UKA TARSADIA UNIVERSITY
Maliba Pharmacy College
B. Pharm 2ⁿᵈ Semester Internal Examination April-May 2013
030020205 - Biostatistics

Time: 10:00 a.m. To 1:00 p.m.   Max. Marks: **70**
Date: 04/05/2013
Instructions:
> ➢ Question no. **1** is compulsory.
> ➢ From Q.2 to Q.7 attempt any **four** questions.
> ➢ Make suitable assumption whenever necessary.
> ➢ Figures to the right indicate full marks.

Q.1   **(a)**   **Answer the following: (any six)**   **06**
  1   Define : Statistical Hypothesis
  2   What is Chi-square test?
  3   What is rank correlation?
  4   What is Type-I error?
  5   Enlist Nonparametric tests.
  6   Explain the terms of Degree of Freedom.
  7   What is double blind study?
  8   Define: F-Test

  (b)   **Describe in brief: (any four)**   **08**
  1   What is x chart? How are the control limits determined while drawing this chart?
  2   Differentiate between Process & Product control.
  3   Describe Cross over designs.
  4   Find r_{xy} from following data:

  $$n=10, \quad \sum(x-\bar{x})(y-\bar{y})=1650, \quad \sigma_x^2=196, \quad \sigma_y^2=225$$

  5   What is scattered diagram? How do interpret scattered diagram?
  6   When sign test is used and what are its limitations?

Q.2   **(a)**   Discuss type of distributions with examples.   **04**
  (b)   A sample of 200 persons with a particular disease was selected. Out of these, 100 were   **05**
        given a drug and the others were not given any drug. The results are as follows.

	Drug	No drug
Cured	65	55
Not cured	35	45
Total	100	100

  Test, whether the drug is effective or not apply χ^2 test.

  (c)   Populations consist of 5 numbers 2, 3, 6, 8, 11. Consider all possible size of two which can   **05**
        be drawn with replacement from this population. Calculate the standard error of sample
        mean.

Q.3   **(a)**   Enlist various methods of sampling and explain their merits and demerits.   **04**
  (b)   Ten competitions in a musical test were ranked by the three judges in the following order.   **05**

Judge-1	1	6	5	10	3	2	4	9	7	8
Judge-2	3	5	8	4	7	10	2	1	6	9
Judge-3	6	4	9	8	1	2	3	10	5	7

  Use the method of Rank correlation to determine which pair of judged has the nearest
  approach to common linking in music.

  (c)   Find the correlation coefficient between the serum diastolic B.P. and serum cholesterol   **05**
        levels of 10 randomly selected data of 10 persons.

Person	1	2	3	4	5	6	7	8	9	10
Cholesterol	307	259	341	317	274	416	267	320	274	336
Diastolic BP	80	75	90	74	75	110	70	85	88	78

Q.4 (a) The two regression equations of the variables x and y are x=19.13 - 0.87y and y=11.64 – 0.50x. find **04**

    i) Mean of x's and y's.

    ii) The correlation coefficient between X and Y.

(b) Two samples of size 8 and 7 give the sum of squares of deviations from their respective means equal to 34 and 24 respectively. Test the hypothesis that the populations have the same variance given that $F_{0.05} = 4.2$ for (7, 6) degree of freedom. **05**

(c) What is chi-square distribution? Describe the uses of chi-square test? **05**

Q.5 (a) From the following data calculate two equations of line of regression. **04**

	X	Y
Mean	60	67.5
Standard deviation	15	13.5

Correlation coefficient between X and Y is 0.50. Also estimate the value of Y for X=72 using the appropriate equation.

(b) A tea company appoints four salesmen A, B, C. D, and observes their sales in three seasons-summer winter and monsoon. Perform Two-Way ANOVA the figures are in the following table: **05**

Season	A	B	C	D	Total
Summer	36	36	21	35	128
Winter	28	29	31	32	120
Monsoon	26	28	29	29	112
Totals	90	93	81	96	360

    A) Do the salesmen significantly differ in performance?

    B) Is there significant difference between the between the seasons?

(c) Write a note on: a) bar diagram b) Pie diagram **05**

Q. 6 (a) Distinguish between simple random sampling and stratified random sampling. **04**

(b) Construct x charts from the following data and state your conclusion. **05**

Sample no.	Observations
1	20, 22, 25,24
2	18, 23, 20, 26
3	24, 25, 22, 20
4	23, 21, 26, 24
5	24, 25, 24, 21
6	20, 22, 23, 25
7	18, 23, 22, 26
8	23, 20, 25, 25
9	20, 22, 26, 24
10	19, 22, 24, 23

(c) Eight items of a sample have the following values: 47, 50, 52, 48, 47, 49, 53, 51. Does the mean of the 8 observations differ significantly from the assumed population mean of 48? Use 5% level of significance. **05**

Q.7 (a) Explain the terms regression and state the difference between regression and correlation. **04**

(b) For studying some characteristics of a population observation of the population are 5, 9, 11, 19. Taking all possible samples of size 2 without replacement from the population verify the following. **05**

    1) $E(\bar{y}) = \bar{Y}$ 2) $E(s^2) = s^2$ 3) $V(\bar{y}) = (\frac{N-n}{N})\frac{s^2}{n}$

(c) A sign test of the effectiveness of a safety program. The following are the average weekly losses of worker –hours due to accidents in the industrial plants before and after a certain safety program were put into operation. **05**

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Use the sign test at the 0.05 level of significance to the test whether the safety program is effective.