**Printed Pages :** **PH-243**

| (Following Paper ID and Roll No. to be filled in your Answer Books) | | | | | | | | | | |
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| **PAPER ID :** | **Roll No.** | | | | | | | | | |

# B. PHARM.

## Theory Examination (Semester-IV) 2015-16

## PHARMACEUTICAL BIOSTATISTICS

***Time : 3 Hours*** ***Max. Marks : 100***

### SECTION A

**Q1.Attempt all the questions.** **(2x10 =20 marks)**

a) Define the term "arithmetic mean" and write its formula.
b) If the mean of 10, 15, 25, a, 30 is 18. What will be the value of "a".
c) What are the various sources of information? Define any two.
d) Write the empirical relationship between mean, median and mode.
e) What is the standard deviation of 48, 58, 62, 45, 64, 52, 59, 53?
f) What do you mean by "regression analysis".
g) Define the term "skewness" and "Kurtosis".
h) What is the median of series 12, 21, 27, 32, 33, 47, 48, 50, 55?
i) Define "Histogram" and "Frequency Polygon".
j) Write the formula for "mode" and "standard error of mean".

### SECTION B

Q.2 **Attempt any five questions.** **(10x5 =50 marks)**

**a)** An equation of two lines of regression obtained in a correlation analysis are $2x + 3y – 8 = 0$ and $x + 2y – 5 = 0$. Obtain the correlation coefficient and the variance of y, if variance of x is 12.

**b)** Define the following
(i) Poisson distribution (ii) Mutually exclusive events (iii) Multiplication probability
(iv) Addition probability (v) Normal distribution

**c)** A certain stimulus administered to each of the 12 patients resulted in the following increase in blood pressure 5,2,8,-1,3,0,-2,1,5,0,4 and 6. Find out whether the stimulus resulted in an increase in blood pressure or not. (Given that for 11 degree of freedom $t_{0.01} = 2.2$).

**d)** From the following data, find the line of regression of x on y and y on x.

| X | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Y | 2 | 3 | 5 | 4 | 6 |

Also, find the most probable value of y when x = 2.5.

**e)** Following data relate to the protein intake of 400 families from the rural population. Draw histogram, frequency polygon and frequency curve.

| Protein intake | 15-25 | 25-35 | 35-45 | 45-55 | 55-65 | 65-75 | 75-85 |
|---|---|---|---|---|---|---|---|
| No. of families | 30 | 40 | 100 | 110 | 80 | 30 | 10 |

**f)** Write a short note on
(i) Correlation and its types
(ii) Analysis of variance

**g)** Describe sampling and enlist its various types with merits and limitations.

## SECTION C

**Attempt any two questions.** **(15x2 =30 marks)**

Q.3 In an attempt to plot a Dose-response curve (DRC), a bioassay was performed with following results

| Dose (mg) | 2 | 4 | 8 | 16 | 32 | 64 | 128 |
|---|---|---|---|---|---|---|---|
| Log dose | 0.30 | 0.60 | 0.90 | 1.20 | 1.50 | 1.80 | 2.10 |
| Response | 32 | 58 | 94 | 120 | 150 | 174 | 213 |

Calculate using the above data, the value of correlation coefficient **(Note: Take log dose as the x-data).**

Q.4 From the following data, find the mean, median and mode.

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|---|---|---|---|---|---|---|---|---|
| No. of students | 5 | 10 | 20 | 40 | 30 | 20 | 10 | 4 |

Q.5 Data were collected over a period of 10 years showing number of deaths from horse kicks in each of the 200 army corps. The distribution of deaths was as follows

| No. of deaths | 0 | 1 | 2 | 3 | 4 | Total |
|---|---|---|---|---|---|---|
| Frequency | 109 | 65 | 22 | 3 | 1 | 200 |

Fit a Poisson distribution to the data and calculate the theoretical frequencies. (Given $e^{-0.61} = 0.5435$)