Total No. of Pages: 2

Register Number: 5428

Name of the Candidate:

B.Sc. DEGREE EXAMINATION – 2011

(STATISTICS)

(DOUBLE DEGREE)

(THIRD YEAR)

(PART – III)

720. DISTRIBUTION THEORY

December) (Time: 3 Hours

Maximum: 100 Marks

SECTION - A

Answer any EIGHT questions. $(5 \times 8 = 40)$

1. Define distribution function and give its properties.
2. State conditional distribution function and conditional density function.
3. Define moment generating function and state its limitations.
4. Find the distribution function whose characteristic functions is $f(t) = (q + p\, e^{it})^n$.
5. Obtain MGF of Binomial distribution and deduce its mean and variance.
6. Define Geometric distribution. Show that the conditional distribution of $\frac{x_1}{(x_1 + x_2 = n)}$ is discrete uniform
7. Define uniform distribution and obtain its mean deviation about mean.
8. Obtain the mean and variance of Beta distribution of first kind.
9. State and prove additive property of chi-square distribution.
10. Define student's 't' statistic. Give its applications.

SECTION - B

Answer any THREE questions. $(3 \times 20 = 60)$

11. (i) Explain with example:
    (a) Independent random variables.
    (b) Probability density function.
    (c) Joint probability mass function.
    (ii) If x and y are two random variables having joint density function

$$f(x,y) = \begin{cases} k(6 - x - y), & 0 < x < 2 \;;\; 2 < y < 4 \\ 0, & \text{otherwise} \end{cases}$$

Find a) k; b) $P(x < 1 \cap y < 3)$; c) $P(x<1/y<3)$.

12. (i) Establish the relation between cumulants and moments.
    (ii) State and prove uniqueness theorem of characteristic functions.

13. (i) Derive the central moments of Poisson distribution.
    (ii) Obtain moment generating function of Negative Binomial distribution and also its cumulant, generating function. Deduce moments, b and g coefficients.

14. (i) Define exponential distribution and obtain its moment generating function. Deduce the mean and variance.
    (ii) If x and y are independent Gamma variates with parameters m and g respectively, show that u = x+y and v = $\frac{x}{x+y}$ are distributed as g(m+n) and b_1(m,g) respectively.

15. (i) Define F statistic and obtain its mean, mode and variance.
    (ii) Derive the probability density function of chi-square distribution.

%%%%%%