Reg. No. : ....
Name : ....

III Semester B.Sc. Degree (CBCSS - Reg./Suppl./Imp.) Examination,
November - 2019
(2014 Admn. Onwards)
COMPLEMENTARY COURSE IN STATISTICS FOR
GEOGRAPHY/PSYCHOLOGY CORE
3C03STA:PROBABILITY AND DISTRIBUTION THEORY
(use of calculators and statistical tables are permitted)

Time : 3 Hours

Max. Marks : 40

PART-A

(Short Answer)

Answer **all** the questions.

(6×1=6)

1. Define a sample space and give an example.

2. State the properties of probability density function(pdf).

3. Define the distribution function of a continuous random variable.

4. Define a Poisson distribution.

5. State any two properties of Normal distribution.

6. Write down the mean and variance of a chi-square distribution with n degrees of freedom.

PART-B

(Short essays)

Answer any **six** questions.

(6×2=12)

7. Given $P(A) = \frac{1}{3}, P(B) = \frac{1}{2}$ and A and B are independent events. Find $P(A \cap B)$ and $P(A/B)$.

8. Two unbiased dice are thrown. What is the probability of getting at least one head?

9. State the axiomatic definition of probability.
10. Define expectation of a random variable both in discrete and continuous cases.
11. Find the constant k, if X has the following probability mass function (p.m.f)

X	0	1	2	3	4	5	6
P(X=x)	0.1	0.2	2k	0.1	0.3	0.1	3k

12. Find the mean of the binomial distribution.
13. Find the mean of X if P(X=0)=P(X=1) and X follows Poisson distribution.
14. What do you mean by a sampling distribution? Give an example.

PART-C
(Essays)

Answer any **four** questions. $(4 \times 3=12)$

15. If A and B are any two events prove that $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.
16. Distinguish between discrete and continuous random variable. Give one example for each.
17. Find the mean and variance of Poisson distribution.
18. Show that exponential distribution possesses the lack of memory party.
19. If X follows Normal distribution with mean 20 and variance 25, find the probabilities

    a) $P(12 \le X \le 18)$ and b) $P(X \le 10)$.

20. State any four applications of chi-square distribution.

PART-D
(Long essays)

Answer any **two** questions. $(2 \times 5=10)$

21. State and prove Bayes theorem.

22. If $f(x) = \frac{1}{5}$ where x=1,2,3,4,5, is it a probability mass function? Also find $P(X<3)$ and $P(X \ge 2)$.

23. Fit a Poisson distribution to the following data:

No.of emergency admissions in a day	Number of days(frequency)
0	122
1	60
2	15
3	2
4	1

24. Derive the sampling distribution of the sample mean when a random sample of size n is taken from $N(\mu, \sigma^2)$.

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