

**IIHMR UNIVERSITY**  
**The IIHMR University, Jaipur**  
Institute of Health Management Research  
**MBA Hospital and Health Management**  
Batch 20<sup>th</sup> (2015-2017) First Year



**Biostatistics**  
**Term Examination**

Roll No. \_\_\_\_\_

Time - 3 Hour

M.M-70

*The question paper contains 3 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. Attempt any 5 questions from section C.*
- c) *Marks are indicated against each question.*

**Section-A**

Kindly tick (✓) against the correct option:

(4x1=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:**

**(3x1=3 marks)**

- v) \_\_\_\_\_ Frequencies are used for drawing a histogram.
- vi) If the grading of diabetes is classified as "mild", "moderate" and "severe" the scale of measurement used is \_\_\_\_\_
- vii) For a skewed distribution, \_\_\_\_\_ may not be an appropriate measure of central tendency.

**Kindly write True or False against the statement:**

**(3x1=3 marks)**

- viii) The standard error of a sample mean of birth weight estimates the variation in the birth weight of a population of new born babies.
- 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:**

**(4x2.5=10 marks)**

- Biostatistics
- Levels of measurement (Types of scale)
- Describe mean with its merits and demerits
- Two types of errors in hypothesis testing
- Normal distribution
- Steps followed in testing of hypothesis

### **Section-C**

- 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:
  - Greater than 15 g/dl **(3 marks)**
  - Less than 12 g/dl **(3 marks)**
  - Between 11 g/dl and 14 g/dl **(4 marks)**
- Skin cancer has an incidence in northern North America of 24 cases per 100000 individuals per year. In a community of 12200 individuals, how likely is it that:
  - Only 1 case will occur? **(2 marks)**
  - Fewer than three cases will occur? **(4 marks)**
  - More than 5 cases will occur? **(4 marks)**
- In a simple random sample 125 unemployed male graduate dropouts between the ages of 16 and 21, inclusive, 88 stated that they were regular consumers of alcoholic beverages. Construct a 95% confidence interval for the population proportion and interpret it.

(10 marks)

4. A study was conducted to test if use of herbal tea played any role in prevention of common cold. Data was collected on the number of people who developed cold and those who did not develop cold and data was tabulated in relation to whether they consumed herbal tea or not-

|                     | Herbal tea |              |
|---------------------|------------|--------------|
|                     | Consumed   | Not consumed |
| Had cold            | 12         | 23           |
| Did not have a cold | 34         | 38           |

Whether use of herbal tea played any role in prevention of common cold?

(10 marks)

5. In a large city like Ahmedabad 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. 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    |

- i) Whether injection changed the level of BP? What will be null and alternate hypotheses?

(5 marks)

- ii) What statement can you make about the actual change in BP.?

(5 marks)

7. The age and blood pressure of 10 women are:

| Age            | 56  | 42  | 36  | 47  | 49  | 42  | 60  | 72  | 63  | 55  |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Blood Pressure | 147 | 125 | 118 | 128 | 145 | 140 | 155 | 164 | 149 | 150 |

- a) Find the regression equation of blood pressure on age.

(5 marks)

- b) Estimate the blood pressure of woman whose age is 45 years.

(5 marks)