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The Assam Royal Global University, Guwahati

Royal School of Information Technology

BCA/B.Sc. (IT) 5th Semester

Special Supplementary Examination, August 2024

Course Title: Introduction to Probability and Statistics

Course Code: CAP052C501/INT052C501

Time: 3 Hours **Maximum Marks: 70**

Note: Attempt all questions as per instructions given.

The figures in the right-hand margin indicate marks.

SECTION – A

1. Answer the following questions: **2 × 8**

a. Give two examples of uses of means.

b. Find the IQR of the series: 5,3,7,13,10,20,17,14,23,27,29,30,33,35.

c. A die is thrown. Write the probability distribution of the outcome.

d. A random variable X follows binomial probability distribution with mean 4 and variance is 9, write f(x).

e. If the population standard deviation is σ, then what will be the standard error of sample mean $\bar{x}$?

f. Distinguish between point estimation and interval estimation.

g. Point out any two assumptions for performing an ANOVA?

h. Which test is applicable to test the significance of an observed sample correlation and what is its degrees of freedom?

SECTION-B

2. Answer any two of the following: **6 × 2**

a. Find the standard deviation of the following data:

Age:	10	20	30	40	50	60	70	80
No. of participants:	5	9	12	16	15	12	8	2

b. A card is drawn at random from a well-shuffled pack of cards. Find the probability of getting (i) a face card (ii) either a spade or a king card.

c. 30 apples are marked from 1 to 30. An apple is drawn at random. Find the probability that the number on the apple is a multiple of either 4 or 5.

P.T.O.

3. **Answer any two of the following:** 7×2

a. The probability density function of a continuous random variable X is given as $f(x) = k(x-1)(2-x),\ 1 \leq x \leq 2$. Find $(i)\ k\quad (ii)\ P\left(\frac{5}{4} \leq x \leq \frac{3}{2}\right)$.

b. For a binomial distribution $n = 10\ and\ p = \frac{1}{2}$. Find $P(X = 3) and\ P(X > 1)$.

c. A cardiologist studied the pattern of cholesterol level in a large group of patients and found that the mean level was 165 with standard deviation of 5.9. What is the probability that a patient selected at random will have a value (i) higher than mean level (ii) between 165 and 175? $[Given: P(z > 0) = 0.5, P(0 < z < 1.69) = 0.4545]$

4. **Answer any two of the following:** 7×2

a. A population consists of five numbers 2, 3, 6, 8, 11. Consider all possible samples of size two which can be drawn with replacement from its population. Find the standard error of means of these samples.

b. Show that the sample mean is an unbiased estimator of the population mean.

c. Show that in a random sample from a normal population sample mean is a consistent estimator of the population mean.

5. **Answer any two of the following:** 7×2

a. Obtain the regression lines from the following:

X	15	18	15	14	12	11
Y	42	62	52	72	82	92

b. The yields per acre of corn are given below:

Plot	Variety Yields in fields per acre	
	A	B
P	20	25
Q	22	19
R	12	19

State whether the difference between the yields of two varieties is significant taking 7.71 as the table value of F at 5% level for v1 = 1 and v2 = 4.

c. A random sample of 27 pairs of observations from a normal population gave r = 0·6. Test whether 'r' is significant if $t_{0.05}(25) = 2.06$.