

**TWO YEARS POST MATRIC TEACHING PROGRAM
OF PARAMEDICS**

**F. SC. MEDICAL LABORATORY TECHNOLOGY
(Elementary Chemistry & Chemical Pathology)**

ELEMENTARY CHEMISTRY AND CHEMICAL PATHOLOGY

Theoretical - 100 x 1 hrs.

Practical - 85 x 2 hrs.

ELEMENTARY CHEMISTRY

1. Introduction to Chemistry

Definition - Division of chemistry - utility of each branch.

2. Element

Definition- atomic structure - periodic tables - valency properties - classification - symbols - metals and nonmetals - Brief description of important elements.

3. Compound and mixture

Definition - properties - difference between mixture and compound - separation of mixture - formulae of common compounds.

4. Units of measurement

Metric system - imperial system - conversion from Fahrenheit to Centigrade and vice versa - measurement of weight, volume, heat, energy, length etc.

5. Solution.

Definition - compounds and solutions - classification of solution - solubility - factors influencing solubility - concentration of solution - molar, molal, normal and saturated solution - preparation of solution.

6. Acid, base and salt.

Definition of acid, base, salt and alkali - measurement of strength of acidity and alkalinity - titration - hydrogen ion concentration - measurement of hydrogen ion concentration - indicators - pH - Henderson Hassel Bach equation.

7. Various chemical process.

Definition - Procedure - Utilisation

Filtration	Distillation
Crystallisation	Fractional distillation
Decantation	Hydrolysis
Precipitation	Centrifugation
Evaporation	Oxidation and reduction
Titration	Catalysis.
Sublimation	

8. Chemical reactions

Introduction brief description of chemical reactions and its types.

9. Introduction of chemical pathology

Definition and scope of chemical pathology - subjects to be taught - relationship with other branches of pathology - apparatus and reagents to be used - description. Principle of operation of calorimeter, flame photometer, blances, pH meter and centrifuge.

10. Carbohydrates, lipids, proteins, enzymes and vitmins.

Brief account of sources, classification, metabolism and importance.

11. Blood/chemistry

Normal values - short description of metabolism - interpretation of findings of following in blood.

Sugar, cholesterol, urea, uric acid, bilirubin, alkaline and acid phosphate, creatinine. Total protein, S.G.P.T, S.G.O.T., thymol turbidity.

12. Electrolytes and water

Important electrplytes in human body. Brief account of functions and metabolism of Na. K.Ca and Fe in blood - distribution of body fluid - dehydration and oedema.

13. **Significance of** quantitative analysis of urine for calcium, creatinine urea, sugar, albumin chloride.

ELEMENTARY CHEMISTRY AND CHEMICAL PATHOLOGY

Topics	Wight age %
1. Introduction to chemistry.	02 %
2. Element.	03 %
3. compound and mixture.	04 %
4. Units of measurement.	04 %
5. Solutions.	05 %
6. acid, base and salts.	07 %
7. Various chemical process.	12 %
8. Chemical reactions.	04 %
9. Introduction to chemical pathology.	07 %
10. Carbohydrates, lipids, proteins, enzymes and vitamins.	20 %
11. Blood chemistry.	20 %
12. Electrolytes and water.	06 %
13. Significance of quantitative analysis of urine.	06 %
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Total :	100 %

ELEMENTARY CHEMISTRY AND CHEMICAL PATHOLOGY
PRACTICAL ACTIVITIES CLASS XI AND XII

Activities	Number of Laboratory Periods
1	2

Elementary Chemistry

1. Measurement of weight in different units.	1
2. Measurement of volume in different units.	1
3. measurement of length in different units.	1
4. Measurement of heat in different units.	1
5. Use and maintenance of electrical balances.	1
6. Solubility - demonstration of factors affecting solubility.	1
7. preparation concentrated solution.	1
8. Preparation of Molar solution of different compounds.	2
9. Preparation of Molal solution of different compounds.	2
10. Preparation of Normal solution of different compounds.	2
11. preparation of saturated solution of different compounds.	1
12. Measurement of strength of acidity and alkalinity - titration of acid, bases and other solutions.	3
13. Measurement of pH of solutions by different methods.	2
14. Demonstration of following procedures: filtration - Crystallisation - decantation - distillation - fractional distillation - centrifugation - Hydrolysis - oxidation - reduction etc.	8

Chemical Pathology

15. Introduction - apparatus and reagents used in chemical pathology laboratory.	2
16. Description, principle and operation of colorimeters - different types.	2
17. <i>Description and operation of flame photometer.</i>	2
18. Description and operation of pH meters.	2
19. Description and operation of balances.	2
20. Description and operation of centrifuge.	2
21. Sampling of blood and urine for chemical examination - Separation of plasma and serum.	1
22. Preparation of anticoagulant and preservatives used in chemical pathology	2
23. Estimation of glucose in blood - interpretation of results.	3
24. Estimation of cholesterol in blood.	3
25. Estimation of urea in blood.	3
26. Estimation of creatinine in blood.	3
27. Estimation of uric acid in blood.	3
28. Estimation of bilirubin in blood.	3
1	2

29. Estimation of total protein in blood.	3
30. Estimation of Acid phosphatase in blood.	2
31. Estimation of Alkaline phosphatase in blood.	2
32. Estimation of S.G.P.T in blood.	2
33. Estimation of S.G.O.T in blood.	2
34. Demonstration of Thymol turbidity test.	1
35. Estimation of sodium and potasium in serum by flame photometer.	4
36. Estimation of calcium in blood.	2
37. Quantitative analysis of urine for calcium, creatinine, urea, sugar, albumin and chloride.	8

Total:-	85

LABORATORY REQUIREMENT FOR CHEMICAL PATHOLOGY

Equipment

- | | |
|-----------------------------------|------------------|
| 1. Balance. | 6. pH meter. |
| 2. Incubator. | 7. Centrifuge. |
| 3. Water bath. | 8. Refrigerator. |
| 4. Calorimeter/Spectrophotometer. | 9. Hot Plate. |
| 5. Flame Photometer. | |

Glass Ware

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|----------------------|------------------------|
| 1. Volumetric flask. | 9. Wash bottles. |
| 2. Conical flask. | 10. Funnel. |
| 3. Beakers. | 11. Cylinders. |
| 4. Pipettes. | 12. Pestle and mortar. |
| 5. Test tubes. | 13. Pasteur pipettes. |
| 6. Centrifuge tubes. | 14. Cuvettes. |
| 7. Reagent bottles. | 15. Burettes. |
| 8. Dropping bottles. | 16. Follin Wu tubes. |

Chemicals

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|--------------------------|---------------------------------|
| 1. Copper sulphate. | 27. Cholesterol Powder. |
| 2. Sodium chloride. | 28. Potassium sodium tartarate. |
| 3. Sodium carbonate. | 29. Potassium iodide. |
| 4. Tartaric acid. | 30. Sodium sulphate. |
| 5. Molybdic acid. | 31. Sulfosalicylic acid. |
| 6. Sodium tungstate. | 32. Sodium citrate. |
| 7. Sodium hydro - oxide. | 33. Trisodium citrate. |
| 8. Phosphoric acid. | 34. Potassium dichromate. |
| 9. Glucose. | 35. Sodium nitroprusside. |
| 10. Benzoic acid. | 36. Nitric acid. |