SEAT No._____ No. of Printed Pages: 3

[3/A-I]

SARDAR PATEL UNIVERSITY
B.Sc. Semester-IV Examination
Tuesday, 11th October,2022
Time:-12:30 P.M. to 02:30 P.M. Paper Code:- US04FSTA01 M.Marks:70
Subject:-Foundation of Statistics-II
Note:- Simple/Scientific calculators are allowed. Statistical Table is allowed.

Q.1. Multiple Choice Questions: - [10]

1 A _____ tells us the amount and direction of relationship between two variables.
(a) regression coefficient (b)Variance (c) correlation coefficient (d) none of these

2 A negative correlation is present when _____.
(a) two variables move in opposite directions.
(b) two variables move in the same direction.
(c) one variable goes up and one goes down
(d) several variables never change.

3 The line $Y = 20 + 9X$ represents the regression equation of_____.
(a) X on Y (b) Y on X (c) both (d)None of these

4 If X is the number of successes in an independent series of 20 Bernoulli trials, then X has a _____ distribution.
(a) normal (b) Poisson (c) Binomial (d) None of these

5 The number of defective parts in a lot of 30 parts is an example of _____.
(a) a discrete random variable (b) a continuous random variable
(c) a constant (d) (a) and (b)

6 If X is $b(n = 8, p = 1/2)$, the mean of X is_____.
(a) 6 (b) 4 (c) 2 (d)1.414.

7 Which of the following is not correct about a standard normal distribution?
(a) $P(0 \leq Z \leq 1.50) = 0.4332$ (b) $P(Z \geq 2) = 0.0228$
(c) $P(Z \geq -2.5) = 0.4938$ (d) $P(Z \leq -1) = 0.1587$

8 A standard normal distribution is a normal distribution
(a) with a mean of 1 and a standard deviation 0
(b) with any mean and any standard deviation
(c) with a mean of 0 and any standard deviation
(d) with a mean of 0 and standard deviation of 1

9 The area under the normal curve between z = 0 and z = 1 is _____the area under the normal curve between z = 1 and z = 5.
(a) < (b) > (c) = (d) none of these

10 When testing for independence in a contingency table with 6 rows and 5 columns, there are _____ degrees of freedom.
(a) 6 (b) 7 (c)20 (d)5

Q.2. Fill in the blanks: - [08]

1 If one of the regression coefficient is 1/2 than other must begreater than _____.

2 The number of arrivals per hour at an automatic teller machine is Poisson distributed with a mean of 3.5 arrivals/hour. _____ is the probability that more

(P.T.O.)

than two arrivals occur in an hour.

3 The shape of the Normal curve is _____ shape.

4 _____values cannot occur in a chi square distribution

State whether the following are True or False.

5 The correlation coefficient between X and Y is 5.

6 The mean and variance of Poisson distribution are equal.

7 For Normal distribution mean= median=mode.

8 For testing for independence in a 2x2 contingency table d.f. is 4.

Q.3 Short Questions: - (Attempt any Ten) [20]

1 Give two examples each of
(i) Positive correlation (ii) Negative correlation

2 Define correlation coefficient. State its limits and interpret them.

3 What is regression?

4 A random variable X follows Poisson distribution with parameter 3. Find $P(X \geq 1)$.

5 A multiple choice test has 20 questions, with each question having 5 possible answers. Suppose a student randomly guesses the answer of each question. What is the probability that the student will answer all 20 questions correctly

6 In a binomial distribution consisting of 5 independent trials, probability of 1 and 2 successes are 0.4096 and 0.2048 respectively. Find the parameters of the distribution.

7 Define Poisson Distribution. State situations where Poisson distribution can be used.

8 Define Normal distribution. State its Parameters.

9 State the Properties of Normal distribution.

10 Find the area under the standard normal curve for the following, using the z-table. Sketch each one.

(a) between $z = 2$ and $z = 2.5$

(b) between $z = -0.56$ and $z = 0$

11 Interviews with 185 persons engaged in a stressful occupation reveal that 76 were alcoholics, 81 were mentally depressed and 54 were both.
(a)Present the above data in the two-way frequency table (b) State its objective(s) (c) Which statistical test would you prefer to the said objective(s).

12 Write in brief on chi square test in a 2×2 contingency table.

Q.4. Long Questions: - (Attempt any four) [32]

1 State the method for studying correlation coefficient. The table below gives 10 successive days .

X	74	75	75	74	71	65	49	51	56	69
Y	4.64	4.58	4.67	4.60	4.83	4.55	5.14	4.71	4.69	4.65

Calculate r, the correlation coefficient. Comment on it.

2 In an experiment the number of grams of a given salt which dissolved in 100 gm of water was observed at eight different temperatures.

Temp.(^{0}c)	0	10	20	30	40	50	60	70
Weight of salt	51.5	61.5	67.2	72.6	73.5	82.2	83.5	88.0

Find the regression equation which could be used to predict the weight of salt given the temperature. Predict the weight of salt which would dissolve at temperatures (i) 35^0c (ii) 45^0c.

3 The mean and variance of a binomial distribution are 4 and 2 respectively. Find $(a)P(X = 0)(b)P(X \leq 2)(c)P(X > 3)(d)P(2 \leq X \leq 5)(e)P(2 < X \leq 5)$

4 A random variable X follows Poisson distribution with mean 5. Find (a)P(X=1) (b) P($X \leq 2$) (c) P(X≥ 1) $(d)P(2 \leq X \leq 4)$.(e) P(X=3) (f)P($1 \leq X \leq 3$)(g)P(X≥ 3)

5 Let X be a normal random variable with mean 10 and standard deviation 4, determine the following probabilities (i) $P(X \leq 7)$ (ii) $P(12 \leq X \leq 15)$ (iii) $P(X \geq 8)$(iv) P(X≥13). Also sketch the area.

6 It was found that the mean length of 100 parts produced by a lathe was 20.05 mm with a standard deviation of 0.02 mm. Find the probability that a part selected at random would have a length

(a) between 20.03 mm and 20.08 mm

(b) between 20.06 mm and 20.07 mm

(c) less than 20.01 mm

(d) greater than 20.09 mm.

7 1000 families were selected at random in a city to test the belief that high income families usually send their children to public schools and the low income families often send their children to government schools. The following results were obtained:

Income	School	
	Public	Govt.
Low	370	430
High	130	70

Test whether income and type of schooling are independent.

8 From the following data find out whether there is any relationship (association) between gender and preference of colour.

Colour	Gender	
	Male	Female
Red	10	40
White	70	30
Green	30	20

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