



UNIVERSITY OF THE PUNJAB

Second Prof. A/2016
Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmacy Practice-I (Pharmaceutical Mathematics
and Biostatistics)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

PAPER: 6 (New Course)

NOTE: Attempt FIVE questions 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.

SECTION - I

- Q.1 a) Differentiate between discrete and continuous variables, give examples. (6, 14)
b) Following still birth rate per 1000 total birth were reported by different cities.

25, 36, 40, 28, 27, 30, 29, 26, 35, 37, 36, 27, 29, 40, 34,
25, 30, 40, 30, 35

Compute Arithmetic mean, median and mode.

- Q.2 a) Define absolute and relative dispersion. (6, 14)
b) Following frequency distribution shows the daily sodium intake by different persons.

Sodium intake:	6.0 – 6.2	6.3 – 6.5	6.6 – 6.8	6.9 – 7.1	7.2 – 7.4	7.5 – 7.7
No. of Persons:	2	13	29	40	15	8

Compute Mean deviation about mean and standard deviation.

- Q.3 a) In an experiment to study the dependence of Hypertension on smoking habits, the following data were taken on different individuals. (10,10)

	Non Smokers	Moderate Smokers	Heavy Smokers
Hypertension	21	36	30
Non Hypertension	48	26	19

Test, at 0.05 level of significance, that the presence or absence of hypertension is independent of smoking habits.

- b) A sample of 12 jars of peanut butter was taken from a lot, each jar being labeled "8 ounces net weight". These 12 jars have an average weight of 7.64 ounce with standard deviation as 0.30 ounce. Test whether jar weights are consistent with a population mean weight of 8 ounce. Assume that the weights are normally distributed.
- Q.4 a) Compute and interpret the correlation co-efficient for the following data: (12, 8)

X (height)	12	10	14	11	12	09	13
Y (weight)	18	17	23	19	20	15	20

- b) A certain type of medicine expires on the average 3.0 years with a standard deviation of 0.5 year. Assume that the medicine lives are normally distributed, find the probability that a given medicine will expire less than 2.4 years.
- Q.5 In a biological experiment four concentrations of a certain chemical are used to enhance the growth of a certain type of plant over a specified period of time. The following growth data, in cm., were recorded for the plants. (20)

Concentration	1	8.2	8.7	9.4	9.2	9.6	10.5	
	2	7.7	8.4	8.0	7.9	7.5		
	3	6.9	5.8	6.8	6.1	5.7	6.0	5.9
	4	8.5	9.6	9.9	9.8	8.9	9.1	

Is there a significant difference in the average growth of these plants for the different concentrations of the growth chemical? Use a 0.05 level of significance. Also find Isd value.

P.T.O.

Q.6 a) Discuss the applications of t-statistic and analysis of variance.

(6, 14)

- b) A certain drug is claimed to be effective in curing colds. In an experiment on 328 people with colds, half of them were given the drug and half of them were given sugar pills. The patients reactions are recorded in the following table. Test the hypothesis that the drug is no better than sugar pills for curing colds. Let level of significance is 0.05.

Category	Helped	Harmed	No effect
Drug	104	20	40
Sugar	88	24	52

SECTION-II

Q.7. a) Solve the system of equations

(7,7,6)

$$x + y = 7$$

$$x^2 - xy + y^2 = 13$$

- b) Which term of the A.P: -2, 4, 10, ..., is 148? Write down its general term a_n and hence deduce the value of its 20th term.

- c) Use binomial theorem to expand $\left(2x - \frac{y}{2}\right)^6$ and simplify each term.

Q.8. a) Two angles of a triangle are $50^\circ 11' 15''$ and $43^\circ 48' 45''$ find third angle.

(4,8,8)

- b) Show that the points A (3, 1), B (-2, -3) and C (2, 2) are the vertices of an isosceles triangle.

- c) The daily profit from the sale of pharmaceutical product is given by

$$P = -0.1x^2 + 16x - 100, \text{ dollars.}$$

What level of production maximizes profit?

And what is the maximum possible profit?

Q.9. a) The Fahrenheit temperature reading F is a linear function of the Celsius reading C . if $C=0$ when $F=32$, and $C=100$ when $F=212$, express F as a function of C. (6,8,6)

- b) Find dy/dx of $y = (x^2 - 3)^5 + \cos^4(7x) + e^{2x} \ln(4 - x)$

- c) Integrate

$$x^{\frac{1}{2}} + \frac{1}{3}x + 4x^2 - 3$$



Subject: Pharmacy Practice-I (Pharmaceutical Mathematics and Biostatistics)
PAPER: 6 (New Course)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt FIVE questions 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.

SECTION - I

- Q.1 a) Define Biostatistics and differentiate between Descriptive and Inferential Statistics. (10, 10)
b) Following are the weights of patient in a hospital.

67, 64, 67, 63, 74, 81, 60, 65, 73, 68, 77, 64, 72, 66, 60
65, 68, 57, 67, 61, 85, 57, 65, 72, 66, 74, 85, 86, 85, 80
73, 81, 72, 65, 68, 67, 63, 66, 75

Obtain frequency distribution with class interval of 5, beginning with 55.

- Q.2 a) Define Mean-deviation and variance. (6, 14)
b) Consider the following frequency distribution of the length of life in minutes of black flies subjected to a new spray.

Classes:	0.1 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0	5.1 – 6.0
No. of Flies:	10	18	30	20	12	09

Compute Co-efficient of variation.

- Q.3 a) The probability that a patient recovers from an operation is 0.75. What is the probability that exactly 5 of the next 8 patients having this operation survive. (10, 10)
b) A filling machine is regulated so that it discharges an average of 190 ml per bottle. If the amount of discharge is normally distributed with a standard deviation of 16 ml, what fraction of the bottles will contain between 180 and 210 ml?

- Q.4 a) Differentiate between Regression and Correlation. (4, 16)
b) The amounts of a chemical compound (Y) which dissolved in 100 grams of water at various temperature (X) were recorded as follows:

X:	0	15	30	45	60	75
Y:	8	12	23	30	41	48

Find the equation of the regression line and estimate the amount of chemical that will dissolve in 100 grams of water at 50° temperature.

- Q.5 a) Define level of significance and level of confidence. (4, 16)
b) Four laborites are being used to perform chemical analysis. Samples of the same material are sent to the laborites for analysis as part of the study to determine whether or not they give, on the average, the same results. The analytical results for the laborites are as follows.

Laboratory	A	59	61	60	59	58
	B	63	65	63	59	60
	C	56	56	57	55	58
	D	61	60	61	60	62

Perform the analysis of variance and give conclusion. (4, 16)

- Q.6 a) Discuss the application of chi-square.
b) Candidates for scientific posts gave particulars of their degrees and hobbies. The data are presented in the following table.

Hobbies	Degrees		
	Biology	Chemistry	Physics
Music	24	83	17
Crofts Work	11	62	28
Reading	32	121	34

Test the association between the two Criteria of Classification, i.e. the degrees and the hobbies.

SECTION-II

(7,7,6)

Q.7. a) Solve the equation:

$$(x+3)^{1/2} + 1/(x+3)^{1/2} = 5/2$$

- b) Production of certain drug of a pharmaceutical company increases at the rate of 15% per year. If its present production is 150,000 units, what will be the production after 4 years?
- c) Find the middle term in the binomial expansion of $(3x+1/2x)^8$ and write it in simplified form.

(6,6,8)

Q.8. a) Without using calculation, verify that

$$\sin^2 \pi/6 : \sin^2 \pi/4 : \sin^2 \pi/3 : \sin^2 \pi/2 = 1:2:3:4$$

- b) Find the equation of the side AB of the triangle whose vertices are A(-3,2), B(5,4), and C(3,-8). What is the slope of the altitude drawn from the vertex C to the side AB.
- c) The points A (-5, -2) and B (5, -4) are ends of a diameter of a circle. Find the centre and radius of the circle.

(7,6,7)

Q.9. a) Evaluate

$$\lim_{x \rightarrow 4} \left(\frac{x^2 - 2x - 8}{x^2 - 3x - 4} \right)$$

- b) Find the maximum of $f(x) = 80x - 16x^2$
- c) Integrate

$$\frac{1}{2}x^{1/2} + (x^2 - 2x - 8)^{3/2} (x - 1)$$



UNIVERSITY OF THE PUNJAB

Second Prof: A/2017
Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmacy Practice-I (Pharmaceutical Mathematics and Biostatistics)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

PAPER: 6 (New Course)

Note: Attempt FIVE questions 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.

SECTION – I

Q.1 a) Define the following: (10, 10)

- Biostatistics
- Bivariate data
- Descriptive statistics
- Chronological data
- Primary data

b) Marks obtained by a student in different subjects are as follows.

Subject	Marks
Zoology	45
Botany	48
Physics	47
Chemistry	40

Make a Pie-Chart.

Q.2 a) Describe the properties of coefficient of correlation. (8, 12)

b) Find the coefficient of correlation between BP and Age.

Age (x)	20	25	29	35	40	46	50
BP (Y)	82	87	90	80	100	97	101

Q.3 a) A certain type of storage battery lasts on the average 3.5 years with a standard deviation of 0.8 years. Assuming that the battery lives are normally distributed, find the probability that a given battery will last less than 2.5 years. (10, 10)

b) The incidence of occupational disease in an industry is such that workmen have a 30% chance of suffering from it. What is the probability that out of 6 workmen, 4 or more will catch the disease?

Q.4 a) Discuss the application of chi-square distribution. (8, 12)

b) A group of 10 children are found to have the following intelligence quotients: 125, 113, 116, 131, 112, 123, 108, 113, 132 and 128. Is it reasonable to suppose that these children have come from a large population whose average IQ is 115.

Q.5 a) Describe the least significance difference test. (8, 12)

b) The analysis of variance of RCB design produced the following results.

S.O.V.	D.F.	S.S.	M.S.	F-ratio
Treatment	3	28.2	=	=
Block	5	=	13.80	=
Error	=	34.1	=	

- Complete the ANOVA table.
- Do the data provide sufficient evidence to indicate a difference among the treatment means? Test using $\alpha = 0.01$.

Q.6 a) Define mean, median and mode. What is empirical relation between them? (8, 12)

b) We are given the following frequency distribution for the weights of pieces of luggage

Weight (Kg)	7 – 9	10 – 12	13 – 15	16 – 18	19 – 21
No. of pieces:	02	08	14	19	07

P.T.O.

Compute Co-efficient of variation.

SECTION-II

Q.7. a) Solve the equation

(6)

$$x^{\frac{2}{5}} + 8 = 6x^{\frac{1}{5}}$$

b) If 5th term of an A.P. is 13 and 17th term is 49 then find the general term a_n .

(7)

c) Find the value of n when ${}^nP_2 = 30$.

(7)

Q.8. a) Prove the identity:

(6)

$$\cos^2 \theta - \sin^2 \theta = \frac{1 - \tan^2 \theta}{1 + \tan^2 \theta}$$

b) Show that the points A (5, 2), B (-2, 3), C (-3, -4) and D (4, -5) are vertices of parallelogram.

(7)

c) Find the Centre and radius of the circle whose equation is $x^2 + y^2 - 6x + 4y + 13 = 0$

(7)

Q.9. a) Evaluate

(6)

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{\sin^2 x}$$

b) Find $f'(x)$ when $f(x) = \sin e^{3x} \ln(2x^2 - 3)$

(7)

c) Use the rule of integration by parts to find

(7)

$$\int x \cos x \, dx$$



UNIVERSITY OF THE PUNJAB

Second Prof: 2nd Annual - 2017
Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmacy Practice-I (Pharmaceutical Mathematics
and Biostatistics)

PAPER: 6 (New Course)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt FIVE questions 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.

SECTION - I

- Q.1 a) Differentiate the following in the example. (12, 8)
- (i) Quantitative and Qualitative variables
 - (ii) Continuous and Discrete Variables
 - (iii) Independent and dependent variables

- b) The data regarding surgery in a large hospital is as:

	No. of Patients
No Surgery	120
Surgery as Part of Trial	89
Surgery within one year	72
Surgery within 1 – 5 year	29
Surgery > 5 year	17

Make bar chart of above data.

- Q.2 a) State the properties of variance. (05, 15)
- b) Given $\bar{x} = 40$ $\bar{y} = 36$
 $S_x = 6$ $S_y = 8$ and $r = 0.8$
Find the two regression lines. Predict y when x = 30 and predict x when y = 40

- Q.3 a) Describe the properties of Binomial distribution. (5, 15)
- b) Suppose that weights of 2000 male students are normally distributed with mean 150 pounds and standard deviation 20 pounds. Find the number of students with weights (i) less than or equal to 110 pounds (ii) between 125 and 135 pounds, (iii) greater than 145 pounds.

- Q.4 a) State the addition rule for not mutually exclusive events and multiplication rule for independent events. (8, 12)
- b) Out of group of 340 people exposed to infection, 265 had not been immunized, and of these 100 contracted the disease. Of those who had been immunized, 20 were infected. Does it seem that treatment gave any protection against infection? What is the difference in the significance of the result of the χ^2 test?

- Q.5 a) Differentiate between Type-I and Type-II errors in testing of hypotheses. (10, 10)
- b) The hemoglobin level of three groups of children fed three diets are given. Test whether the means of these three groups differ significantly?

Group I	11.6	10.3	10.0	11.5	11.8	10.9
Group II	11.2	8.9	9.2	8.8	8.4	9.3
Group III	9.8	9.7	11.5	11.6	10.8	11.2

- Q.6. A sample of 12 jars of peanut butter was taken from a lot whose standard deviation is 1.2 ounce and each jar being labeled "8 ounces net weight". The individual weights in ounces are: 8.3, 8.1, 7.7, 7.6, 7.8, 7.6, 7.8, 7.6, 7.4, 7.5, 7.9, 8.1, 7.5, 7.6 (8, 12)
- a) Test whether these weights are consistent with a population mean weight of 8 ounces. Assume that the weights are normally distributed.
- b) Again test the hypothesis as in part (a) when standard deviation of 1.2 ounces is unknown.

P.T.O.

SECTION-II

Q.7. a) Solve the equation

(6)

$$\frac{1}{x+1} + \frac{2}{x+2} = \frac{7}{x+5} ; x \neq -1, -2, -5.$$

b) Find three G.M^s. between 2 and 32.

(7)

c) Find the number of diagonals of a 6-sided figure.

(7)

Q.8. a) What is the length of the arc intercepted on a circle of radius 14cm by the arms of a central angle of 45° ?

(7)

b) Find an equation of the line passing through the point (11, -5) and parallel to a line with slope -24.

(7)

c) The yield in bushels from a grove of orange trees is given by $y = x(800 - x)$, where x is the number of orange trees per acre. How many trees will maximize the yield. Find the maximum yield.

(6)

Q.9. a) Evaluate

(6)

$$\lim_{x \rightarrow 0} \left(\frac{\sin ax}{\sin bx} \right)$$

b) Find $f(x)$ when $f(x) = \frac{2}{x^{3/2}} + \sin^3(3x^2 - 4)$

(7)

c) Find $\int \frac{x^2 + 2x + 2}{x + 2} dx$

(7)

UNIVERSITY OF THE PUNJAB

Second Prof: 2nd Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No. in Fig.

Roll No. in Words.

**Subject: Pharmacy Practice-I (Pharmaceutical
Mathematics and Biostatistics (New Course))**
PAPER: 6 Part – I (Compulsory)

MAX. TIME: 30 Min.

MAX. MARKS: 20

Signature of Supdt.:

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer cutting and overwriting is not allowed.

(20x1=20)

1. The shape of a normal curve is
a) Bell-shape
b) J-shape
c) U-shape
d) L-shape
2. The total area under normal curve is
a) 1
b) 4
c) 3
d) 2
3. The mean of c, c, c, c is
a) c
b) d
c) b
d) a
4. The Mode of 6, 6, 9, 8, 11 is
a) 6
b) 7
c) 8
d) 9
5. The Mean deviation of a Normal distribution is
a) $\frac{4}{5}\sigma$
b) $\frac{5}{4}\sigma$
c) $\frac{3}{6}\sigma$
d) $\frac{2}{3}\sigma$
6. The coefficient of correlation is always lies between
a) -1 and 0
b) -1 and +1
c) -1 and 3
d) 3 and -1
7. The range of Normal variable is
a) $-\infty$ to $+\infty$
b) $-\infty$ to $+0$
c) 0 to $-\infty$
d) $-\infty$ to $+1$
8. The sum of errors of Regression line is always equal to
a) Zero
b) One
c) Maximum
d) Minimum
9. t-distribution is asymptotic to
a) x-ax is
b) y-ax is
c) zero
d) x and y ax is
10. If $n_1 = 15$ and $n_2 = 16$ then degree of freedom for t-test for independent sample is
a) 27
b) 28
c) 29
d) 30
11. Chi-square value increases with the increase in
a) Level of significance
b) Degree of freedom
c) P-value
d) Text statistic
12. If there are five treatment and total subjects are twenty then degree of freedom for error in ANOVA is
a) 14
b) 15
c) 16
d) 17
13. Equation of the type $2^{2x} - 2^{x+2} + 1 = 0$ is called
a) Reciprocal equation
b) Exponential equation
c) Radical equation
d) Quadratic equation
14. H.M. between two number $X = -2$, $y = -6$ is
a) 3
b) -4
c) -3
d) $\sqrt{12}$

P.T.O

15. If ${}^nC_{14} = {}^nC_8$, then the value of n is
 a) 22
 b) 6
 c) 14
 d) 8
16. If $\sin \theta < 0$ and $\cos \theta > 0$, then the terminal arm of the angle θ will lie in quadrant
 a) I
 b) II
 c) III
 d) IV
17. The radius of the circle, $x^2 + y^2 + 12x - 10y = 0$ is
 a) 61
 b) $\sqrt{61}$
 c) 36
 d) 25
18. $\lim_{x \rightarrow 4} \left(\frac{x^2 - 16}{x - 4} \right)$ is equal to
 a) 0
 b) 4
 c) -8
 d) 8
19. The derivative of $(x - 8 + \sqrt{x})$ w.r.t x is
 a) $-8 + \frac{\sqrt{x}}{2}$
 b) $1 + 2x$
 c) $1 + \frac{1}{2\sqrt{x}}$
 d) $1 + \frac{x}{2}$
20. Integral of $(6 + \sin x)$ w.r.t x is
 a) $6x - \cos x + c$
 b) $-\cos x + c$
 c) $6x + \cos x + c$
 d) $\cos x + c$



UNIVERSITY OF THE PUNJAB

Second Prof: 2nd Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

**Subject: Pharmacy Practice-I (Pharmaceutical
Mathematics and Biostatistics (New Course))**

**MAX. TIME: 2 Hrs. 30 Min.
MAX. MARKS: 80**

PAPER: 6 Part – II

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt FIVE questions 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.

SECTION – I

Q.2 Explain the difference between the following: (10)

- Descriptive and inferential statistics
- Primary and secondary data
- Discrete and continuous variable
- Quantitative and qualitative variable

Q.3 a) Which type of average is suitable in the following situation? (06)

- Size of shoes sold at shop
- BP of Normal persons
- Income of doctors
- Run scored by a player in different matches.
- Sale at shop
- Growth rate of population

b) Distribution of children according to the Hb contents in their blood is as. (10)

Hb (g/100cc):	9.0 – 9.9,	10.0 – 10.9,	11.0 – 11.9,	12.0 – 12.9,	13.0 – 13.9
No. of children:	5,	30,	83,	34,	17

Calculate mean deviation and standard deviation.

Q.4 a) Define the following terms: (06)

- Trial
- Mutually exclusive events
- Outcome
- Sample space
- Equally likely events
- Compound events

b) Prevalence of diabetes in community is 30% if 5 children are born, what is the probability of following cases? (10)

- None of diabetic
- At least 4 are diabetic
- At most 2 are diabetic

Q.5 a) Describe the properties of regression line. (06)

b) The following is the age and systolic blood pressure of 6 women. (10)

Age:	56,	42,	72,	36,	63,	47
B.P:	147,	125,	160,	118,	149,	128

Estimate a linear regression of blood pressure on age. Estimate the expected blood pressure of a woman whose age is 50 years.

Q.6 a) Describe the application and properties of chi-square distribution. (06)

b) According to medical Research it is said that crows around the eyes are due to smoking. A sample of 500 people was taken. Habits of smoking and crows the eye were observed, following is the data. (10)

	Crows	Not crows
Smoking	95	55
Not Smoking	103	247

Whether this data shows any association between smoking habit and crows.

P.T.O.

- Q.7. In a biological experiment concentrations of a certain chemical are used to enhance the growth of a certain Type of plant over a specified period of Time. The following growth data, in centimeters, were recorded for the plants. (16)

Concentration		
1	2	3
8.2	7.7	6.9
8.7	8.4	5.8
9.4	8.6	7.2
9.2	8.1	6.8
8.9	8.0	7.4
	8.5	6.1
		6.5

Is there a significant difference in the average growth of their plants for the different concentrations of the chemical? Use a 0.01 level of significance.

SECTION-II

- Q.8 a) Solve the system of equations: (6,5,5)

$$y = 2x - 4, 2x^2 - 4xy - y^2 = 6,$$

- b) Write down a_n and a_{12} of the A.P.

$$-1, -7, -13, -19, \dots$$

- c) Using Binomial Theorem, expand

$$\left(\frac{x}{2} - \frac{2}{x}\right)^4$$

- Q.9 a) Prove that (5,6,5)

$$\frac{1}{1 + \sin \theta} + \frac{1}{1 - \sin \theta} = 2 \sec^2 \theta.$$

- b) Find h such that A (-1, h), B (3, 2) and C (7, 3) are collinear.

- c) The sensitivity S to a drug is related to the dosage x in milligrams by: $S = 900X - X^2$. Determine what dosage gives maximum sensitivity. Determine the maximum sensitivity also.

- Q.10 a) Find (5,6,5)

$$\lim_{x \rightarrow \infty} \left(\frac{3x + 5}{6x - 8}\right)^3$$

- b) If $y = \frac{1}{x^3} + (-e^{2x} - 2x + 3) \cos x$, find $\frac{dy}{dx}$

- c) Find $\int \left[\frac{1}{x} + x \sec^2(x^2)\right] dx$



Doctor of Pharmacy (Pharm.D.) Second Prof: Annual-2019

Subject: Pharmacy Practice-I (Pharmaceutical Mathematics and Biostatistics)

Paper: 6 Part – I (Compulsory) (New Course) Time: 30 Min. Marks: 20

Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option.

(20x1=20)

1. Ten babies are born in hospital on same day. All weight 2 kg each. The standard deviation is:
a) Zero
b) One
c) Minse One
d) 2
2. Calculate the made of 70,71,72,70,70,72,71
a) 70
b) 71
c) 71.5
d) 72
3. Among the measure of dispersion which is the most frequently used
a) Range
b) Mean
c) Median
d) Standard Deviation
4. Which scale of measurement has an absolute Zero?
a) Normal
b) Ordinal
c) Interval
d) Ratio
5. Which is not a characteristics of normal distribution
a) Symmetric
b) Bell-Shaped
c) Mean = Median = Mode
d) Negative Skewness
6. The degree of freedom for a contingency table with 3 rows and 2 column is
a) 6
b) 2
c) 4
d) 5
7. Probability values fall on scale between
a) -1 to +1
b) 0 and 1
c) -1 to 0
d) None of the above
8. A type of graphical presentation of data used to explain relation between dependent and independent variable is
a) Histogram
b) Frequency Polygon
c) Frequency Curve
d) Scatter Plot
9. The F-Statistics is calculated in
a) Analysis of variance
b) Testing single mean
c) Testing of a variance
d) None of these
10. For testing single mean with the sample size 20, that t-test has d.f.
a) 18
b) 19
c) 20
d) 21
11. In one-way ANOVA. There are 5 treatment then, its degree of freedom is
a) 2
b) 3
c) 4
d) 5
12. If correlation Co-efficient $r = +1$, then variables are
a) Perfectly Positively Correlated
b) Perfectly Negatively Correlated
c) Independent
d) None of these
13. Roots of the equation $x^2 - 6x + 8 = 0$ are
a) 2,6
b) 2,4
c) 8,1
d) 6,1
14. The sequence -2,4,6,10,....., is
a) Harmonic
b) Geometric
c) Arithmetic
d) None of these

P.T.O.

15. ${}^{12}C_{10} = \dots\dots\dots$
a) 66
b) 120
c) 132
d) 22
16. $\frac{5\pi}{6}$ Converted to degrees is
a) 105°
b) 120°
c) 135°
d) 150°
17. The midpoint of line segment joining $A(-8,3), B(2,-1)$ is
a) $(-3,1)$
b) $(1,-3)$
c) $(-6,2)$
d) $(2,-6)$
18. The Centre of the circle $x^2 + y^2 - 10x + 4y + 13 = 0$ is at
a) $(-5,2)$
b) $(5,-2)$
c) $(-10,4)$
d) $(10,4)$
19. $\lim_{x \rightarrow 0} \left(\frac{\tan x}{x} \right) = \dots\dots\dots$
a) Undefined
b) 0
c) 1
d) 2
20. $\int \left(3 + \frac{1}{x} \right) dx = \dots\dots\dots$
a) $\ln x$
b) $3x - \frac{1}{x^2}$
c) $-\frac{1}{x^2}$
d) $3x + \ln x$



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Second Prof: Annual-2019

Roll No.

Subject: Pharmacy Practice-I (Pharmaceutical Mathematics and Biostatistics)

Paper: 6 Part - II (New Course)

Time: 2 Hrs. 30 Min. Marks: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt *FIVE* questions in all, selecting *THREE* questions from Section I and *TWO* questions from Section II. Use of Scientific Calculators and Statistical Tables are allowed. Graph paper may be supplied on demand.

SECTION - I

Q.2 a) Classify each as nominal level, ordinal level, Interval level and rational level (08) measurements:

- (i) Gender (Male, Female)
- (ii) Eye Color
- (iii) Rating (Poor, Good, Excellence)
- (iv) Position (1st, 2nd, 3rd, etc)
- (v) Temperature
- (vi) IQ Score
- (vii) Age
- (viii) Weight

b) The following scores represent the final examination grade for an elementary (08) statistics course

23,60,79,32,57,74,52,70,82,36,80,77,81,95,41,

65,92,85,55,76,52,10,64,75,78,25,80,98,81,67

Using the 08 interval set, make a frequency distribution

Q.3 a) Define the following: (06)

- (i) Range
- (ii) Standard Deviation
- (iii) Coefficient of variation

b) The Following data of two drugs. (10)

Drug A: 12, 15, 6, 73, 19, 24, 48, 57
Drug B: 47, 42, 76, 48, 54, 35, 53, 64, 59, 58,

Which drug is more consistent with respect to variation.

Q.4 a) State the properties of co-efficient of correlation. (06)

b) Compute and interpret the co-relation co-efficient for the following data: (10)

X(height) 12, 10, 14, 11, 12, 09,
Drug B: 18, 17, 23, 19, 20, 15,

Q.5 a) Describe the properties of Student's t-distribution. (06)

b) Describe the procedure of testing two means for independent small sample sizes (10)

Q.6 The analysis for CRD design produced the ANOVA table shown below:

S.O.U	d.f	S.S	M.S	F-ratio
Treatment	2		27.25	
Error		217.75		=
Total	11	272.25	=	=

i) Complete the ANOVA table. (06)

ii) Do the data provided sufficient evidence to indicate a difference among the (10) treatment means, using $\alpha=0.05$

P.T.O.

SECTION - II

Q.7 a) Solve the equation $2^x + 2^{6-x} - 20 = 0$

(16)

- b) The population of a certain town is 95000. What will be its population after 3 years if it increases geometrically at the rate of 4% annually?
- c) How many diagonals can be formed by joining the vertices of the polygon having 8 sides?

Q.8 a) An arc subtends an angle of 70° at the center of a circle whose radius is 108mm. Find the length of the arc. (16)

- b) Find equation of the line having x-intercept -3 and y-intercept 4 and write your answer in slope-intercept form.
- c) Convert the equation of the circle $x^2 + y^2 - 10x + 4y + 13 = 0$ into standard form $(x-a)^2 + (y-b)^2 = r^2$ and hence write its center and radius.

Q.9 a) Express area of an equilateral triangle as a function of the length of a side. (16)

b) Find $f'(x)$ when $f(x) = \left(\frac{2x^3 - 3x^2 + 4}{\tan x} \right)^3$

c) Find $\int [x^2(x^3 - 12)^2 - \tan x] dx$.



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) 2nd Prof: Annual-2021

Subject: Pharmacy Practice-I (Pharmaceutical Mathematics and Biostatistics)

Paper: 6 Part – II (New Course)

Roll No.

Time: 2 Hrs. 30 Min. Marks: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt *FIVE* questions in all, selecting *THREE* questions from Section – I and *TWO* questions from Section – II. Use of Scientific Calculators and Statistical Tables are allowed. Graph paper may be supplied on demand.

Section – I

Q.2.	<p>a) Describe the procedure of paired sample T – test?</p> <p>b) To determine whether membership in a Fraternity is beneficial or detrimental to one's grade. The following grade point average were collected over a period of 5 years.</p> <table><tr><td>Years</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Fraternity</td><td>2.0</td><td>2.0</td><td>2.3</td><td>2.1</td><td>2.4</td></tr><tr><td>Non-Fraternity</td><td>2.2</td><td>1.9</td><td>2.5</td><td>2.3</td><td>2.4</td></tr></table> <p>Assuming the population to be normal, test at 5% level of significance whether membership in a fraternity is detrimental to one's grade.</p>	Years	1	2	3	4	5	Fraternity	2.0	2.0	2.3	2.1	2.4	Non-Fraternity	2.2	1.9	2.5	2.3	2.4	(8) (8)
Years	1	2	3	4	5															
Fraternity	2.0	2.0	2.3	2.1	2.4															
Non-Fraternity	2.2	1.9	2.5	2.3	2.4															
Q.3.	<p>a) Describe the properties of coefficient of correlation?</p> <p>b) Find the coefficient of correlation for the data</p> $n = 10 \qquad \sum X = 130 \qquad \sum Y = 220$ $\sum X^2 = 2288 \qquad \sum Y = 5486 \qquad \sum XY = 3467$	(8) (8)																		
Q.4.	<p>a) Differentiate between Descriptive and inferential statistics?</p> <p>b) Find Mean, Median and Mode of the following data</p> <table><tr><td>Group</td><td>11 – 20</td><td>21 – 30</td><td>31 – 40</td><td>41 – 50</td><td>51 – 60</td></tr><tr><td>Frequency</td><td>10</td><td>12</td><td>15</td><td>14</td><td>11</td></tr></table>	Group	11 – 20	21 – 30	31 – 40	41 – 50	51 – 60	Frequency	10	12	15	14	11	(8) (8)						
Group	11 – 20	21 – 30	31 – 40	41 – 50	51 – 60															
Frequency	10	12	15	14	11															
Q.5.	<p>a) Describe the properties of normal Distribution?</p> <p>b) If the average height of miniature poodles is 30 centimeters, with a standard deviation of 4.1 centimeters. What percentage of miniature poodles exceed 35 centimeters in height assuming that the height follow a normal distribution</p>	(8) (8)																		
Q.6.	<p>a) Write down the procedure of one-way ANOVA</p> <p>b) Complete the ANOVA Table and analyze at 5% level of significance that all treatments mean are significantly different.</p>	(8) (8)																		

S.O.V	d.f.	S.S	M.S	F-ratio
B.S.S	5	?	11.5	?
E.S.S	?	?	?	=
T.S.S	24	200.25	=	=

Section – II

Q.7.	a) Solve the equation $\frac{1}{x+1} + \frac{2}{x+2} = \frac{7}{x+5}$	(5)
	b) How many terms are there in the G.P.; 1,3,9.....,729?	(5)
	c) Using binomial theorem expand $\left(\frac{x}{2} - \frac{2}{x^2}\right)^6$	(6)
Q.8.	a) Prove the identity: $\cos^4 \theta - \sin^4 \theta = 1 - 2\sin^2 \theta$	(5)
	b) Find K so that the line joining A(7,3), B(k,-6) and the line joining C(-4,5), D(-6, 4) are parallel.	(5)
	c) Find the equation of the ellipse with centre at the origin, major axis of length 6 unit located on the x – axis, and minor axis of length 4 units.	(6)
Q.9.	a) A rectangular has perimeter 20m. Express the area of rectangle as a function of the length of one of its sides.	(5)
	b) Differentiate $f(x) = e^{3\cos x} + \ln(x^2 + 2x - 2)$	(5)
	c) Evaluate $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x dx$	(6)



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) 2nd Prof: Annual-2021

Subject: Pharmacy Practice-I

(Pharmaceutical Mathematics and Biostatistics)

Paper: 6 Part - I (Compulsory)

(New Course)

Time: 30 Min. Marks: 20

Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

Attempt this Paper on this Question Sheet only.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer cutting and overwriting is not allowed. (20x1=20)

i.	In microbiology, the average dilution titers is computed by a) Arithmetic Mean b) Geometric Mean c) Harmonic Mean d) Median
ii.	If mean, median and mode are 10, 16 and 22 respectively the distribution is a) Symmetric b) Negatively skewed c) Normal d) Positive skewed
iii.	All are measure of dispersion expect a) Median b) Range c) Mean Deviation d) Standard Deviation
iv.	The range of normal distribution is a) $-\infty$ to $+\infty$ b) $-\infty$ to 0 c) $+\infty$ to 0 d) 0 to $-\infty$
v.	If the probability of new born being female is 0.5, then the probability of new born being male is a) 1 b) 0 c) 0.5 d) -0.5
vi.	A type - II error is committed when a a) False H_A is accepted b) True H_0 is rejected c) False H_0 is accepted d) None of these
vii.	Normal curve is a) Linear b) Parabolic c) Curvilinear d) Symmetrical
viii.	The sum of deviation taken from Mean is always equal to a) One b) Zero c) Two d) Three
ix.	Heights and weights of boys in a classroom are a) Associated b) Correlated c) Both of these d) None of these
x.	t - distribution is asymptotic to a) x - axis b) y - axis c) z - axis d) xy - axis

xi.	The value of the chi-square lies between a) 0 and ∞ b) 0 to -1 c) -1 to +1 d) 0 to $-\infty$
xii.	Least significance difference is applied in condition when a) H_0 is accepted b) H_0 is rejected c) Both cases d) None of these cases
xiii.	If $4^x = \frac{1}{2}$, then x is equal to a) 2 b) 8 c) $-\frac{1}{2}$ d) $\frac{1}{2}$
xiv.	The number of signals that can be given by 5 flags of different colours, using 3 flags at a time is a) 15 b) 60 c) 8 d) 2
xv.	If A,G,H are arithmetic, geometric and harmonic means between two numbers a and b, then which of the following options is true? a) $G = A \times H$ b) $G^2 > A \times H$ c) $G^2 < A \times H$ d) $G^2 = A \times H$
xvi.	$\frac{7\pi}{12}$ converted into degrees is a) 105° b) 135° c) 150° d) 75°
xvii.	All points (x, y) with $x < 0$, $y > 0$ determine a) Quadrant I b) Quadrant III c) Quadrant II d) Quadrant IV
xviii.	The centre of the circle $x^2 + y^2 - 4x - 10y - 71 = 0$ is a) (-2,-5) b) (2,5) c) (5,2) d) (-5,-2)
xix.	The function $f(x) = \frac{15}{x-3}$ is not defined for a) $x = 5$ b) $x = -5$ c) $x = -3$ d) $x = 3$
xx.	Given that y varies inversely as x, and $y=5$ when $x=2$; then y in terms of x is a) $y = \frac{10}{x}$ b) $y = \frac{5}{2}x$ c) $y = \frac{2}{5}x$ d) $\frac{3}{x}$