

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

**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)**

- Define the term "arithmetic mean" and write its formula.
- If the mean of 10, 15, 25, a, 30 is 18. What will be the value of "a".
- What are the various sources of information? Define any two.
- Write the empirical relationship between mean, median and mode.
- What is the standard deviation of 48, 58, 62, 45, 64, 52, 59, 53?
- What do you mean by "regression analysis".
- Define the term "skewness" and "Kurtosis".
- What is the median of series 12, 21, 27, 32, 33, 47, 48, 50, 55?
- Define "Histogram" and "Frequency Polygon".
- 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	50	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  $e^{-0.61} = 0.5435$ )

