

LIHMR UNIVERSITY
School of Pharmaceutical Management
MBA Pharmaceutical Management
Batch-08 (2016-2018) First Year



Bio-Statistics
Term Examination

Time - 3 Hour

MM-70

The question paper contains 4 printed pages.

Note:

1. Kindly attach the question paper with the answer sheet at the time of submission of answer sheet.
2. All sections are compulsory.
3. Marks are indicated against each question.

Section-A

Kindly tick (✓) against the correct option.

(4 x 1 mark = 4 marks)

- i. In which of the following charts, the rectangular bars touch each other:
 - a. In Bar and Histogram both
 - b. In Bar chart only
 - c. In Histogram only
 - d. None of both
- ii. Mean value of weight of a group of 10 boys was found to be 18.2 kg. Later it was found that weight of one of the boys was wrongly recorded as 2 kg that should have been 20 kg. The true mean weight of the group is:
 - a. 18.2 kg
 - b. 20.2 kg
 - c. 16.4 kg
 - d. 20 kg
- iii. If N is total observations and k is number of observations in a class, the angle for this class is given by:
 - a. $(360 \times k)/N$
 - b. $(360 \times N)/k$
 - c. $(N \times k)/360$
 - d. $(360)/(N \times k)$
- iv. In a 3 x 4 contingency table, the number of degrees of freedom equals to:
 - a. 1
 - b. 5
 - c. 6
 - d. 12

Kindly fill in the blanks for the following:

(3 x 1 mark = 3 marks)

- v. Pearson's coefficient of correlation lies between
- vi. If the grading of diabetes is classified as "mild", "moderate" and "severe" the scale of measurement used is
- vii. For large degrees of freedom, the distribution becomes almost a distribution

Kindly write True or False against the statement.

(3 x 1 mark = 3 marks)

- viii. We calculate z-scores, subtract the standard deviation and divide by the median
- ix. With increasing degree of accuracy, the sample size increases
- x. Association between an employee's performance level and his job satisfaction could be tested by doing t-test

Section-B

Define any four from the following:

(4 x 2.5 marks = 10 marks)

- a. Use of Biostatistics in pharmaceutical field
- b. Levels of measurement (Types of scale)
- c. Describe mean with its merits and demerits
- d. Two types of errors in hypothesis testing
- e. Normal distribution
- f. Steps followed in testing of hypothesis
- g. Chi-squared test

Section-C

Attempt any five of the following:

- 1) Following are the measurements of 20 persons blood pressure:

100	98	101	94	84
85	104	99	92	106
108	112	94	108	104
110	92	100	101	102

Summarize the major features of the above data set by calculating:

- a. The mean (2.5 marks)
 - b. The median (2.5 marks)
 - c. The standard deviation (2.5 marks)
 - d. The coefficient of variation (2.5 marks)
- 2) The Hb level in healthy women has mean 13.5 g/dl and standard deviation 1.5 g/dl, what is the probability for a woman selected randomly will have Hb level:
- a. Greater than 15 g/dl (3 marks)
 - b. Less than 12 g/dl (3 marks)
 - c. Between 11 g/dl and 14 g/dl (4 marks)

- 3) What is the probability for the following, if the probability of cure after taking antibiotic is 0.75 and number of patients is 4:
- No patients are cured (2 marks)
 - One patient is cured (2 marks)
 - Two patients are cured (2 marks)
 - Three patients are cured (2 marks)
 - Four patients are cured (2 marks)

- 4) Ten individual tablets are assayed according to a quality control specification. The 10 assay results are as follows:
101.8 102.6 99.8 104.9 103.8 104.5 100.7 106.3 100.6 105.0
The 10 assay results are assumed to be sampled from normal distribution. Construct 95% and 99% confidence interval for the true batch mean. (10 marks)

- 5) Five women were given an injection to induce labour. Their blood pressure (BP) before and after the injection was:

Patient Number	BP	
	Before	After
1	97	100
2	85	94
3	87	98
4	97	96
5	71	88

- Whether injection changed the level of BP? What will be null and alternate hypotheses? (5 marks)
 - What statement can you make about the actual change in BP? (5 marks)
- 6) In a clinical test, 60 people received a new drug and 50 people received a placebo. Of the people on the new drug, 40 of the 60 showed a positive response and 25 of the 50 people on placebo showed a positive response. Perform a statistical test to determine if the new drug shows more of an effect than the placebo. (10 marks)
- 7) The table below shows the results of an experiment comparing tablet dissolution as performed by two laboratories. Each laboratory determined the dissolution of tablets from the same batch of a standard product.

**TABLE: Percent Dissolution after 15 minutes
for Tablets from a Single Batch Tested in Two Laboratories**

Laboratory	
A	B
79.1	87.0
90.3	91.2
85.6	75.3
81.4	79.4
74.5	80.7
95.3	82.8



Is there any significant difference between the mean percent dissolution of tablets in the two laboratories? Test at 5% level. (10 marks)

8) Five tablets were weighed and then assayed with following results:

Weight (mg)	205	200	202	198	197
Potency (mg)	103	100	101	98	98

a. Find the regression equation of potency on weight. (7 marks)

b. Predict the potency for a 200-mg tablet. (3 marks)

