Roll No. _____

SIVS-N-198-A-18
B.Sc. IVth Semester Degree Examination
Mathematical Statistics
(Sampling Distributions and Fortran Language)
Paper-IV(4.1)
(New)

Time : 3 Hours   Maximum Marks : 80

Instructions to candidates:
Statistical tables and graph sheets will be supplied on request.

SECTION-A

I.   Answer ALL the questions   (15×1= 15)

1)   With usual notations, the marginal p.d.f of X given by

a) $\int_x f(x,y)dx$ b) $\int_y f(x,y)dy$

c) $\int_x \int_y f(x,y)dxdy$ d)   none

2)   Two random variables X and Y are independent, if

a) $f(x,y) = f_1(x).f_2(y)$ b) $f(x,y) \neq f_1(x).f_2(y)$

c) $f_1(x) = \dfrac{f(x,y)}{f_2(y)}$ d)   none

3)   The p.d.f of Gamma distribution with parameter λ is

a) $\dfrac{1}{\sqrt{\lambda}} e^{-x} x^{\lambda-1}$ b) $\dfrac{1}{\lambda} e^{-x} x^{\lambda-1}$

c) $\dfrac{1}{\sqrt{\lambda}} \lambda^x x^{\lambda-1}$ d)   none

4)   Which of the following is true in chi-square distribution
a)   Mean =mode   b)   Mean<mode
c)   Mean= Variance   d)   Mean> Mode

5) Jacobian of transformation is a
   a) Square
   b) Rectangle
   c) matrix
   d) Determinant

6) Student's t-distribution is
   a) positively skewed
   b) Negatively skewed
   c) unskewed
   d) none

7) F-distribution was introduced by
   a) Fisher
   b) Snedecor
   c) W.S.Gosset
   d) P.V. sukhatme

8) The number of columns in a FORTRAN coding sheet is
   a) 32
   b) 64
   c) 72
   d) 80

9) A valid real constant in exponent form is
   a) -4.2E-8
   b) 8.0 E 2.8
   c) 3.4 E+568
   d) -64.8-E3

10) In FORTRAN an Inbuilt square root function is
    a) SQR
    b) SROOT
    c) SQRT
    d) None

11) The value of B(m,n) is ____

12) The m.g.f of chi-square variate with n d.f is ____

13) The square of a standard normal variate is a _____ variate with ____ degrees of freedom.

14) TEMPERATURE is an Invalid real variable name because ____

15) Before END statement, _____ statement should be there in a FORTRAN program

SECTION-B

II. Answer any **FIVE** questions.   (5× 5= 25)

16) If X and Y have the joint p.d.f $f(x,y) = \frac{1}{8}(6 - x - y); \ 0 \le x \le 2; \ 2 \le y \le 4,$ then, find

    a) The marginal p.d.f of X

    b) Conditional p.d.f of Y given X=x

17) Define Beta variate of first kind. Find its mean and variance

18) Derive the relation between t and F-distributions.

19) State week law of large numbers and interpret it.

20) Define F-variate. Derive its distribution

21) What is arithmetic expression? State its rules

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22) Write FORTRAN equivalents of following expressions

a) $v = ut + \dfrac{1}{2}at^2$

b) $\log(4x^2 + \sqrt{\sin x})$

c) $e^{|x|} - e^{|y|}$

d) $e^{4x^2} + \dfrac{9}{x^2}$

e) $a^2 + 3a^2b + b^3$

SECTION-C

III. Answer any **FOUR** questions. (4× 10= 40)

23) If x_1^2 and x_2^2 are independent x^2-variates with n_1 and n_2 d.f respectively then show

that $U = \dfrac{x_1^2}{x_1^2 + x^2}$ and V= $x_1^2 + x_2^2$ are independently distributed, U as $B_1(\dfrac{n_1}{2}, \dfrac{n_2}{2})$

variate and V as a x^2 - variate with $(n_1 + n_2)$ d.f.

24) Derive the limiting form of t-distribution

25) Define Beta distribution of second kind with parameters (μ, ν). show that

a) $\mu_r^1 = \dfrac{\sqrt{\mu} + r}{\sqrt{\mu}} \dfrac{\sqrt{\nu} - r}{\sqrt{\nu}}$

b) $H = \dfrac{\mu - 1}{\nu}$

26) With usual notations in F-distribution, deduce

$$\mu_r{}^1 = \left(\dfrac{n_2}{n_1}\right)^r \dfrac{\sqrt{\dfrac{n_1}{2} + r} \; \sqrt{\dfrac{n_2}{2} + r}}{\sqrt{\dfrac{n_1}{2}} \; \sqrt{\dfrac{n_2}{2}}}$$

Hence, Find the mean and variance.

27) Describe briefly the types of constants and variables in FORTRAN.

28). Draw flow chart and write a FORTRAN program to compute correlation coefficient.

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