odd ordered moments are zero then the distribution of X may be________.

i) normal ii) t

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

h) If $X \sim \chi_n^2$ then mgf of X is________.

i) $\left(1-\frac{t}{1/2}\right)^{-n}$ ii) $\left(1-\frac{t}{1/2}\right)^{\frac{-n}{2}}$

iii) $\left(1-\frac{t}{2}\right)^{-n}$ iv) $\left(1-\frac{t}{2}\right)^{\frac{-n}{2}}$

i) If $X \sim t_n$ with $n = 5$ then Var (x) is ________.

i) $\frac{3}{5}$ ii) $\frac{4}{3}$

iii) $\frac{3}{4}$ iv) $\frac{5}{3}$

j) If a r.v. X follows F distribution with $(6,n)$ d.f. with mean 2 then the value of n is________.

i) 2 ii) 3

iii) 4 iv) 5

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

a) Define chi-square variate with n d.f. and derive its pdf.

b) Define normal distribution with parameters (μ, σ^2). Find mean and median of the distribution.

c) Define exponential distribution with parameter θ. Obtain its cgf, hence find first four cumulants.

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

a) If $X \sim U(a,b)$ then find the distribution of $Y = \frac{X-a}{b-a}$.

b) If $X \sim G(\theta, n)$ then find variance of X.

c) If $X \sim \beta_1(m,n)$ find mean of X.

d) If $X \sim \beta_2(m,n)$ find variance of X.

e) If $X \sim t_n$ then find mode of X.

f) If $X \sim F(1, n)$ then show that $\sqrt{X} \sim t_n$.

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Seat No.	

B.Sc. (Part - II) (Semester - IV) Examination, May - 2017
STATISTICS (Paper - VII)
Probability Distributions - II
Sub. Code : 63706

Day and Date : Tuesday, 16 - 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 in the bracket indicate full marks.**
3) **Use of calculators and statistical tables is allowed.**

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

i) If X ~ U (a,b) then mean of X is ________.

a) (b-a)/2 b) $(b-a)^2/2$

c) (a+b)/2 d) none of these

ii) If X ~ exponential distribution with mean (1/θ) then mgf of X is ______.

a) $(1-t/\theta)^{-1}$ b) $(1-t/\theta)$

c) $(1-\theta/t)^{-1}$ d) $(1-\theta/t)$

iii) Gamma distribution is ________.

a) negatively skewed b) positively skewed

c) symmetric d) none of these

iv) If X ~ β_1 (4,2), then mode of X is ________.

a) 4/3 b) 3/5

c) 3/4 d) 5/3

v) If X ~ β_2 (m,n), then pdf of 1/X is __________.

a) β_1 (m,n) b) β_1 (n,m)

c) β_2 (m,n) d) β_2 (n,m)

vi) If X ~ N (μ,σ^2), then cgf of X is _______.

a) $(\mu t+\sigma^2 t^2/2)$ b) $(\mu t-\sigma^2 t^2/2)$

c) $(\mu t+\sigma^2 t^2)$ d) $(\mu t-\sigma^2 t^2)$

P.T.O.

vii) If $X \sim N(0,1)$, then the distribution of X^2 is ________.

a) χ^2 with 1 d. f.
b) G (1/2,1/2)
c) both (a) and (b)
d) none of these

viii) If $X \sim \chi^2$ with n d.f., then variance of X is ________.

a) n
b) 2n
c) 0
d) none of these

ix) If all odd ordered central moments are zero then the distribution may be ________.

a) Gamma
b) β_1
c) β_2
d) t

x) If $X \sim F(10,6)$ then mean of X is ________.

a) 2/3
b) 3/2
c) 5/3
d) 3/5

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

i) Define t distribution with n d.f. and derive its pdf.

ii) If $X \sim N(\mu,\sigma^2)$, then find the mgf of X, hence find mean and variance.

iii) Define gamma distribution with parameters (θ,n). Find γ_1 and γ_2 and comment.

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

i) If $X \sim U(a,b)$ then find the distribution of $Y = (b-X)/(b-a)$

ii) State and prove the lack of memory property of exponential distribution.

iii) If $X \sim \beta_1(m,n)$ then find $E(\sqrt{X})$

iv) State and prove the additive property of Chi-square distribution.

v) Find the mode of F distribution.

vi) State the important properties of normal probability curve.

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Seat No.	

C-737

Total No. of Pages : 3

B.Sc. (Part - II) (Semester - IV)
Examination, November - 2017
STATISTICS
Probability Distributions - II (Paper - VII)
Sub. Code : 63706

Day and Date : Friday, 24 - 11 - 2017 **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 the most correct alternative. **[10]**

a) If X ~ U (a,b) then mean of X is _______.

i) $\frac{a+b}{2}$ ii) $\frac{b-a}{2}$

iii) $\frac{(b-a)^2}{12}$ iv) None of these

b) If X ~ exp (1) then the distribution of $Y = e^{-x}$ is _______.

i) exp (1) ii) $\exp\left(\frac{1}{2}\right)$

iii) U (0,1) iv) U (0, 2)

c) If mgf of distribution of a continuous random variable is $(1-3t)^{-12}$ then the distribution of X is _______.

i) G (3, 12) ii) $G\left(\frac{1}{3},12\right)$

iii) G (12, 3) iv) $G\left(12,\frac{1}{3}\right)$

P.T.O.

d) If $X \sim \beta_1(m, n)$ then mean of X is _______.

i) $\frac{n}{m+n}$ ii) $\frac{m+n}{n}$

iii) $\frac{m+n}{m}$ iv) $\frac{m}{m+n}$

e) If $X \sim \beta_2(m, n)$ then distribution of $\frac{1}{X}$ is ________.

i) $\beta_1(m, n)$ ii) $\beta_1(n, m)$

iii) $\beta_2(n,m)$ iv) none of these

f) If $X \sim N(\mu, \sigma^2)$ then the distribution of $Y = \left(\frac{X-\mu}{\sigma}\right)^2$ is _______.

i) Y_1^2 ii) $G\left(\frac{1}{2},\frac{1}{2}\right)$

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

g) If $X \sim N(0, 1)$ then *cgf* of X is ______.

i) $e^{\frac{1}{2}t^2}$ ii) $\frac{1}{2}t^2$

iii) t iv) $t+\frac{1}{2}t^2$

h) If $X \sim X_n^2$ with $n = 5$ then mode of X is ________.

i) 3 ii) 4

iii) 5 iv) 6

i) t - distribution is ________.

i) symmetric ii) postively skewed

iii) negatively skewed iv) none of these

j) F- distribution is invented by ______.

i) G.W. snedecor

ii) R.A. Fisher

iii) W.S. Gosset

iv) none of these

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

a) Define t - variate with n d.f. and derive its pdf.

b) If $X \sim G(\theta, n_1)$, $Y \sim G(\theta, n_2)$ and X & Y are independent variates then show that

i) $U = X + Y$ & $V = \dfrac{Y}{X+Y}$ are independent.

ii) $U \sim G(\theta, n_1 + n_2)$

iii) $V \sim \beta_1(n_2, n_1)$

c) Define normal distribution with parameters (μ, σ^2). obtain its *mgf* and *cgf*

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

a) State important properties of normal probability curve.

b) If $X \sim U(a, b)$. Find mean & variance of X.

c) If $X \sim \beta_2(m, n)$, Find mode of X.

d) State and prove additive property of chi - square distribution.

e) State and prove lack of memory property of exponential distribution.

f) If $X \sim F(n_1, n_2)$. Find mode of X.

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Seat No.	

B.Sc. (Part-II) (Semester-IV) Examination, May - 2018
STATISTICS
Probability Distributions - II (Paper-VII)
Sub. Code : 63706

Day and Date : Wednesday, 16-05-2018 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

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

Q1) Choose the most correct alternative: **[10]**

a) If X ~ U (a, b) then Variance of X is _______.

i) $\frac{b-a}{2}$ ii) $\frac{a+b}{2}$

iii) $\frac{(b-a)^2}{2}$ iv) none of these

b) Exponential distribution is _________.

i) negatively skew ii) positively skew

iii) symmetric iv) none of these

c) If X ~ G (θ, n) then mode of X is _______.

i) $\frac{\theta}{n}$ ii) $\frac{n}{\theta}$

iii) $\frac{\theta}{n-1}$ iv) $\frac{n-1}{\theta}$

d) If X ~ β_1 (1, 2), then mean of X is ______.

i) $\frac{1}{3}$ ii) $\frac{2}{3}$

iii) $\frac{3}{4}$ iv) none of these

e) If $X \sim \beta_2\ (m, n)$, then distribution of $\left(\frac{1}{1+X}\right)$ is ______.

i) $\beta_1(m,n)$ ii) $\beta_1(n,m)$

iii) $\beta_2(m,n)$ iv) $\beta_2(n,m)$

f) The MGF of X is $e^{10t+50t^2}$ then its probability distribution is ________.

i) N(10, 100) ii) N(10, 10)

iii) N(10, 50) iv) N(0, 1)

g) If $X \sim N\ (0, 1)$, then the distribution of X^2 is ________.

i) χ^2 with 1 d.f. ii) G(1/2, 1/2)

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

h) If $X \sim \chi^2$ with n d.f., then variance of X is ______.

i) n ii) $2n$

iii) 0 iv) none of these

i) If $X \sim t$ distribution with n d.f. then X^2 follows _________.

i) χ_n^2 ii) t_{2n}

iii) F(1, n) iv) N(0, 1)

j) If $X \sim F\ (8, 6)$ then mean of X is ______.

i) $\frac{2}{3}$ ii) $\frac{3}{2}$

iii) $\frac{5}{3}$ iv) $\frac{3}{5}$

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

a) Define Chi-square distribution with n d.f. and derive its pdf.

b) Define Gamma distribution with parameters (θ, n). Find γ_1 and γ_2.

c) If $X \sim N(\mu, \sigma^2)$, then find cgf of X, hence find first four cumulants of X.

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

a) If $X \sim U\ (a, b)$ then find the distribution of $Y = \frac{X-a}{b-a}$.

b) Find median of exponential distribution.

c) If $X \sim \beta_2\ (m, n)$ then find $E\left(\frac{1}{X}\right)$.

d) Obtain the formula for even ordered central moments of t distribution.

e) Find the mean of F distribution.

f) If $X \sim \beta_1\,(m, n)$ then find mode of X.

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