

PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCE
M.Sc., Winter 2019-20 Examination

Semester: 3
Subject Code: 11206204
Subject Name: Statistical Methods

Date: 03/12/2019
Time: 02:00 pm to 04:30 pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. A) Answer the following questions (Each of 04 marks) (08)

- (a) The probability that a college student will graduate is 0.4. Determine that probability that out of 5 students (a) none (b) exactly one (c) at least one will be graduate.
- (b) Assume the mean height of soldiers to be 68.22 inches with a variance of 10.8 inches. How many soldiers in a regiment of 1000 would you expect is be over six feet tall?

Q.1. B) Answer the following questions (Any two)

- (a) Find mean of Binomial Distribution. (04)
- (b) The first four moments of a distribution about $x=2$ are 1, 2.5, 5.5 and 16. Calculate the four moments about \bar{X} . (04)
- (c) You are given the following data: (04)

	X	Y
Arithmetic Mean	36	85
Standard Deviation	11	8
Correlation between X and Y	0.66	

Find two regression lines.

Q.2. A) Answer the following questions.

- (a) Short note (Each of 02 marks) (04)
 1. Correlation
 2. Hypothesis
- (b) Compute Spearman's rank correlation for the following observations, (04)

Judge X	20	22	28	23	30	30	23	24
Judge Y	28	24	24	25	26	27	32	30

Q.2. B) Answer the following questions. (Any two)

- (a) A coin was tossed 400 times and the head turned up 216 times. Test the hypothesis that the coin is unbiased. (03)
- (b) It is 3% of electric bulbs manufactured by company are defective. Using the Poisson distribution, find the probability that a sample of 100 bulbs will contain (a) no defective (b) exactly one defective (03)
- (c) Define Normal Distribution. (03)

Q.3. A) Answer the following questions

- (a) In an experiment of immunization of cattle from tuberculosis the following results were obtained. (04)

	Affected	Not affected
Inoculated	12	16
Not inoculated	16	6

Calculate χ^2 and discuss the effect of vaccine in controlling susceptibility of tuberculosis. (the value of chi square test at 5% and 1dof is 3.84)

- (b) The manufacture of a certain make of electric bulbs claims that his bulbs have a mean life of 25 months with a standard deviation of 5 months. A random sample of 6 such bulbs gave the following values, life of the months 24,26, 30, 20, 20, 18. Can you regard the producer's claim to be valid at 1% level of significance. The appropriate test statistics is 4.032 at 5 degree of freedom. (04)

Q.3. B) Answer the following questions.

(a) In hospital 480 female and 520 male babies were born in a week. Do these figures confirm the hypothesis that males and females are born in equal number? (04)

(b) Mean of the Binomial distribution is 20 and SD is 4 then find the values of p, q, n. (04)

Q.4. A) Answer the following questions.

(a) The following table shows the number of customers returning the products in a marketing territory. The data is for 100 stores: (06)

No. of returns	0	1	2	3	4	5
No. of stores	4	14	23	23	18	9

Fit a Poisson Distribution.

(b) Explain Statistical Quality Control. (02)

Q.4. B) Answer the following questions.

(a) Give the statement of central limit theorem. (06)

(b) Define Markov' s chain.

(c) Define Chebyshev' s inequality.