K15U 0338

Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree (CCSS – 2014 Admn. – Regular) Examination, November 2015

COMPLEMENTARY COURSE IN STATISTICS FOR GEOGRAPHY AND PSYCHOLOGY

3C03 STA (G & P) : Probability and Distribution Theory

Time : 3 Hours Max. Marks : 40

PART – A

(Short answer)

Answer **all** the **6** questions : **(6×1=6)**

1. Define probability mass function.
2. Define complement of an event. Give an example.
3. If A and B are mutually exclusive events P(A) = 0.3, P(B) = 0.4, find
   i) $P(A \cup B)$ ii) $P(A' \cap B)$
4. Define Students t distribution.
5. State any three properties of a distribution function.
6. Define Chi-square distribution.

PART – B

(Short Essay)

Answer **any 6** questions : **(6×2=12)**

7. What are the properties of normal distribution ?
8. Write the relationship between the normal and Chi-square distribution.

P.T.O.

9. If A and B are independent, show that $P(A)\,P(B) \leq P(A) + P(B)$.

10. A balance coin tossed twice. What is the probability of getting at least one head ?

11. Show that $P(x) = \frac{x}{15}$; for $x = 1, 2, 3, 4, 5$; otherwise is a probability function.

12. Define random variable and give one example.

13. State Bayes theorem.

14. If $0 < p < 1$; and

x	– 1	0	1
P(x)	p	1 – 2p	P

Find the mathematical expectation of x.

PART – C
(Essay)

Answer **any 4** questions : **(4×3=12)**

15. If x is a normal variate with mean 30 and variance 9. Find the probabilities :
    i) $P(26 \leq x \leq 40)$
    ii) $P(x \leq 45)$.

16. What is Snecodors F statistic and F distribution ?

17. Derive the moment generating function of binomial distribution.

18. State and prove addition theorem of probability.

19. Find the distribution of the total no. of heads obtained in 3 tosses of a balanced coin.

20. Derive the sampling distribution of sample mean.

PART – D
(Long Essay)

Answer **any 2** questions : **(2×5=10)**

21. Urn A contains 2 white and 2 black balls. Urn B contains 1 white and 3 black balls. One urn is chosen at random and one red ball is drawn. Find the probability that the ball comes from urn B.

22. a) Briefly explain the inter relationships between chi, f, t distributions.

    b) Write the uses of chi square distribution.

23. Four unbiased coins are tossed and number of heads noted. The experiment repeated 30 times and the following distribution is obtained :

x	0	1	2	3	4
Frequency	4	5	10	9	2

    Fit a binomial distribution and find expected frequencies.

24. Define exponential distribution. State and prove the lack of memory property of exponential distribution.
