PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCE
M.Sc. Winter 2018-19 Examination

Semester: 3   **Date: 30/10/2018**
Subject Code: 11206204   **Time: 10:30 am to 1:00 pm**
Subject Name: Statistical Methods   **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) A manufacturing firm produces steel pipes in three plants with daily production volumes of 500,1000 and 2000 units respectively . According to past experience, it is known that the fraction of defective outputs produced by three plants are 0.05, 0.08 and0.01. If a pipe is selected from a day's total production and found to be defective. What is the probability that it came from the first plant.

(b) The mean weight of 500 male students in certain college is 151 lb and standard deviation is 15 lb. Assuming weight are normally distributed find how many students weight (a) between 120 lb and 155 lb. (b) more than 185 lb.

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

(a) The probability that an evening college students 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.   **(04)**

(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.   **(04)**

(c) The probability that A speaks the truth is 0.6 and the probability that B Speaks the truth is 0.7. They both agree about a statement. Find the probability that the statement is true.   **(04)**

Q.2. A) Answer the following questions.

(a) A sample of 100 tyres is taken from a lot. The mean life of tyres is found to be 39350 kms with population standard deviation of 3260 kms. Could the sample from a population with mean life of 40,000? Establish a 99% confidence limits within which the mean life of tyres is expected to lie.   **(04)**

(b) 10 workers are selected at random from a large number of workers in factory. The number of item produced by them on a certain day are found to be 51, 52, 53, 55, 56, 57, 58, 59, 60, 59   **(04)**

In the light of this data, would it be appropriate to suggest the mean of number of items produced in the population 58?

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

(a) Fill in the blank.   **(03)**
   1. The range of coefficient of correlation is _____.
   2. If Null hypothesis is false but during the testing of hypothesis, Null hypothesis is accepted such type of error is known as _____.
   3. Number of defects in the same unit is represented by _____ charts.

(b) Write difference between variable chart and attribute chart.   **(03)**
(c) List the different methods of sampling and discuss any of one.   **(03)**

Q.3. A) For a random sample of 10 person, fed on diet A, the increased weight in pounds were: **(08)**
10, 6, 16, 17, 13, 12, 8, 14, 15, 9

For another random sample of 12 persons, fed on diet B, the increased weight in same period were:
7, 13, 22, 15, 12, 14, 18, 8, 21, 23, 10, 17

Test whether the diets A and B differ significantly as regards their effect on increase in weight.

Q.3. B) Answer the following questions (Any two)

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

	Affected	Not affected
Inoculated	12	16
Not inoculated	16	6

Calculate χ^2 and discuss the effect of vaccine in controlling susceptibility of tuberculosis.

(b) Two random samples were drawn from two normal population and their values are **(04)**

A:	66	67	75	76	82	84	88	90	92		
B:	64	66	74	78	82	85	87	92	93	95	97

Test whether two populations have the same variance at 5% level of significance.

(c) Calculate coefficient of correlation from the following data: **(04)**

X:	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Y:	0.30	0.29	0.29	0.25	0.24	0.24	0.24	0.29	0.18	0.15

Q.4. A) Develop the analysis of variance computations for the following completely randomized design. **(08)**
At $\alpha = 0.5$, is there a significant difference between the treatment means?

A	B	C
136	107	92
120	114	82
113	125	85
107	104	101
131	107	89
114	109	117
129	97	110
102	114	120

Q.4. B) Answer the following questions (Any one)

(a) The amount of chemical compound y, which were dissolved in 100 grams of water at **(06)**
various temperatures, x were recorded as follows:

X (^{0}C)	15	15	30	30	45	45	60	60
Y (grams)	12	10	25	21	31	33	44	39

Find the regression lines using above data.

(b) The lengths of axis of ball bearings of Atlas cycle are given below. In each sample the lengths **(06)**
of four bearings are measured draw $\bar{X}$ chart and R chart.
(For n=4, A_2=0.73, D_3=0, D_4=2.28)

Sample no.	Length of axis (in c.m.)			
1	27	29	24	15
2	31	26	34	35
3	32	46	30	32
4	35	20	34	46
5	55	25	33	54
6	22	46	52	42
7	14	24	32	43
8	36	52	19	50
9	29	21	17	29
10	33	31	32	18
11	52	34	17	25
12	23	41	21	29
13	28	22	45	21
14	32	27	16	30
15	23	23	27	36