UNIVERSITY OF THE PUNJAB

First Prof. A/2015

Examination:- Doctor of Pharmacy (Pharm.D.)

Roll No. .....

Subject: Pharmaceutical Mathematics & Biostatistics **TIME ALLOWED: 3 hrs.**

PAPER: 6 (Old Course) **MAX. MARKS: 100**

NOTE: Attempt FIVE question in all, selecting THREE questions from Section I and TWO from Section II. Use of scientific Calculators and Statistical tables are allowed. Graph Paper may be supplied on demand.

SECTON – I

Q1. (a) Differentiation between descriptive and inferential statistics. (6)

(b) Calculate mean, median and mode for the data given below (14)

Marks:	1-3	3-5	5-7	7-9	9-11
Frequency:	10	16	30	11	8

Q2. (a) Define standard deviation and coefficient of variations. (6)

(b) The weight of two groups of 10 rats fed on two different experimental data are as follows. (14)

Diet	Weight Gains (gms)							
Diet A	11	11	13	17	11	11	15	14
Diet B	12	10	11	12	13	12	11	10

Which diet produced the most consistent given on the basis of standard deviation.

Q3. Suppose that diastolic blood pressure x is hypertensive women centers about a mean of 98 mm with a standard deviation of 10mm and is normally distributed. Find (20)

(a) $P(96<x<104)$

(b) $P(x<88)$

(c) $P(x>115)$

(d) $P(100<x<110)$

Q4. (a) Write down the properties of t-distribution. (8)

(b) A random sample of 25 children was found to have mean skinfold thickness at triceps of 3.5mm with standard deviation of 2.4mm. Can it be reasonably regarded as a representative sample of population having a mean thickness of 3.3mm at 5% level of significance. (12)

PTO

Q5. (a) Define the following terms (8)
(i) Correlation
(ii) Regression

(b) The following data was obtained in a study of the relationship between weight and chest size of infants of birth. Calculate correlation coefficient for this data (12)

Weight (Kg)	Chest Size (cm)
3.8	28.8
3.3	27.3
2.8	29.6
5.1	36.5
4.1	32.3

SECTION-II

Q1. (a) In how many ways we can select 12 students out of 20 children (10)
(b) Expand using binomial theorem. (10)

$$\left(a-\frac{1}{a}\right)^7$$

Q2. (a) What is the measure in radius of 130^0 Angle? (10)
(b) Prove that (10)

$$\frac{Sin\theta}{1+Cos\theta}+Cot\theta=Cosc\theta$$

Q3. (a) Find the derivative of (10)

$$Y=-x^4+2x^2-1$$

(b) Evaluate the indefinite integral (10)

$$\int(4x^3+x^2+5)dx$$

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SECTION – I

(10, 10)

Q.1 a) Differentiate between:
(i) Discrete and continuous variables
(ii) Primary and secondary data

b) Given below are the mean annual death rates per 1000 at ages 20 – 65 in different occupational groups

7.5,	8.2,	6.2,	8.9,	7.8,	8.4,	9.4,	9.9,	10.9,	10.8,	7.4,	9.7
11.6,	12.6,	8.0,	10.2,	9.2,	12.0,	9.9,	7.3,	8.4,	10.3,	10.1,	10.0
11.1,	6.5,	12.5,	7.8,	6.5,	8.7,	9.3,	12.4,	10.6,	9.1,	9.7,	9.3

Obtain frequency distribution with classes 6.0 – 6.9, 7.0 – 7.9 and so on.

Q.2 The grade point average of pharmacy students selected at random are as follows: **(20)**
3.2,1.9,2.7,2.4,2.8,2.9,3.8,3.0,2.5,3.3,2.9,2.5,3.7,2.9,2.0,3.2,2.8,2.1,2.6,2.9.

Obtain mean, median, mode and standard deviation.

(5, 15)

Q.3 a) Define the main properties of Normal distribution.

b) If the cholesterol value for a group of persons is normally distributed with mean of 200 mg /100 ml and standard deviation of 20 mg/ 100 ml. Find the proportion of individuals whose cholesterol values is (i) between 185 and 220 mg (ii) greater than 225 mg.

(4, 16)

Q.4 a) Differentiate between Regression and correlation

b) In a study between X = the amount of rain fall (0.01 cm) and Y = the quantity of air pollution removed (mcg/cubic meter), the following data were collected:

X:	4.3	4.5	5.9	5.6	6.1	5.2	3.8	2.1	7.5
Y:	125	121	116	118	114	118	132	141	108

Find the equation of linear regression and predict the amount of particulate removed when amount of rain fall is 4.8 units.

(6, 14)

Q.5 a) Define level of significance and level of confidence.

b) A random sample of 10 cigarettes of a certain brand has an average nicotine content of 3.6 mg and a standard deviation of 0.9 mg. Is this in line with the manufacturer's claim that the average nicotine content does not exceed 3.2 mg. Use a 0.01 level of significance and assume the distribution of nicotine contents to be normal.

P.T.O.

Q.6 a) Discuss the applications of t-statistic. **(6, 14)**

b) A random sample of college students are classified according to class status and drinking habits

Habit	Freshman	Sophomore	Junior	Senior
Heavy drinkers	29	41	33	28
Moderate drinkers	32	29	36	39
Non-drinkers	55	34	27	17

Test the hypothesis that the class status and drinking habits are independent. Use a 0.05 level of significance.

SECTION-II

Q.7. a) Solve the equation **(10, 10)**

$X(X-7) = (2X-1)(X+4)$

b) Find the 20^{th} term and the partial sum of 20 terms of the series: $2, \frac{7}{2}, 5, \frac{13}{2}, \ldots\ldots\ldots\ldots$

Q.8. a) Find the middle term in the expansion of $\left(2a - \frac{x}{a}\right)^{12}$ **(10, 10)**

b) Prove that $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$

Q.9. a) Find the derivative of $6x^9 + 8x^5 + 9$ **(10, 10)**

b) Integrate the function: $f(x) = 6x^3 + 3x^2 + 8x + 5$