



Institute of Health Management Research

MBA Hospital and Health Management

Batch-23rd (2018-2020)

First Year

Bio-Statistics

Term Examination

Time - 3 Hour

MM-70

The question paper contains 4 printed pages.

Note:

- a. Kindly attach the question paper with the answer sheet at the time of submission of answer sheet.
- b. All sections are compulsory.
- c. Marks are indicated against each question.

Section A

Kindly tick (✓) against the correct option. (4 x 2marks = 8 marks)

i. Which of the following is qualitative variable -

- a. Parity
- b. Diastolic blood pressure
- c. Diagnosis
- d. Height

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. Which of the following graph can be used to show the relationship between two continuous variables-

- a. Pie chart
- b. Histogram
- c. Scatter diagram
- d. None



- iv. Probability distributions are useful because:
- We know the probability of randomly selecting a score from any region of the distribution
 - We know the probability of the tails being equal
 - We know the probability that the peak of the distribution will be in the middle
 - Probability distributions are not useful

Kindly fill in the blanks for the following (3 x 2marks = 6 marks)

- v. Correlation coefficient tends to lie between.....
- vi. For a skewed distribution, may not be an appropriate measure of central tendency
- vii. For large degrees of freedom, the distribution becomes almost adistribution

Kindly write True or False against the statement (3 x 2marks = 6 marks)

- viii. The standard normal distribution has mean = 0 and standard deviation = 1
- ix. The standard error of the mean of a sample is a measure of how far a mean from a sample of this size is likely to be from the population mean
- 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 5 marks= 20 marks)

- Use of Biostatistics in health and hospital fields
- Levels of measurement (Types of scale)
- Describe mean with its merits and demerits
- Use of standard error (SE) in health survey research
- Chi squared distribution
- Steps followed in testing of hypothesis

Section C

Attempt any three from the following questions

1. 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)**



2. Suppose the Acme Drug Company develops a new drug, designed to prevent colds. The company states that the drug is equally effective for men and women. To test this claim, they choose a simple random sample of 100 women and 200 men from a population of 100,000 volunteers. At the end of the study, 38% of the women caught a cold; and 51% of the men caught a cold. Based on these findings, can we reject the company's claim that the drug is equally effective for men and women? Use a 0.05 level of significance. (10 marks)
3. A new drug is proposed to lower total cholesterol and a study is designed to evaluate the efficacy of the drug in lowering cholesterol. Fifteen patients agree to participate in the study and each is asked to take the new drug for 6 weeks. However, before starting the treatment, each patient's total cholesterol level is measured. The initial measurement is a pre-treatment or baseline value. After taking the drug for 6 weeks, each patient's total cholesterol level is measured again and the data are shown below. Use appropriate statistical test to see whether there is a statistically significant reduction in cholesterol. Use a 0.05 level of significance. (10 marks)

Patient	Baseline	6 Weeks
1.	215	205
2.	190	156
3.	230	190
4.	220	180
5.	214	201
6.	240	227
7.	210	197
8.	193	173
9.	210	204
10.	230	217
11.	180	142
12.	260	262
13.	210	207
14.	190	184
15.	200	193

4. The administrator at your local hospital states that on weekends the average wait time for emergency room visits is 10 minutes. Based on discussions you have had with friends who have complained on how long they waited to be seen in the ER over a weekend, you dispute the administrator's claim. You decided to test your hypothesis. Over the course of a few weekends you record the wait time for 40 randomly selected patients. The average wait time for these 40 patients is 11 minutes with a standard deviation of 3 minutes. Do you have enough evidence to support your hypothesis that the average ER wait time exceeds 10 minutes? You opt to conduct the test at a 5% level of significance.(10 marks)

5. 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)

