

[LH 0815]

AUGUST 2015

Sub.Code :2604

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR
PAPER IV – BIO STATISTICS AND PHYSICS**

Q.P. Code: 802604

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. A certain drug administered to 10 patients showed following additional hours of sleep;

-1.0	0.5	2.7	-0.6	1.2	1.8	1.6	3.5	0.2	-1.7
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Can it be concluded that the drug does produce additional hours of sleep?

2. Write brief notes on ANOVA.
3. Write briefly about states of matter. Discuss in detail about various gas laws and its clinical application.

II. Write Notes on:

(8 x 5 = 40)

1. Explain the procedure for doing chi-square test.
2. Write short notes on systematic and cluster sampling.
3. Find the mean deviation from median and mode from the following data:

C I	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
Frequency	7	10	16	24	23	28	17	7	2	1

4. Scatter diagram.
5. Why it that standard deviation is considered the most popular measure of dispersion?
6. Measure of mortality.
7. Oxygen dissociation curve.
8. Factors affecting gas diffusion across alveoli to blood.

III. Short Answers on:

(10 x 3 = 30)

1. What are the main purposes of tabulation?
2. The following data gives the per acre yield on wheat (kilogram) from 10 experimental farms

2020	2100	2040	2030	2070	2060	2080	2050	2110	2090
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3. Give different methods of collection of data.
4. Define measure of dispersion.
5. Type of population.
6. Types of error.
7. Define regression analysis.
8. Vital capacity.
9. Surfactant and its role.
10. Venturi principle.

[LI 0216]

FEBRUARY 2016

Sub.Code :2604

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR
PAPER IV – BIO STATISTICS AND PHYSICS**

Q.P. Code: 802604

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. Obtain the regression equation of Y on X for the following data.

X(Age)	66	35	56	42	72	36	63	47	55	45
Y (BP)	145	124	147	125	160	118	128	128	150	124

Also estimate the BP of a man whose age is 50 years.

2. What is sampling? Explain the important methods of sampling commonly used?
3. A. Discuss the anatomical structures and its contribution, significance of pulmonary Ventilation.
- B. Identify muscles associated with breathing and their function in pulmonary ventilation at rest and during exercise. Discuss about control of respiration.

II. Write Notes on:

(8 x 5 = 40)

1. Distinguish between correlation and regression.
2. Explain student's t-test and its application.
3. What are the characteristics of good average?
4. Write notes of Multivariate analysis.
5. Write notes on mann whitney U-test?
6. An IQ test was administered to 5 persons before and after they are trained, the result are given below.

Candidate	I	II	III	IV	V
IQ Before	110	120	123	132	125
IQ After	120	118	125	136	121

7. Ideal gas equation – How do you arrive at it?
8. Hypoxic pulmonary vasoconstriction.

III. Short Answers on:

(10 x 3 = 30)

1. Name different measures of central values.
2. Define Harmonic mean.
3. Define statistics.
4. Define Standard deviation.
5. What is the need of sampling?
6. Define null and alternative hypothesis.
7. Define correlation and its properties.
8. Anatomical dead space.
9. Avagadro's number.
10. Define shunt and dead space.

[LJ 0816]

AUGUST 2016

Sub.Code :2604

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR
PAPER IV – BIO STATISTICS AND PHYSICS**

Q.P. Code: 802604

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. Explain the process of drawing a simple random sample with an example.
2. The test scores of 40 students are summarized in a frequency distribution below.
Find the mean, variance and standard deviation for the data

Scores	50-59	60-69	70-79	80-89	90-99
Freq	8	7	10	9	6

3. Discuss factors affecting oxygenation and ventilation.

II. Write Notes on:

(8 x 5 = 40)

1. Discuss the applications of statistics in respiratory therapy.
2. Explain descriptive statistics.
3. Discuss the construction of frequency distribution.
4. The weekly salaries of 24 randomly selected employees of a company are given below. Construct a box plot for the dataset.

310	320	450	460	470	500	520	540	580	600
650	700	710	840	870	900	1000	1200	1250	1300
1400	1720	2500	3700						

5. Explain normal distribution and its properties.
6. What are uses of a scatter diagram?
7. Illustrate the steps in conducting a paired –t-test.
8. Explain analysis of variance with relevant examples.

III. Short Answers on:

(10 x 3 = 30)

1. Define statistics.
2. What is mode?
3. Define quartiles.
4. What is an alternative hypothesis?
5. Define standard error.
6. Define range.
7. What is a random sample?
8. What is correlation analysis?
9. Discuss states of matter.
10. State Charles' laws.

[LK 0217]

FEBRUARY 2017

Sub.Code :2604

B.Sc. RESPIRATORY THERAPY

FIRST YEAR

PAPER IV – BIO STATISTICS AND PHYSICS

Q.P. Code: 802604

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. Discuss ANOVA and its applications.
2. Calculate the pearson's correlation coefficient for the following data

X	10	5	12	8	18
Y	12	8	15	7	24

3. Discuss the various roles of surfactant.

II. Write Notes on:

(8 x 5 = 40)

1. Explain the steps involved in hypothesis testing.
2. Distinguish between random and non-random sampling procedure.
3. Calculate mean, median and mode for the following data:

25	20	30	40	24	39	20	20	30	21
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4. Explain the uses of a scatter diagram.
5. Explain measures of dispersion.
6. Explain the purpose of regression analyses.
7. Discuss the three types of t-tests with relevant examples.
8. Discuss Venturi principle.

III. Short Answers on:

(10 x 3 = 30)

1. What is the scope of statistics?
2. Define quartiles.
3. What is called sampling frame?
4. What is a parameter?
5. Define type 1 error.
6. Define standard deviation.
7. What is the equation for a straight line?
8. Define vital capacity.
9. Discuss states of matter.
10. Explain briefly gas diffusion.

B.Sc. RESPIRATORY THERAPY

FIRST YEAR

PAPER IV – BIO STATISTICS AND PHYSICS

Q.P. Code: 802604

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. Explain regression lines. Obtain the regression equation of X on Y from the following data.

X	2	3	7	8	10
Y	10	9	11	8	12

2. Explain Normal distribution and the application of normal probability curve.
3. Briefly explain the factors affecting oxygenation and ventilation.

II. Write Notes on:

(8 x 5 = 40)

1. Differentiate random and non-random sampling procedure.
2. Find the coefficient of variation for the following data.

C.I	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
F	10	15	32	40	22	18

3. Calculate the mean, median, mode of the following data.
45, 55, 58, 62, 65, 68, 69, 70, 73, 74, 77, 79, 74, 81, 74, 83, 89, 93, 96, 99.
4. Chi-square test.
5. Scatter diagram.
6. Explain Gas laws.
7. Student's t-test and its application.
8. Discuss the different patterns of flow.

III. Short Answers on:

(10 x 3 = 30)

1. Avogadro number.
2. Different states of matter.
3. Standard deviation.
4. Quartiles.
5. Pie diagram.
6. Median.
7. What is statistical significance?
8. Correlation.
9. Variance.
10. Types of population.

B.Sc. RESPIRATORY THERAPY

FIRST YEAR

PAPER IV – BIO STATISTICS AND PHYSICS

Q.P. Code: 802604

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. The temperature (X) and pulse (Y) of five patients tabulated below. Calculate the Karl Pearson's coefficient of correlation between X and Y.

Patient	Temperature (X)	Pulse (Y)
A	102	100
B	101	90
C	100	80
D	99	70
E	98	60

2. With neat diagram explain the different types of graphs and the important points to be remembered in the construction of graphs.
3. Explain the different states of matter and its properties. How do particles move in solids, liquids, and gases?

II. Write Notes on:

(8 x 5 = 40)

1. Characteristics of Normal distribution.
2. Derive Ideal gas equation.
3. Calculate mean and median from following data

C.I	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
F	10	20	35	40	25	25	15

4. Calculate the standard deviation and co-efficient of variation using the following data; 25, 28, 30, 27, 25.
5. List the uses of Chi-square test.
6. Explain frequency distribution.
7. Discuss Mann Whitney test.
8. Explain analysis of variance with examples.

III. Short Answers on:

(10 x 3 = 30)

1. Laminar flow.
2. Standard error.
3. Pressure.
4. Charles law.
5. Random sample.
6. Median.
7. Type I error.
8. Range.
9. Histogram.
10. Harmonic mean.

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR
PAPER IV – BIO STATISTICS AND PHYSICS**

Q.P. Code: 802604

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. What is sampling? Explain the commonly used sampling methods.
2. Explain ANOVA and its applications. What are the different types of ANOVA?
3. Briefly explain various gas laws and derive Ideal gas equation.

II. Write Notes on:

(8 x 5 = 40)

1. Concepts of Correlation and Regression.
2. Calculate mean and median from the following ungrouped data relating to Hemoglobin percent in g/100 ml. 6.5, 6.0, 7.5, 8.2, 8.5, 8.7, 8.8, 8, 9, 9 and 9.5.
3. Write the properties of Normal distribution.
4. Calculate the standard deviation and co-efficient of variation using the following data; 25, 28, 30, 27, 25.
5. Measures of central tendency.
6. Different patterns of liquid flow.
7. Principle of Venturi meter.
8. Characteristics of good average.

III. Short Answers on:

(10 x 3 = 30)

1. Variance.
2. Test of significance.
3. Scatter diagram.
4. Measure of dispersion.
5. Quartiles.
6. States of matter.
7. Types of error.
8. Avogadro number.
9. Tabulation of data.
10. Define statistics.

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR
PAPER IV – BIO STATISTICS AND PHYSICS**

Q.P. Code: 802604

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. The researcher have 500 respiratory rate value of pediatric pneumonic patient. The researcher is more interested to find the central distribution of this data set. To describe which type of test is used and what are the merits and demerits of this test.
2. With neat diagram explain the different types of graphs and the important points to be remembered in the construction of graphs.
3. Briefly explain various gas laws and derive Ideal gas equation.

II. Write Notes on:

(8 x 5 = 40)

1. Characteristics of good average.
2. Bias.
3. Test of significance.
4. H_0 & H_1 .
5. Odds ratio, Risk ratio.
6. Chi square test.
7. Standard Deviation, Standard Error, Co efficient Of Variation.
8. Blinding.

III. Short Answers on:

(10 x 3 = 30)

1. Paired t test.
2. Population mean.
3. Skewness and kurtosis.
4. Confidence limit.
5. Significance of 2x2 contingency table.
6. Prevalence.
7. Rate, Ratio, Proportion.
8. Infant Mortality Rate.
9. ANOVA.
10. Write some statistical tool names which used for analysis?

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR
PAPER IV – BIO STATISTICS AND PHYSICS**

Q.P. Code: 802604

Time: Three Hours

Maximum : 100 Marks

Answer All questions

I. Elaborate on:

(3 x 10 = 30)

1. The researcher wants to know the prevalence and the incidence rate of patients who underwent mechanical ventilation therapy. Write a research protocol and methodology based on this research question.
2. Define data and briefly explain the various methods of presenting data.
3. Which test has been used to find the relationship between the age and respiratory rate among the patients attending in respiratory OP.?

II. Write Notes on:

(8 x 5 = 40)

1. Non Random Sampling.
2. Non probability technique.
3. Non Parametric tests.
4. Difference between the sample mean and the population mean.
5. Explain the sampling technique.
6. Standard error.
7. Confidence Interval.
8. Independent t test.

III. Short Answers on:

(10 x 3 = 30)

1. Critical region.
2. Level of significance.
3. Power of the study.
4. Co variance and Co efficient.
5. Incidence.
6. Risk ratio.
7. Cluster sampling.
8. Minimize the error.
9. Mean, Median, Mode.
10. Mortality rate.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0321]

MARCH 2021

Sub. Code: 2604

(AUGUST 2020 EXAM SESSION)

B.Sc. RESPIRATORY THERAPY

FIRST YEAR (Regulation 2014-2015)

PAPER IV – BIO STATISTICS AND PHYSICS

Q.P. Code : 802604

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Define the normally distributed and non-normally distributed data briefly note the specific test for the each data.
2. Discuss the anticipation of the data and the types of the probability with the example.
3. Various methods of sampling technique.

II. Write Notes on:

(8 x 5 = 40)

1. Research question and the formation of research question.
2. Critical area and critical region with its significance.
3. Confidence Interval.
4. Types of Error.
5. Testing of hypothesis.
6. Regression.
7. Sample size.
8. Odds ratio and Risk ratio.

III. Short Answers on:

(10 x 3 = 30)

1. Interquartile range.
2. Mean, Median, Mode.
3. Standard deviation and standard error.
4. Correlation.
5. Skewness.
6. Rate, ratio, proportion.
7. Coefficient of variance.
8. P value.
9. Parametric test.
10. Significance of biostatistics in research.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0422]

APRIL 2022

Sub. Code:2604

(FEBRUARY 2021 & AUGUST 2021 EXAM SESSIONS)

B.Sc. RESPIRATORY THERAPY

FIRST YEAR (Regulations 2014-2015)

PAPER IV – BIO STATISTICS & PHYSICS

Q.P NO. 802604

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Estimate SBP value when DBP – 90 using regression Co-efficient.

DBP	78	95	76	92	98	95
SBP	127	135	120	130	144	136

2. Discuss Measures of variability with its merits and demerits.
3. Describe three important Gas Laws.

II. Write Notes on:

(8 x 5 = 40)

1. Find out the measures of central tendency for the given data of the systolic BP (in mm Hg) recordings from 11 persons:
150,126,160,130,128,154,122,160,150,146,158.
2. What is oxygenation and ventilation?
3. Frequency distribution.
4. Normal Distribution.
5. ANOVA.
6. States of matter.
7. Median test.
8. Scatter diagram.

III. Short Answers on:

(10 x 3 = 30)

1. Scales of Measurement.
2. Probability.
3. Sampling error.
4. Non-parametric test.
5. Product moment correlation.
6. Diffusion.
7. Test of Significance.
8. Correlation.
9. Bar and Pie diagram.
10. Parameter.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1122]

NOVEMBER 2022

Sub. Code: 2604

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR (Regulation 2014-2015)
PAPER IV – BIO STATISTICS & PHYSICS
Q. P. Code: 802604**

Time: Three hours

Maximum : 100 Marks

Answer ALL Questions

I. Elaborate on: (3 x 10 = 30)

1. Discuss about various levels of measurements of biological data.
2. Briefly explain sampling and non-sampling errors. How can you control these errors?
3. Write a general procedure for testing of hypotheses.

II. Write notes on: (8 x 5 = 40)

1. Clarify the difference between classification and tabulation.
2. Briefly discuss exclusive and inclusive class intervals.
3. Explain in brief pie-chart.
4. What are the properties of a good measures of central tendency?
5. What do you understand by the test of goodness of fit?
6. Define regression co-efficient and discuss its properties.
7. How is median test performed?
8. Discuss factors affecting Oxygenation and Ventilation.

III. Short answers on: (10 x 3 = 30)

1. What are the demerits of arithmetic mean?
2. What is the impact of extreme values of a set on median?
3. Define co-efficient of variation.
4. Give two examples for mutually exclusive events.
5. State the axioms of probability.
6. Define critical value.
7. Distinguish between descriptive and inferential statistics.
8. What is alternative hypothesis?
9. Define Gay Lussac's law.
10. Write the categories of gas flow in vacuum systems.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0423]

APRIL 2023

Sub. Code: 2604

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER IV – BIO STATISTICS & PHYSICS
Q.P. Code: 802604**

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. The researcher have 500 respiratory rate value of pediatric pneumonic patient. The researcher is more interested to find the central distribution of this data set. Describe the type of test used and what are the merits and demerits of this test.
2. The researcher was interested to find the efficacy of two different oxygen flow methods among the patients who are admitted in the ICU with the complaints of COPD. Which type of sampling technique is used to allocate the patient in the both groups.
3. Define the various type of study designs and explain in the detail regarding Analytical Study.

II. Write Notes on:

(8 x 5 = 40)

1. Correlation and regression.
2. Bias.
3. Test of significance.
4. State the Law of Gas.
5. Odds ratio, Risk ratio.
6. Chi square test.
7. Standard Deviation, Standard Error, Co efficient of Variation.
8. Blinding.

III. Short Answers on:

(10 x 3 = 30)

1. Paired t test.
2. Population mean.
3. Skewness and kurtosis.
4. Confidence limit.
5. Significance of 2x2 contingency table.
6. Diffusion.
7. Rate, Ratio, Proportion.
8. Infant Mortality Rate.
9. ANOVA.
10. Scatter diagram.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1123]

NOVEMBER 2023

Sub. Code: 2604

B.Sc. RESPIRATORY THERAPY
FIRST YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER IV – BIO STATISTICS & PHYSICS
Q.P. Code: 802604

Time: Three Hours

Answer All questions

Maximum : 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. A study was conducted among 152 subjects to find the association of gender and a specific disease. Of total 70 males, 40 were found to have the disease while 38 of 82 females had the disease.
 - a) State the Null hypothesis.
 - b) Construct a 2X2 table.
 - c) Apply the Chi-Square test and interpret.
2. Describe measures of central tendency with examples.
3. Discuss factors affecting Oxygenation and Ventilation.

II. Write Notes on:

(8 x 5 = 40)

1. Find out Quartile Deviation for the given data of the systolic BP (in mm Hg) recordings from 11 persons: 150, 126, 160, 130, 128, 154, 122, 160, 150, 146, 158.
2. Normal Probability Curve.
3. Non-Parametric Test.
4. Frequency Distribution.
5. Presentation of Data.
6. Rank Correlation.
7. Type 1 and Type 2 error.
8. States of Matter.

III. Short Answers on:

(10 x 3 = 30)

1. Types of Variables.
2. Sample size.
3. Functions of Statistics.
4. Range and its coefficient.
5. Assumptions of 't' test.
6. Ways of lung volume measurement.
7. Mean Deviation.
8. Define Gay- Lussac's Law.
9. Capnography.
10. Regression.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 0424]

APRIL 2024

Sub. Code: 2604

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER IV – BIO STATISTICS & PHYSICS
Q.P. Code: 802604**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Discuss presentation of data with appropriate scales of measurement.
2. Explain the importance of diffusion.
3. Calculate rank correlation coefficient from the following data:

x	78	89	97	69	59	79	68
y	125	137	156	112	107	136	124

II. Write Notes on:

(8 x 5 = 40)

1. Measures of Central Tendency.
2. Distinguish between Parametric and Non-Parametric tests.
3. Discuss about Lung Volume Measurements.
4. Standard deviation and its coefficient.
5. Steps in Hypothesis Testing.
6. Characteristics of Normal Curve.
7. Different patterns of liquid flow.
8. Three important Gas Laws.

III. Short Answers on:

(10 x 3 = 30)

1. Discuss states of Matter.
2. Limitations of statistics.
3. Graphical Data Presentation.
4. Power of the test.
5. Level of significance.
6. Percentiles.
7. Oxygenation.
8. Assumptions of ANOVA.
9. Need for sample.
10. Mean Deviation.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1125]

NOVEMBER 2025

Sub. Code: 2604

**B.Sc. RESPIRATORY THERAPY
FIRST YEAR (Regulations 2014-2015 & 2018-2019 onwards)
PAPER IV – BIO STATISTICS & PHYSICS
Q.P. Code: 802604**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain various methods of collecting primary data and give their merits.
2. Explain in detail about ANOVA.
3. Define Regression. Elaborately discuss on different type of regression models. List out properties of Regression co-efficient.

II. Write Notes on:

(8 x 5 = 40)

1. Write a relationship between mean, median and mode.
2. Define Standard deviation. Write merits and demerits.
3. Distinguish between standard deviation and standard error.
4. List out the characteristics of normal probability distribution.
5. Write Mann-Whitney U-test for testing the identicalness of two populations.
6. Briefly give notes on scatter diagram.
7. What are the factors affecting oxygenation?
8. Write short note on different types of states of matter.

III. Short Answers on:

(10 x 3 = 30)

1. What is the role of Bio-statistics?
2. What you understand by ordinal scale.
3. Write the meaning of cumulative frequency.
4. Define range and its relative of measure.
5. How you rectify non-sampling error.
6. Define complimentary event.
7. What is the difference between linear and non-linear model?
8. What are the uses of 2x2 contingency table?
9. What tests are using for small sample? Why?
10. Define Boyle's law.
