IIHMR UNIVERSITY

# The IIHMR University, Jaipur

Institute of Health Management Research

**MBA Hospital and Health Management**

**Batch 19th (2014-2016), 1st Year**

## Biostatistics

**CC-604**

**Term Examination**

**Maximum Marks: 70** **Time Allowed: 3 hrs.**

**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 1mark = 4 marks)**

i. Time is an example of data with
   a. Nominal Scale
   b. Ordinal Scale
   c. Interval Scale
   d. Ratio Scale

ii. What is the defining characteristic of interval level data?
   a. You can put the categories you have in order of magnitude
   b. You have a fixed zero
   c. You have categories which cannot be ordered in a meaningful way
   d. You have equal intervals between adjacent points on the scale

iii. Which of the following is not a measure of central tendency?
   a. Mean
   b. Range
   c. Mode
   d. Median

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

**Kindly fill in the blanks for the following (3 x 1mark = 3 marks)**

v. Pearson's coefficient of correlation lies 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 a .....distribution

**Kindly write True or False against the statement (3 x 1mark = 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 hospital and health 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

**Instruction: Attempt any five of the following**

1. Johnson and Johnson company wants to understand the age profile of customers who patronize a particular skin and healthcare product. A study was conducted by a research firm and the following results are obtained:

| Age | Frequency |
|---|---|
| 20-24 | 20 |
| 25-29 | 27 |
| 30-34 | 50 |
| 35-39 | 30 |
| 40-44 | 22 |
| 45-49 | 19 |
| 50-54 | 12 |

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. Suppose the average length of stay in a chronic disease hospital of a certain type of patient is 60 days with standard deviation of 15. If it is reasonable to assume an approximately normal distribution of lengths of stay, find the probability that a randomly selected patient from this group will have a length of stay:

a. Greater than 50 days (2.5 marks)
b. Less than 30 days (2.5 marks)
c. Between 30 and 60 days (2.5 marks)
d. Greater than 90 days (2.5 marks)

3. 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)

4. The following data for blood protein (g/100 ml) were observed for the comparison of two drugs. Both drugs were tested on each person in random order.

| Patient | Drug A | Drug B |
|---|---|---|
| 1. | 8.1 | 9.0 |
| 2. | 9.4 | 9.9 |
| 3. | 7.2 | 8.0 |
| 4. | 6.3 | 6.0 |
| 5. | 6.6 | 7.9 |
| 6. | 9.3 | 9.0 |
| 7. | 7.6 | 7.9 |
| 8. | 8.1 | 8.3 |
| 9. | 8.6 | 8.2 |
| 10. | 8.3 | 8.9 |
| 11. | 7.0 | 8.3 |
| 12. | 7.7 | 8.8 |

a. Perform a statistical test for drug differences at the 5% level (5 marks)
b. Place 95% confidence limits on the average differences between drugs A and B.(5 marks)

5. In a large city like Ahmadabad 20 per cent of random sample of 900 school children had defective eye sight. In other city like Bombay 15 per cent of random sample of 1600 school children had defective eye sight. Is this difference between two proportions significant at $\alpha$ = 5%? (10 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. 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 203-mg tablet (3 marks)