pharmacy

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SECTION :

pharmacy

SUBJECT :

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In exercise of the powers conferred by section 10 of the Pharmacy Act, 1948 (8 of 1948), the Pharmacy Council of India, with the approved of the Central Govt. hereby makes the following regulations namely :- 33/3

CHAPTER-I

1. Short title and commencement :

(1) These regulations may be called the Education Regulations, 1991.

(2) They shall come into force on the date of their publication in the official Gazette.

2. Qualification for Pharmacist: The minimum qualification required for registration as a pharmacist shall be a pass in Diploma in pharmacy (Part-I & Part-II and satisfactory completion of Diploma in Pharmacy (Part-III).

Or

Any other qualification approved by the Pharmacy Council of India as equivalent to the above.

3. Diploma in Pharmacy Part-I and Part-II shall consist of a certificate of having passed the course of study prescribed in Chapter-II of these regulations.

4. Diploma in Pharmacy Part-III shall consist of a certificate of having satisfactorily completed course of practical training as prescribed in Chapter-III of these regulations.

Diploma in Pharmacy (Part-I and Part-II)

5. Minimum qualification for admission to Diploma in Pharmacy Part-I course :- A pass in any of the following examinations with Physics, Chemistry and Biology with 60% marks in aggregate on the above subject :

(1) Intermediate examination in Science.

(2) The first year of the three year degree course in Science.

(3) 10+2 examination (academic stream) in Science.

(4) Pre-degree examinations or

(5) Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

6. Duration of the course : The duration of the course shall be for two academic years and each academic year spread over a period of not less than one hundred and eighty working days in addition to 500 hours practical training spread over a period of not less than 3 months.

7. Course of study: The course of study for Diploma in Pharmacy Part-I and Diploma in Pharmacy Part-III shall include the subjects as given in the Tables I & II below. The number of hours devoted to each subject for its teaching in Theory and Practical shall not be less than that noted against it in columns 2 and 3 of the Tables below.

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TABLE- I

(Diploma in Pharmacy (Part-I)

Subject	No. of hours of theory	No.of hours of practical
Pharmaceutics-I	75	100
Pharmaceutical Chemistry	75	75
Pharmacognosy	75	75
Biochemistry & Clinical Pathology	50	75
Human Anatomy & Physiology	75	50
Health Education & Community Pharmacy	50	-
	400	375 =775

TABLE-II

Diploma in Pharmacy (Part-II)

Subject	No.of hours of theory	No.of hours of practical
Pharmaceutics-II	75	100
Pharmaceutical Chemistry-II	100	75
Pharmacology & Taxacology	75	50
Pharmaceutical Jurisprudence	50	-
Drug Store and Business Management.	75	-
Hospital and Clinical Pharmacy.	75	50
	450	275 =725

8. The syllabus for each subject of study in the said Tables shall be as specified in Appendix-A to these regulations.

9. Approval of the authority conducting the course of study:-

The course of regular academic study prescribed under regulation 7 shall be conducted in an institution, approved by the Pharmacy Council of India under sub-section (1) of Section 12 of the Pharmacy Act, 1948.

Provided that the Pharmacy Council of India shall not approve any institution under this regulation unless it provides adequate arrangements for teaching in regard to building, accommodation, equipment and teaching staff as specified in Appendix-5 to these regulations.

10. Examinations :-

There shall be an examination for Diploma in Pharmacy (Part-I) to examine students of the first year course and an examination for Diploma in Pharmacy (Part-II) to examine students of the second year course. Each examination may be held twice every year. The first examination in a year shall be the annual examination and the second examination shall be supplementary examination of the Diploma in Pharmacy (Part-I) or Diploma in Pharmacy (Part-II), as the case may be. The examination shall be of written and practical (including oral) nature, carrying maximum marks for each part of a subject, as indicated in Table-III and IV below:

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TABLE-III

Diploma in Pharmacy(Part-I) Examination

Subject	Maximum Marks for Theory			Maximum Marks for Practical		
	Exam. nation	*Sess- ional	Total	Exami- nation	*Sess- ional	Total
Pharmaceutics-I	80	20	100	70	30	100
Pharm.Chem-I	80	20	100	70	30	100
Pharmacognesy	80	20	100	70	30	100
Biochemistry & Clinical Pathology	80	20	100	70	30	100
Human Anatomy & Physiology	80	20	100	70	30	100
Health Education and Communitys Pharmacy	80	20	100	-	-	-
Total			600			500 =1100

*Internal assessment

TABLE-IV

Diploma in Pharmacy (Part-II) examination

Subject	Maximum Marks for Theory			Maximum Marks for Practical		
	Exami- nation	*Sess- ional	Total	Exami- nation	Sess- ional	Total
Pharmaceutics-II	80	20	100	70	30	100
Pharm.Chem-II	80	20	100	70	30	100
Pharmacology& Toxicology	80	20	100	70	30	100
Pharmaceutical Jurisprudence	80	20	100	-	-	-
Drugs Store & Business Mgt.	80	20	100	-	-	-
Hospital & Clinical Pharmacy	80	20	100	70	30	100
Total			600			= 1000 400

* Internal assessment.

11. Eligibility for appearing at the Diploma in Pharmacy Part-I Examination 33/8

Only such candidates who produce certificate from the head of the Academic institution in which he/she has undergone the Diploma in Pharmacy Part-I course, in proof of his/her having regularly and satisfactorily undergone the course of study by attending not less than 75% of the classes held both in theory and in practical separately in each subject shall be eligible for appearing at the Diploma in Pharmacy (Part-I) examination.

12. Eligibility for appearing at the Diploma in Pharmacy Part-II examination.

Only such candidates who produce certificate from the Head of the academic institution in which he/she has undergone the Diploma in Pharmacy Part-II course, in proof of his/her having regularly and satisfactorily undergone the Diploma in Pharmacy Part-II course by attending not less than 75% of the classes held both in theory and practicals separately in each subject, shall be eligible for appearing at the Diploma in Pharmacy (Part-II) examination.

13. Mode of examinations:

1) Each theory and practical examination in the subject mentioned in Table-III & IV shall be three hours duration.

2) A candidate who fails in theory or practical examination of subject shall re-appear both in theory and practical, of the same subject.

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3) Practical examination shall also consist of a viva voce (Oral) examination.

14. Award of sessional marks and maintenance of records

1) A regular record of both theory and practical class work and examinations conducted in an institution imparting training for Diploma in Phermacy Part-I and Diploma in the Pharmacy Part-II courses, shall be maintained for each student for the institution and 20 marks for each theory and 30 marks for each practical subject shall be allotted as sessionals.

2) There shall be at least two periodic sessional examinations during each academic year. The highest aggregate of any two performances shall form the basis of calculating sessional marks.

3) The sessional marks in practicals shall be allotted on the following basis:

Actual performance in the sessional examination. 15. Day to Day assessment in the practical class work.15

15. Minimum marks for passing the examination:

A student shall not be declared to have passed Diploma in Pharmacy examination unless he/she secures at least 50% marks in each of the subject separately in the theory examinations, including sessional marks and at least 60% marks in each of the practical examination including sessional marks. The candidates securing 60% marks or above in aggregate

in all subjects in a single attempt at the Diploma in Pharmacy (Part-I) or Diploma in Pharmacy(Part-II) examinations shall be declared to have passed in first class the Diploma in Pharmacy (Part-I) or Diploma in Pharmacy (Part-II) examinations, as the case may be. Candidates securing 75% marks or above in any subject or subject shall be declared to have passed with distinction in that subject or those subjects provided he/she passes in all the subjects in a single attempt.

16. Eligibility for promotion (Part-II) Diploma in Pharmacy

All candidates who have prepared for all the subjects and passed the Diploma in Pharmacy Part-I examination are eligible for promotion to the Diploma in Pharmacy Part-II class. However, failure in more than two subject shall debar him/her from promotion to the Diploma in Pharmacy Part-II class.

17. Improvement of sessional marks:

Candidates who wish to improve sessional marks can do so, by appearing in two additional sessional examinations during the next academic year. The average score of the two examinations shall be the basis for improved sessional marks in theory. The sessional of practicals shall be improved by appearing in additional practical examinations. Marks awarded to a candidate for day to day assessment in the practical class, can not be improved unless he/she attends a regular course of study again.

18. Approval of examinations:

The examinations mentioned in regulations 10 to 13 and 15 shall be held by an authority hereinafter referred to as the Examining Authority in a State, which shall be approved by the Pharmacy Council of India under sub-section (2) of section 12 of the Pharmacy Act 1948, Such approval shall be granted only if the Examining Authority concerned fulfil the conditions as specified in Appendix-C to these regulations.

19. Certificate of passing examination for Diploma in Pharmacy (Part-II)

Certificate of having passed the examination for the Diploma in Pharmacy, Part-II shall be granted by the Examining Authority to a successful student.

CHAPTER-III

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Diploma in Pharmacy (Part-III)

(Practical Training)

20. Period and other conditions of Practical Training:

1) After having appeared in Part-II examination of Diploma in Pharmacy conducted by Board/University or other approved Examination Board or any other course accepted as being equivalent by the Pharmacy Council of India, a candidate shall be eligible to undergo practical training in one or more of the following institutions namely:

i) Hospitals/Dispensaries run by Central/ State Governments/Municipal Corporations/ Central Government Health Scheme and Employees State Insurance Scheme.

ii) A Pharmacy, Chemist and Durggist licensed under the Drugs and Cosmetic Rules 1945 made under the Drugs and Cosmetics Act 1940 (23 of 1940).

iii) Drugs manufacturing unit licensed under the Drugs and Cosmetics Act, 1940 & rules made thereunder.

2) The institutions referred in sub-regulation (i) shall be eligible to impart training subject to the condition that the number of student pharmacists that may be taken in any hospital, pharmacy, chemist and druggist and Drugs manufacturing unit licensed under the Drugs and Cosmetics

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Rules, 1945 made under the Drugs and Cosmetics, Act, 1940 shall not exceed two where there is one registered pharmacist engaged in the work in which the student pharmacist is under-going practical training, where there is more than one registered pharmacist similarly engaged, the number shall not exceed one for each Additional such registered pharmacist.

3) Hospital and Dispensary other than those specified in sub-regulation (1) for the purpose of giving practical training shall have to be recognised by Pharmacy Council of India on fulfilling the conditions specified in Appendix-D to these regulations.

4) In the course of practical training, the trainee shall have exposure to-

i) Working knowledge of keeping of records required by various acts concerning the profession of Pharmacy, and

ii) Practical experience in-

a) the manipulation of pharmaceutical apparatus in common use.

b) the reading, translation and copying of prescription including checking of doses

c) the dispensing of descriptions illustrating the commonenly methods of administering medicaments;

(d) the storage of drugs and medical preparations.

5) The practical training shall be not less than five nundred hours spread over a period of not less than three months, provided that not less than two hundred and fifty hours are devoted to actual dispensing of prescriptions.

1. Procedure to be followed prior to commencing of the training:

1) The Head of an academic training institution, on application, shall supply in triplicate'Practical Training Contract Form for qualification as a Pharmacist' (hereinafter referred to as the Contract Form) to candidate eligible to undertake the said practical training. The Contract Form shall be as specified in Appendix-E to these regulations.

2) The Head of an academic training institution shall fill section I of the Contract Form. The trainee shall fill section-II of the said contract Form and the Head of the instituion agreeing to impart the training (hereinafter referred to as the Appendix Master) shall fill Section-III of the said Contract Form.

3) It shall be the responsibility of the trainee to ensure that one copy (hereinafter referred to as the first copy of the Contract Form) so filled is submitted to the Head of the academic training institution and the other two copies (hereinafter referred to as the second copy and

the third copy) shall be filed with the Appentice Master (if he so desires) or with the trainee pending completion of the training.

22. Certificate of passing Diploma in Pharmacy(Parg-III)

On satisfactory completion of the apprentice period, the Apprentice Master shall fill SECTION-IV of the second copy and third copy of the ContractForm and cause it to be sent to the head of the academic training institution who shall suitably enter in the first copy of the entries from the second copy and third copy and shall fill SECTION-V of the three copies of Contract Form and thereafter hand over both the second copy and third copy to the trainee.

This, if completed in all respects, shall be regarded as a certificate of having successfully completed the course of Diploma in Pharmacy(Part-III)

CHAPTER-IV

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23. Certificate of Diploma in Pharmacy:

A certificate of Diploma in Pharmacy shall be granted by the Examining Authority to a successful candidate on producing certificate of having passed the Diploma Pharmacy Part-I and Part-II and satisfactory completion on practical training for Diploma in Pharmacy (Part-III).

24. Miscellaneous:

No course of training in pharmacy shall be considered for approval under regulation 18 unless it satisfies all the conditions prescribed under these regulations.

25. Repeal and Savings:

1) The Education Regulations, 1981(hereinafter referred to as the said regulations) published by the pharmacy Council of India vide No.14-55/79 Act-I/PCI/4235-4650 dt. 8th July,1981 is hereby repealed.

2) Not withstanding such repeal-

a) anything done or taken under the said regulations shall be deemed to have been done or taken under the corresponding provisions of these regulations.

b) a person who was admitted as a student under the said regulations to the course of training for Diploma in thermacy and

who had not passed the examination at the commencement of these regulations shall be required to pass the examination in accordance with the provisions of the said regulations as if these regulations had not come into force.

Provided however, the Examining Authority in a particular State may fix a date after which the examination under the said Regulations shall not be conducted.

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APPENDIX-A

SYLLABUS

DIPLOMA IN PHARMACY(PART-I)

1.1. PHARMACEUTICS-I

Theory (75 hours)

1. Introduction of different dosage forms. Their classification with examples- their relative applications. Familiarisation with new drug delivery systems.

2. Introduction to Pharmacopoeias with special reference to the Indian Pharmacopoeia.

3. Metrology-Systems of weights and measures. Calculations including conversion from one to another system, Percentage calculations and adjustment of products. Use of alligation method in calculations. Isotonic solutions.

4. Packaging of Pharmaceuticals- Desirable features of a container-types of containers. Study of glass and plastics as materials for containers and rubber as a material for closures their merits and demerits. Introduction to aerosol packaging.

5. Size reduction- Objectives, and factors affecting size reduction, methods of size reduction-Study of Hammer mill, ball mill, Fluid energy Mill and Disintegrator.

6. Size separation-Size separation by sifting. Official standards for powders. Sedimentation methods of size separation. Construction and working of Cyclone separator.

7. Mixing and Homogenisation- Liquid mixing and powder mixing, Mixing of semisolids. Study of silverson Mixer-Homogeniser, Planetary Mixery Agitated powder mixer; Triple Roller Mill; Propeller Mixer, Colloid Mill and Hand Homogeniser. Douole cone mixer.

8. Clarification and Filtration-Theory of filtration, Filter media; Filter aids and selection of filters. Study of the following.

9. Extraction and Galenicals (a) Study of porcolation and maceration and their modifications, continuous hot retraction-

12. Introduction to drying processes- Study of Tray Dryers: Fluidized Bed Dryer, Vacuum Dryer and Freeze Dryer.

13. Sterilization- Concept of sterilization and its differences from disinfection- Thermal resistance of microorganisms. Detailed study of the following sterilisation processes.

i) Sterilization with moist heat,

ii) Dry heat sterilization.

iii) Sterilization by radiation,

iv) Sterilization filtration and

v) Gaseous sterilization.

Aseptic techniques- Application of sterilization processes in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipment.

14. Processing of Taolets- Definition, Different types of compressed tablets and their properties. Processes involved in the production of tablets; Tablets excipients; Defects in tablets; Evaluation of Tablets; Physical standards including Disintegration and Dissolution. Tablet coating-Sugar coating, film coating, enteric coating and microencapsulation (Tablet coating may be dealt in an elementary manner)

15. Processing of Capsules-Hard and soft gelation capsules different sizes of capsules; filling of capsules; handling and storage of capsules. Special applications of capsules.

16. Study of immunological products like sera, vaccines, toxoids & their preperations.

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PRACTICAL (100 hours)

Preparation (minimum number stated against each) of the following categories illustrating different techniques involved.

1.	Aromatic waters	3
2.	Solutions	4
3.	Spirits	2
4.	Tinctures	4
5.	Extracts	2
6.	Creams	2
7.	Cosmetic preparations	3
8.	Capsules	2
9.	Taolets	2
10.	Preparations involving sterilisation	2
11.	Ophthalmic preparations.	2
12.	Preparations involving aseptic techiques.	2

Books Recommended: (Latest editions)

1. Remington's Pharmaceutical Science.
2. The Extra Pharmacopoeia-Martindale.

1.2 PHARMACEUTICAL CHEMISTRY-I

Theory (75 hours)

1. General discussion on the following inorganic compounds including important physical and chemical properties; medicinal and Pharmaceutical uses, storage conditions and chemical incompatibility.

(A) Acids, bases and buffers- Boric acid*, Hydrochloric acid, strong ammonium hydroxide, Calcium hydroxide, Sodium hydroxide and official buffers.

(B) Antioxidants- Hypophosphorous acid, Sulpher dioxide, Sodium bisulphite, Sodium meta-bisulphite, Sodium thiosulphate, Nitrogen and Sodium Nitrite.

(C) Gastrointestinal agents-

i) Acidifying agents- Dilute hydrochloric acid

ii) Antacids- Sodium bicarbonate, Aluminium hydroxide gel, Aluminium Phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium oxide, combinations of antacid preparations.

iii) Protectives and Adsorbents- Bismuth subcarbonate and Kaolin.

iv) Saline cathartics- Sodium Potassium tartrate and Magnesium sulphate.

(D) Topical Agents-

i) Protectives- Talc, Zinc Oxide, Calamine, Zinc stearate, Titanium dioxide, Silicone polymers.

ii) Antimicrobials and Astringents- Hydrogen peroxide*, Potassium permanganate, Chlorinated lime, Iodine, Solutions of iodine, povidone- iodine, Boric acid, Borax, Silver nitrate, Mild silver protein, Mercury, Yellow mercuric oxide, Ammoniated mercury.

(E) Dental Products- Sodium flueride, stannous fluoride, Calcium carbonate, Sodium meta phosphate, Dicalcium phosphate, Strontium chloride, Zinc chloride.

(F) Inhalants- Oxygen, Carbon dioxide, Nitrous oxide.

(G) Respiratory stimulants- Ammonium carbonate.

(H) Expectorants and Emetics- Ammonium chloride*, Potasium iodide, Antimony Potassium tartrate.

(I) Antidotes- Sodium nitrite.

2. Major Intra and Extracellular electrolytes-

(A) Electrolytes used for replacement therapy-Sodium Chloride and its preparations, Potassium chloride and its preparations.

(B) Physiological acid-base balance and electrolytes used- Sodium acetate, Potassium acetate, Sodium bicarbonate injection, Sodium citrate, Potassium citrate, Sodium lactate injections, Ammonium chloride and its injection.

(C) Combination of oral electrolyte powders and solutions.

3. Inorganic Official compounds of Iron, Iodine, and Calcium Ferrous Sulphate and Calcium gluconate.

4. Radio pharmaceuticals and Contrast media- Radio activity- Alpha, Beta and Gamma Radiations, Biological effects of radiations, Measurement of radio activity G.M. Counter- Radio isotopes- their uses, storage and precautions with special reference to the official preparations.

Radio opaque Contrast Media- Barium sulphate

5. Quality control of Drugs and Pharmaceuticals- Importance of quality control, significant errors, methods used for quality control, sources of impurities in Pharmaceuticals. Limit tests for Arsenic, chloride, sulphate, Iron and Heavy metals.

6. Identification tests for cations and anions as per Indian Pharmacopoeia.

PRACTICAL(75 hours)

1. Identification tests for inerganic compounds particularly drugs and pharmaceuticals.

2. Limit test for chloride, sulphate, Arsenic, Iron and Heavy metals.

3. Assay of inorganic Pharmaceuticals involving each of the following methods of compounds marked with(*) under theory.
   a) Acid-Base titrations (at least 3)
   b) Redix titrations (One each of Permanganometry and iodimetry)
   c) Precipitation titrations (at least 2)
   d) Complexometric titrations(Calcium and Magnesium).

Books recommended (Latest editions)

1. Indian Pharmacopoeia.

1.3 PHARMACOGNOSY
THEORY(75 hours)

1. Definition, history and scope of Pharmacognosy including indigenous system of medicine.

2. Various systems of classification of drugs of natural origin.

3. Adulteration and drug evaluation; significance of Pharmacopoeial standards.

4. Brief outline of occurrence, distribution outline of isolation, identification tests, therapeutic effects and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.

5. Occurrence, distribution, organoleptic evalution, chemical constituents including tests wherever applicable and therapeutic efficacy of following categories of drugs :

   a) Laxatives: Aloes, Rhuburb, Castor oil, Ispaghula, Senna.
   b) Cardiotonics- Digitalis, Arjuna.
   c) Carminatives & G.I. regulators-Umbelliferous fruits. Coriander, Fennel, Ajowan, Cardamom. Ginger, Black pepper Asafoetida, Nutmeg, Cinnamon, Clove.
   d) Astringents- Catechu.
   e) Drugs acting on nervous system-Hyoscyamus, Belladonna, Aconite, Asnwagandha, Ephedra, Opium, Cannabis, Nux vomia.
   f) Antihypertensives- Rauwolfia

g) Antitussives- Vasaka, Tolu balsam, Tulsi.

h) Antirheumatics- Guggul, Colchicum.

i) Antitumour- Vinca.

j) Antileprotics- Chaulmoogra Oil.

k) Antidiabetics- Pterocarpus, Gymnema, Sylvestre.

l) Diuretics- Gokhru, Punarnava.

m) Antidysenterics- Ipecacuanha.

n) Antiseptics and disinfectants Benzoin, Myrrh, Nim, Curcuma.

o) Antimalarials- Cinchona.

p) Oxytocics- Ergot

q) Vitamines- Shark liver Oil and Amla

r) Enzymes- Papaya, Diastase, Yeast

s) Perfumes and flavouring agents- Peppermint Oil, Lemon Oil Orange Oil, lemon grass Oil Sandalwood.

t) Pharmaceutical aids- Honey, Arachis Oil, Starch, Kaolin. Pectin, Olive Oil, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate Agar, Guar gum, Gelatin.

u) Miscellaneous- Liquorice, Garlic, Picrorhiza, Dioscorea, Linseed, Shatavari, Shankhupushpi, Pyrethrum, Tobacco.

6. Collection and preparation of crude drugs for the market as examplified by Ergot, opium, Rauwolfia, Digitalis, Senna.

7. Study of source, preparation and identification of fibres used in sutures and surgical dressings-cotton, silk, wool and regenerated fibres.

5. Gross anatomical studies of - Senna, Datura, Cinnamon, Cinchona, Fennel, Clove, Ginger, Nuxvomica & ipecacuanha.

PRACTICAL (75 hours)

1. Identification of drugs by morpholigocal characters.
2. Physical and chemical tests for evaluations of drugs wherever applicable.
3. Gross anatomical studies (t.s) of the following drugs Senna, Datura, Cinnamon, Cinchona, Coriander, Fennel, Clove Ginger, Nuxvomica, Ipecacuanha.
4. Identification of fibres and surgical dressings.

1.4- BIOCHEMISTRY AND CLINICAL PATHOLOGY

Theory (50 hours)

1. Introduction to Biochemistry.
2. Brief chemistry and role of proteins, polypeptides and amino acids, classification, Qualitative tests, Biological value, Deficiency diseases.
3. Brief chemistry and role of Carbohydrates, Classification, qualitative tests. Diseases related to carbohydrate metabolism.
4. Brief chemistry and role of Lipids, Classification, qualitative tests. Diseases related to lipids metabolism.
5. Brief chemistry and role of Vitamins and Coenzymes.
6. Role of minerals and water in life processes.
7. Enzymes : Brief concept of enzymic action. Factors affecting it. Thereapeutic and pharmaceutical importance.
8. Brief concept of normal and abnormal metabolism of proteins, carbohydrates and lipids.
9. Introduction to pathology of blood and urine.
   (a) Lymphocytes and Platelets, their role in health and disease.
   (b) Erythrocytes- Abnormal cells and their significance.
   (c) Abnormal constitutents of urine and their significance in diseases.

PRACTICAL (75 hours)

1. Detection and identification of Proteins, Amino acids, Carbohydrates and Lipids.

2. Analysis of normal and abnormal constituents of Blood and Urine (Glucose, Urea, Creatine, creatinine, cholesterol alkaline phosphatase, acid phosphatase, Bilirubin, SGPT, SGOT, Calcium, Diastase, Lipase.)

3. Examination of sputum and faeces (microscope staining).

4. Practice in injecting drugs by intramusculaneous and intravenous routes. Withdrawal of blood .....

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1.5 HUMAN ANATOMY AND PHYSIOLOGY

Theory (75 Hours)

1. Scope of Anatomy and Physiology.
   Definition of various terms used in Anatomy.
2. Structure of cell, function of its components with special reference to mitochonaria and microsomes.
3. Elementary tissues of the body, i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue.
4. Structure and function of skeleton. Classification of joints and their function, joint disorder.
5. Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood.
6. Name and functions of lymph glands.
7. Structure and functions of various parts of the heart. Arterial and venous system with special reference to the names and positions of main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders.
8. Various parts of respiratory system and their functions. Physiology of respiration.
9. Various parts of urinary systems and their functions, structure and functions of kidney. Physiology of Urine formation. Pathophysiology of renal diseases and oedema.

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10. Structure of skeletal muscle. Physiology of muscle contraction. Names, positions, attachments and functions of various skeletal muscles. Physiology of neuromuscular junction.

11. Various parts of central nervous system, brain and parts, functions and reflex action. Anatomy and Physiology autonomic nervous system.

12. Elementary knowledge of structure and functions of organs of taste, smell, ear, eye, and skin. Physiology of part.

13. Digestive system: Names of the various parts of dig system and their functions. Structure and functions of liver physiology of digestion and absorption.

14. Endocrine glands and Hormones. Location of the gland their hormones and functions.

    Pituitary, thyroid, Adrenal and Pancreas.

15. Reproductive system- Physiology and Anatomy of Reproductive system.

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PRACTICAL (50 Hours)

1. Study of the human skeleton.
2. Study with the help of charts and models of the following systems and organs:

   a) Digestive system
   b) Respiratory system.
   c) Cardiovascular system.
   d) Urinary system.
   e) Reproductive system.
   f) Nervous system.
   g) Eye
   h) Ear

3. Microscopic examination of epithelial tissue, cardiac muscle, smooth muscle, skeletal muscle. Connective tissue and nervous tissues.

4. Examination of blood films for TDC, DLC and malarial parasite.

5. Determination of clotting time of blood, erythrocyte sedimentation rate and Heamoglobin value.

6. Recording of body temperature, pulse, heart rate, blood pressuee and ECG.

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1.6 HEALTH EDUCATION AND COMMUNITY PHARMACY

THEORY (50 Hours)

1. Concept of health- Definition of physical health, mental health, social health, spiritual health- determinants of health, indicators of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.

2. Nutrition and health- Classification of foods, requirements, diseases induced due to deficiency of proteins, vitamins, and minerals- treatment and prevention.

3. Demography and family planning- Demography cycle, fertility, family planning, contraceptive methods, behavioural methods, natural family planning method, chemical method, mechanical methods, hormonal contraceptives, population problem of India.

4. First aid- Emergency treatment in shock, snake-bite, burns, poisoning, heat disease, fractures and resuscitation methods. Elements of minor surgery and dressings.

5. Environment and health- Sources of water supply, water pollution, purification of water, health and air, noise, light- solid waste disposal and control- medical entomology, arthropod borne disease and their control, rodents, animals and diseases.

6. Fundamental principles of microbiology- classification of microbes, isolation, staining teachniques of organisms of common diseases.

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7. Communicable diseases- Causative agents, mode of transmission and prevention.

   (a) Respiratory infections- Chicken pox, measles, influenca, diphtheria, whooping cough and tuberculosis.

   (b) Intestinal infections: Poliomyelitis, Hepatitis,

   (c) Arthropod borne infections- Plague, Malaris, Filariasis.

   (d) Surface infections- Rabies, Thachoma, Tetanus, Leprosy.

   (e) Sexually transmition diseases- Syphilis, Conorrhoea, AIDS.

8. Non-communicable diseases- Causative agents, prevention, care and control.
   Cancer, Diabetes, Blindness, Cardiovascular diseases.

9. Epidemiology- Its scope, methods, uses, dynamics of disease transmission. Immunity and immenisations Immunological products and their does schedule. Principles of disease control and prevention, hospital acquired infection, prevention and control. Disinfection, types of disinfection, disinfection procedures, for faeces, urine, cu room, liron, dead-bodies, instruments.

PHARMACY 33/35

2.1 PHARMACEUTICS II

Theory (75 Hours)

1. Dispensing Pharmacy:

   (i) Prescriptions- Reading and understanding of prescriptions; Latin terms commonly used (Detailed study is not necessary), Modern methods of prescribing, adoption of metric system. Calculations involved in dispensing.

   (ii) Incompatibilities in Prescriptions- Study of various types of incompatibilities- physical, chemical and therapeutic.

   (iii) Posology- Dose and dosage of drugs, Factors influencing dose, Calculations of doses onthe basis of age, sex and surface area. Veterinary doses.

2. Dispensed Medications :

   (Note: A detailed study of the following dispensed medication is necessary. Methods of preparation with theoretical and practical aspects, use of appropriate containers and elosures. Special labelling requirements and storage conditions should be high-lighted).

   (i) Powders- Types of Powders-Advantages and disadvantages of powders, Granules, Cachets and Tablet triturates. Prescriptions. Weighing methods, possible errors in weighing, minimum weighable amounts and weighing of a material below the minium weighable amount, geometric dilution and proper usage and care of dispensing balance.

(ii) Liquid Oral Dosage Forms:

(a) Monophasic- Theoratical aspects including commonly used vehicles, essential adjuvant like stabilizers, colourants and flavours, with examples.

Review of the following monophasic liquids with details of formulation and practical methods.

Liquids for internal administration	Liquids for external administration or used on mucus membranes.
Mixtures and concentrates	Gargles
Syrups	Mouth washes
	Throat-paints
	Douches
Elixirs	Ear Drops
	Nasal drops & Spleys
	Liniments
	Lotions.

(b)

(i) Suspensions (elementary study). Suspensions containing diffusible solids and liquids and their preparations. Study of the adjuvants used like thickening agents, wetting agents, their necessity and quantity to be incorporated. Suspensions of precipitate forming liquids like

tinctures, their preparations and stability. Suspensions produced by chemical reaction. An introduction to flocculated/non-flocculated suspension system.

ii) Emulsions- Types of emulsions, identification of emulsion systems, formulation of emulsions, selection of emulsifying agents. Instabilities in emulsions. Preservation of emulsions.

iii) Semi-Solid Dosage Forms:

a) Ointments- Types of ointments, classification and selection of dermatological vehicles. Preparation and stability of ointments by the following processes:

(i) Trituration (ii) Fusion (iii) Chemical reaction (iv) Emulsification.

b) Pastes- Differences between ointments and pastes Bases of pastes. Preparation of pastes and their preservation.

c) Jellies- An introduction to the different types of jellies and their preparation.

d) An elementary study of poultice.

e) Suppositories and pessaries- Their relatives merits and demerits, types of suppositories, suppository bases, classification, properties, Preparation and packing of suppositories. Use of suppositories for drug absorption.

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(iv) Dental and Cosmetic Preparations:
Introduction to Dentrifices, Facial cosmetics, Deodorants, Antiperspirants, Shampoos, Hair dressings and Hair removers.

(v) Sterile Dosage Forms:

(a) Parenteral dosage forms- Definition, General requirements for parenteral dosage forms. Types of parenteral formulations, vehicles, adjuvants, processing, personnel, facilities and Quality control. Preparation of Intravenous fluids and admixtures- Total parenteral nutrition, Dialysis fluids.

(b) Sterility testing, Particulate matter monitoring-
Faulty, seals- packaging.

(c) Opnthalmic Products- Study of essential characteristics of different ophthalmic preparations. Formulation additives, special precautions in handling and storage of ophthalmic products.

PRACTICAL (100 hours)

Dispensing of at least 100 products covering a wide range of preparations such as mixtures, emulsions, lotions, liniments, E.N.T. preparations, ointments, suppositories, powders, incompatible prescriptions egc. Books recommended: (Latest editions)

1. Indian Pharmacopoeia.
2. British Pharmacopoeia.
3. National Formularies (N.F.I., B.N.F.)
4. Remington's Pharmaceutical Sciences.
5. Martindale's Extra Pharmacopoeia.

2.2 PHARMACEUTICAL CHEMISTRY-II

Theory (100 hours)

1. Introduction to the nomenclature of organic chemical systems with particular reference to hetero-cyclic system containing upto 3 rings.

2. The Chemistry of following Pharmaceutical organic compounds, covering their nomenclature, chemical structure, uses and the important Physical and Chemical properties (Chemical structure of only those compounds marked with asterisk (*).

The stability and storage conditions and the different type of Pharmaceutical formulations of these drugs and their popular brand names.

Antiseptics and Disinfectants- Proflavine*, Benzalkonium chloride, Cetrimide, Chloro cresol*, Chloroxylene, Formaldenyde solution, Hexachlorophene, Liquified phenol, Nitro furantoin. Sulfonamides- Sulfadiazine*, Sulfaguanidine*, Phthalyl sulfathiazole, Succinyl sulfathiazcle, Sulfadimethoxine, Sulfamethoxy pyridazine, Sulfa methoxazole, cotrimoxazole, Sulfacetamide*.

Antileprotic Drugs- Clofazimine, Thiambutosine, Dapsone*, Solapsone.

Anti-tubercular Drugs- Isoniazid*, PAS*, Streptomycin, Rifampicin, Ethambutol*, Thiacetazone, Ethionamide, Cycloserine, Pyrazinamide*.

Antiamoebic and Anthelmintic Drugs-Emetine, Metronidazole*, Halogenated hydroxyquinolines, diloxanide

Furoate, Paromomycin Piperazine*, Mebendazole, D.E.C.* Antibiotics- Benzyl Penicillin*, Phenoxy methyl Penicillin*, Benzathine Penicillin, Ampicillin*, Cloxacillin, Carbenicilling, Gentamycin, Neomycin, Brychromycin, Tetracycline, Cephalexin, Cephaloridine, Cephalothin, Griseofulvin, Chloramphenical. Antifungal agents- Udecylenic acid, Tolnaftate, Nystatin, Amphoterecin, Hamycin.

Antimalarial Drugs- Chloroquine*, Amodiaquine, Primaquine, Proguanil, Pyrimethamine*, Quinine, Trimethoprim.

Tranquilizers- Chlorpromazine*, Prochlor Perazine, Trifluo, Perazine, Thiothixena, Haloperidol*, Triperidol, Oxypertine, Chlordiazepoxide, Diazepam*, Lorazepam, Meprobamate.

Hypnotics:- Phenobarbitone*, Butobarbitone, Cyclobarbitone, Nitrazepam, Glutethimide*, Methyprylon, paraldehyde. Triclofosodium.

General Anacsthtics- Halothane*, Cyclopropane*, Diethyl ether*, Metho-hexital sodium, Thiopental sodium, Trichloro ethylene.

Antidepressant Drugs- Amitriptyline, Nortryptyline, Imipramin*, Phenelzine, Tranyl cypromine.

Analeptics- Theophylline, Caffeine*. Coramine*, Dextroamphetamine.

Adrenergic Drugs- Adrenaline* Noradrenaline, Isoprenaline*, Phenylephrine, Salbutamol, Terbutaline, Ephedrine*, Pseudo ephedrine.

Adrenergic Antagonist- Tolazoline, Propranolol*, Practalol.

Cholinergic Drugs- Neostigmine*, Pyridostigmine, Pralidoxime, Pilocarpine, Physiostigmine*.

Cholinergic ntagonists- Atropine*, Hyoscine, Homatropine, Propantheline*, Benztropine, Tropicamide, Biperiden*.

Diuretic Drugs- Furosemide*, Chlorothiazide, Hydrochlorothiazide*, Benzthiazide, Urea*, Mannitol*, Ethacrynic Acid.

Cardiovascular Drugs- Ethyl nitrite*, Glyceryl trinitrate, Alpha methyl dopa, Guanethidine, Clofibrate, Quinidine.
Hypoglycemic Agents- Insulin, Chlorpropamide*, Tolbutamide Glibenclamide, Phenformin & Metformin.

Coagulants and Anti Coagulants- Heparin, Thrombin, Menadione*, Bishydroxycoumarin, Warfarin Sodium.

Local Anaesthetics- Lignocaine*, Procaine*, Benzocaine.

Histamine and Anti bistaminic Agents- Histamine, Diphen hydramine*, Promethazine, Cyproheptadine, Mepyramine, Pheniramine, Chlorpheniramine*.

Analgesics and Anti-pyretics- Morphine, Pethidine*, Codeine, Methadone, Aspirin*, Paracetamol*, Analgin, Dextropropoxyphene, Pentazocine.

Non-steriodal anti-inflammatory Agents- Indomethacin*, phenylbutazone*, Oxyphen butazone, Ibuprofen.

Thyroxine and Antithyroids- Thyroxine*, Methimazole, Methyl thiouracil, Prophylthiouracil.

Diagnostic Agents- Iopanoic Acid, Propyliodone, Sulfobromophthalein.

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Sodium, Indigotindisulfonate Sodium (Indigo Carmine), Evans blue, Congo Red, Fluoreseein Sodium.

Anticonvulsants, Cardiac Glycosides, Antiarrhythmic antihypertensives & vitamins.

Steroidal Drugs- Betamethazone, Cortisone, Hydrocortisone, prednisolone, Progesterone, Testosterone, Oestradiol Mandrolone.

Anti-Neoplastic Drugs- Actinomycins, Azathioprine, Busulphan, Chlorambucil, Cisplatin cyclophosphamide, Daunorubicin, Mercaptopurine, Methotrexate, Mytomycin.

Books Recommended (Latest editions)

1. Pharmacopoeia of India.
2. British Pharmaceutical Codex.
3. Martindale's Extra Pharmacopoeia.

Practical (75 hours)

1. Systematic qualitative testing of organic drugs involving Solubility determination, melting point/ or boiling point, detection of elements and functional groups (10 compounds).
2. Official identification tests for certain groups of drugs included in the I.P. like barbiturates, sulfonamides, Phenothiazines, Antibiotics etc. (8 compounds).
3. Preparation of three simple organic preparations.

2.3 PHARMACOLOGY & TOXICOLOGY

(Theory 75 Hours)

1. Introduction to Pharmacology, scope of Pharmacology.
2. Routes of administration of drugs, their advantages and disadvantages.
3. Various processes of absorption of drugs and the factors affecting them. Metabolism, distribution and excretion of drugs.
4. General mechanism of drugs action and the factors which modify drug action.
5. Pharmacological classification of drugs. The discussion of drugs should emphasise the following aspects:

   i) Drugs acting on the Central Narvous sytem.

      a) General anaesthetics, adjunction to anaesthesia, intraveuous anaesthetics.

      b) Analgesic antipyratics and non-steroidal anti-inflammatory drugs, Narcotic analgesics. Antirheumatic and antigout remedies. Sedatives and Hypnotics, Psychopharmacological agents, anti convulsants, analeptics,

      c) Centrally acting muscle relaxants and antiparkin- sonism agents.

   ii) Local anaesthetics.

   iii) Drugs acting on autonomic nervous system.

      a) Cholinergic drugs, Anticholinergic drugs, anticholinesterase drugs.

      b) Adrenergic drugs and adrenergic recepter blockers.

(c) Neurene blockers and ganglion blockers.

(d) Neuromuscular blockers, drugs used in myasthenia gravis.

(iv) Drugs acting on eye, mydriatics, drugs used in glaucoma.

(v) Drugs acting on respiratory system- Respiratory stimulants Bronchodilators, Nasal decongestants, Expectorants and Antitussive agents.

(vi) Antacids, Physiological role of histamine and serotonin, Histamine and Antihistamines, Prostaglandins.

(vii) Cardio Vascular drugs, Cardiotonics, Antiarrhythmic agents, Antianginal agents, Antihypertensive agents, Peripheral vasodilators and drugs used in atherosclerosis.

(viii) Drugs acting on the blood and blood forming organs. Haematinics, Coagulants and anticoagulants, Haemostatics, Blood substitutes and plasma expanders.

(ix) Drugs effecting renal function- Diuretics and antidiuretics.

(x) Harmones and hormone antagonists- Hypoglycemic agents, Antithyroid drugs, sex harmones and oral centraceptives corticosteroids.

(xi) Drugs acting on digestive system-Carminatives, digestants Bitters, Antacids and drugs used in peptic ulcer, Purgatives, and laxatives, Antidiarrhoeals, Emetics, Antiemetics, Antispasmodics.

6. Chemotherapy of microbial disease: Urinary antiseptics, Sulphonamides, Penicillins, Streptomycin, Tetracylines and other antibiotics.

   Autitubercular agents, Antifungal agents, antiviral drugs, antileprotic drugs.

7. Chemotherapy of protozoal diseases.

8. Chemotherappy of cancer.

9. Disinfectants and antiseptics.

   A detailed study of the action of drugs on each organ is not necessary.

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PHARMACOLOGY

PRACTICAL

(50 Hours)

The first six of the following experiment will be done by the students while the remaining will be demonstrated by the teacher.

1. Effect of K^+, Ca^{++}, acetyl choline and dyeculine on frog's heart.

2. Effect of acetyl choline on rectus abdomi of Frog and guinea pig ileum.

3. Effect of spasmogens and relaxents on rabbics intestine.

2.4 PHARMACEUTICAL JURISPRUDENCE
Theory (50 Hours)

1. Origin and nature of Pharmaceutical legislation in India, its scope and objectives. Evolution of the "Concept of Pharmacy" as an integral part of the Health care system.

2. Principles and significance of Professional Ethics, Critical study of the code or Pharmaceutical Ethics drafted by Pharmacy Council of India.

3. Pharmacy Act, 1948- The General study of the Pharmacy Act with special reference to Education Regulations, working of State and Central Councils, constitution of these councils and functions. Registration procedures under the Act.

4. The Drugs and Cosmetics Act, 1940- General study of the Drugs and Cosmetics Act and the Rules thereunder. Definitions and salient features related to retail and whole sale distribution of drugs. The powers of Inspectors, the sampling procedures and the procedure and formalities in obtaining licences under the rule. Facilities to be provided for running a Pharmacy effectively. General study of the schedules with special reference to schedules C, C_1, F, G, J, H, P and X and Salient features of labelling and storage conditions of drugs.

5. The Drugs and Magic Remedies (Objectionable Advertisement) Act, 1984- General study of the Act, Objectives, special reference to be laid on Advertisements, Magic remedies and objectionable

and permitted advertisements- diseases which cannot be claimed to be cured.

6. Narcotic Drugs and Prychotropic Substances Act, 1985-A brief study of the act with special reference to its objectives, offences and punishment.

7. Brief introduction to the study of the following acts:

1. Latest Drugs (Price Control) Order in force.
2. Poisons Act 1919 (as amended to date)
3. Medicinal and Toilet Preparations (Exicse Duties) Act, 1955 (as amended to date)
4. Medical Termination of Pregnancy Act, 1971 (as amended to date)

2.5 DRUG STORE AND BUSINESS MANAGEMENT
Theory (75 Hours)

PART-I COMMERCE (50 hours)

1. Introduction- Trade, Industry and Commerce, Functions and subdivisions of Commerce, Introduction to Elements of Economical and Management.
2. Forms of Business Organisations.
3. Channels of Distribution.
4. Drug House Management- Selection of Site, Space Lay-out and legal requirements.

   Importance and objectives of Purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto.

   Codification, handling of drug stores and other hospital supplies.
5. Inventory Control- Objects and importance, modern techniques like ABC, VED analysis, the lead time, inventry carrying cost, safety stock, minimum and maximum stock levels, economic order quantity, scrap and surplus disposal.
6. Sales promotion, Market Research, Salesmanship, qualities of a salesman, Advertising and Window Display.
7. Recruitment, training, evaluation and compensation of the pharmacist.
8. Banking and Finance- Service and functions of bank, Finance Planning and Sources of finance.

PART-II ACCOUNTANCY (25 Hours)

1. Introduction to the accounting concepts and conventions, Double entry, Book keeping, Different kinds of accounts.

2. Cash Book.

3. General Ledger and Trial Balance.

4. Profit and Loss Account and Balance Sheet.

5. Simple techniques of analysing financial statements.

Introduction to Budgetting.

Books Recommended (Latest editions)

1. Remington Pharmaceutical Sciences.

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2.6 HOSPITAL AND CLINICAL PHARMACY

THEORY (75 hours)

PART-I : HOSPITAL PHARMACY:

1. Hospitals - Definition, Function, Classifications based on various criteria, organisation, Management and health delivery system in India.

2. Hospital Pharmacy:
   (a) Definition
   (b) Functions and objectives of Hospital Pharmaceutical services.
   (c) Location, Layout, Flow chart of materials and men.
   (d) Personnel and facilities requirements including equipments based on individual and basic needs.
   (e) Requirements and abilities required for Hospital Pharmacists.

3. Drug Distribution System in Hospitals:
   (a) Out-patient services
   (b) In-patient services:- (a) types of services (b) detailed discussion of Unit Dose system Floor ward stock system, Satellite Pharmacy services, Central sterile services, Bed side Pharmacy.

4. Manufacturing:
   (a) Economical considerations, estimation of demand.
   (b) Sterile manufacture- large and small volume parenterals, facilities, requirements, layout

(c) Non-sterile manufacture- Liquid orals, externals, Bulk concentrates.

(d) Procurement of stores and testing of raw materials.

5. Nomenclature and uses of surgical instruments and Hospital Equipments and health accessories.

6. P.T.C. (Pharmacy Therapeutic Committee), Hospital Formulary System and their organisation, functioning, composition.

7. Drug Information service and Drug Information Bulletin.

8. Surgical dressing like cotton, gauze, bandages and adhesive tapes including their pharmacopoeial tests for quality. Other hospital supply eg. I.V. sets, B.G. sets, Ryals tubes, Catheters, Syringes etc.

9. Application of computers in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital and retail pharmacy establishments.

PART-II. CLINICAL PHARMACY

1. Introduction to Clinical Pharmacy Practice-Definition, scope.

2. Modern dispensing aspects- Pharmacists and Patient counselling and advice for the use of common drugs, medication history.

3. terminology used in the Practice of Medicine.

4. Disease, manifestations and pathophysiology including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardio-vascular diseases, Epilepsy. Diabetes, Peptic Ulcer, Hypertension.

5. Physiological parameters with their significance.

6. Drug Interactions:

   (a) Definition and introduction.

   (b) Mechanism of Drug Interaction.

   (c) Drug-drug interaction with reference to analgesies, diuretics, cardio vasular drugs, Gastro-intestinal agents vitamins and Hypoglycemic agents.

   (d) Drug-food interaction.

7. Average Drug Reactions:

   (a) Definition and significance.

   (b) Drug- induced diseases and Teratogenicity.

8. Drugs in Clinical Toxicity- Introduction, general treatment of poisoning, systematic antidotes. Treatment of insecticide., poisoning, heavy metal poison, Narcotic drugs, Barbiturate, Organophosphorus poisons.

9. Drug dependenes, Drug abuse, Addictive drugs and their treatment, complications.

10. Bio-availability of drugs, including factors affecting it.

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Books Recommended (Latest editions)

1. Remington's Pharmaceutical Sciences.
2. Martindale's Extra Pharmacopoeia.

PRACTICAL (50 hours)

1. Preparation of transfusion fluids.
2. Testing of raw materials used in (1).
3. Evaluation of surgical dressings.
4. Sterilization of surgical instruments, glass ware and other hospital supplies.
5. Handling and use of data processing equipments.

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APPENDIX-8

(See regulation 9)

CONDITIONS TO BE FULFILLED BY THE ACADEMIC TRAINING INSTITUTION.

Any authority in India applying to the Pharmacy Council of India for Approval courses of study for Pharmacists under sub-section (1) of Section 12 of the Pharmacy Act, 1948 shall provide.

(A) ACCOMMODATION

Suitable and sufficient accommodation with adequate ventilation lighting and other hygience conditions should be provided to the rooms for principal/Head of the department, office, class room, library, staff common room, students common room, museum, stores etc.

At least four laboratories specified below should be provided for:

1. Pharmaceutics Lab.
2. Pharm. Chemistry Lab.
3. Physiology, Pharmacology and Pharmacognosy Lab.
4. Biochemistry, Clinical Pathology, Hospital and Clinical Pharmacy Lab.

In addition to the laboratories, balance room, aseptic room or cabinet, animal house, a machine room are also to be provided for.

Floor area of the laboratory should not be less than 30 square feet per student required to work in the laboratory at any given time subject to a minimum of 500 square feet.

Laboratories should be fitted and constructed in a manner that these can be kept reasonably clean. Gas and water fittings, shelves,
provided wherever necessary.

(B) Principal/Director/Head of the department may be engaged in teaching upto Eighth hours a week, and the work load of other teaching staff should not be more than 16 hours per week.

Staff student ratio should not exceed 1:60 in theory classes and 1:20 in practical classes. There should be two teachers for a batch of 30 students in practicals.

According to the above norms, the following staff is required for an intake of 60 students:

* Professor/Reader	- One
Senior Lecturers/ Lecturers.	-Seven

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*He may also work as Principal or Head of the Department, as the case may be .

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The minimum qualifications of the Principal/Director/Head of the Institution/Department, and the teachers be as given below:-

Principal/Director/Head of Institution/Department (Professor/Reader)	Basic degree in Pharmacy and Post-graduate in any discipline of Pharaceutical Sciences with not less than 5 years experience in teaching.
Lecturer	M. Pharm. Or B.Pharm. with 3 years teaching/professional experience.

Provided that the above qualifications shall not apply to the incumbents appointed under the repealed Education Regulations.

Non-Teaching Staff

List of Non-teaching staff for the D.Pharm. Course.

1.	Laboratory Technician (Qualification-Diploma in Pharmacy)	2	6.	Typist	1
2.	Laboratory Attendant	4	7.	Asstt. Librarian	1
3.	Office Superintendent	1	8.	Peons	2
4.	Clerk-cum-Accountnat	1	9.	Cleaners/ Sweepers	4
5.	Store-Keeper	1	10.	Gardener	1

List of Equipment for Pharmaceutics Laboratory

A.	Special equipment and instruments	No. required for 60 students	No. required For 120 students
1.	Continuous hot extraction equipment.	5	10

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2.	Conical percolators	20	40
3.	Tincture Press	1	1
4.	Hand grinding mill	5	5
5.	Disintegrato	1	1
6.	Ball mill	1	1
7.	Hand operated Tablet machines	3	3
8.	Tablet coating pan unit with hot air blower Laboratory size.	1	1
9.	Polishing Pan Laboratory size	1	1
10.	Tablet Hardness Tester (Monsanto Type)	3	3
11.	Tablet Hardness tester (pfizer type)	3	3
12.	Disintegration Test Unit	2	2
13.	Dissolution Rate Test apparatus.	1	1
14.	Granulating sieve sets	20	40
15.	Tablet counter small size	5	5
16.	Friability Tester	1	1
17.	Collapsible Tube filling mand sealing equipments	2	2
18.	Capsule filling machine (Laboratory size)	2	2
19.	Prescription balance	40	60
20.	Balance Torsion type with removable glass pan sansitivity, 30 mgm.	5	5
21.	Distillation equipment for distilled water.	2	2
22.	Water deionization Unit	1	2
23.	All glass distillation Un$t for making water for injection.	2	4
24.	Ampoule washing machine	1	1
25.	Ampoule filling and sealing machine.	1	1
26.	Sintered glass filters for (4 different grades) Bacteria proof filtration.	20 each grades	20 each grades

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27.	Millipore filters 3 grades	2each grades	2 each grades
28.	Autoclaves	2	2
29.	Pressure cookers	5	10
30.	Hot Air steriliser	2	3
31.	Incubators	2	2
32.	Aseptic cabinet	2	2
33.	Rabbit cages and holders	10	10
34.	Ampoule clarity test equipments	2	2
35.	Blender	2	2
36.	Sieves Set(Pharmacopoeial standard)	10	10
37.	Laboratory centrifuge	2	2
38.	Ointment slabs	40	40
39.	Ointment spatulas	40	40
40.	Pestle and mortar(Porcelain)	40	40
41.	Pestle and mortar(glass)	10	10
42.	Suppository moulds of 3 size	20 each	30 each
43.	Refrigerator	1	1

B. General glassware — Adequate — Adequate

C. Chemicals, appliances and laboratory facilities. — Adequate — Adequate

2. List of Equipment for Pharmaceutical Chemistry Laboratory

		Nos. required for	
A.	Special Equipment and Instruments.	60 students	120 students
1.	Refractometer	1	1
2.	Polarimeter	1	1
3.	Photo electric Colorimeter	1	1
4.	pH meter	2	2
5.	Atomic model sets	10	10

6.	Analytical balances and weight box sets	10	15
7.	Physical balances & weight box sets	5	5
8.	Platform balance	2	2
9.	Periodic Taole Chart	2	2
B.	General Glassware	Adequate	Adequate
C.	Miscellaneous appliances, Chemicals and laboratory facilities.	Adequate	Adequate

3. List of Equipment for Physiology & Pharmacology Laboratory

A.	Special Equipment and Instruments	Nos. required for 60 students	120Students
1.	Haemogobinometer	20	30
2.	Haemocytometer	10	20
3.	Student's Organ bath	5	10
4.	Sherrington rotating drum	5	10
5.	Frog Boards	10	20
6.	Trays(dissecting)	10	20
7.	Frontal writing levers	15	30
8.	Aeration tube	20	40
9.	Telethermometer	1	2
10.	Pole Climbing apparatus	1	2
11.	Histamine chamber	1	1
12.	Bimple levers	15	30
13.	Starling heart levers	10	20
14.	ECG machine		
15.	Aerators	5	10
16.	Histological slides	25	25
17.	Sphygmomanometer(B.P. appratus)	5	5
18.	Stethoscope	5	5

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19.	First aid equipments	5 sets	5 sets
20.	Contraceptive device	5 sets	5 sets
21.	Dissecting(Surgical) instruments.	20 sets	30 sets
22.	Operation table (small)	2	2
23.	Balance for weighing small animals	1	1
24.	Kymograph paper	Adequate	Adequate
25.	Activity cage(actophoto-meter)	1	1
26.	Analgesiometer	1	1
27.	Thermometers	20	20
28.	Distilled water stills	2	2
29.	Plastic animal cages	10	10
30.	Double unit organ bath with thermostat	1	1
31.	Refrigetator	1	1
32.	Single pan balance	1	1
33.	Charts	Adequate	Adequate
34.	Human Skelton	1	1
35.	Anatemical Specimen(Heart, brain, eye, ear, reproductive system etc.).	1 set	1 set
36.	Electro-convulsometer	1	1
37.	Stop watches	10	10
38.	Clamp, Bossheads, Screw clips.	Adequate	Adequate
39.	Symes' Cannula	20	20
B.	General Glassware:	Adequate	Adequate
C.	Chemical and Misc. laboratory apparatus and appliances		
	(needles, thread, plasticin, tubing, burners, polythene, tubes, syringes egc.	Adequate	Adequate

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4. List of Equipment for Biochemistry and Climical pathology Laboratory.

A.	Special Equipment and Instruments	Nos.required for 60 students	Nos.required for 120 students
1.	Colorimeter	2	2
2.	Microscopes	20	20
3.	Permanent slides (skin, Kidney, Pancreas, smoothmuscle, liver etc.)	Adequate	Adequate
4.	Watch glasses	25	50
5.	Centrifuge	1	1
6.	Microscope with oil immersion	5	5
B.	General Glass ware	Adequate	Adequate
C.	Biochemical reagents for analysis of normal and pathological constituents of urine and blood and facilities.	Adequate	Adequate

5. List of Equipment for Pharmacognosy Laboratory

A.	Special Equipment and Instruments	Nos.required 60 students	for 120 students
1.	Dissecting Microscope	20	20
2.	Charts(different types)	100	100
3.	Models(different types)	50	50
4.	Permanent slides	100	100
5.	Slides andcover slips	Adequate	Adequate
B.	General glassware	Adequate	Adequate
C.	Miscellaneous appliance Chemicals and Laboratory facilities.	Adequate	Adequate

6. List of Equipments for Hospital and Clinical Pharmacy Practical

		Quantity
1.	Water still	1
2.	Mixing vat with stirrer	2
3.	Filtration equipment	2

4.	Filling machine	1
5.	Sealing machine	1
6.	Autoclave sterilizer	1
7.	Memorane filter	1 Unit
8.	Sintered class funnel with complete filtering assembly	10 Units
9.	Small disposable membrane filters for IV aimixture filtration	Adequate
10.	Laminar air flow bench	1
11.	Vacuume pump	1
12.	Ovens	2
13.	Surgical dressing	2
14.	Incubator	1
15.	Karl Fischer apparatus for moisture content determination.	1
16.	Flame photometer	1
17.	pH meter	1
18.	Dissolution apparatus	1
19.	Disintegration test apparatus	1
20.	Hardness tester	1
21.	Centrifuge	1
22.	Magnetic stirrer	1
23.	Thermostatic bath	1
24.	Experimental Animals	Adequate

7.	General List of Equipments	Nos. required for 60 students	120 Students
1.	Distilled water still	2	2
2.	Vacuum pump	2	3
3.	Refrigerator	1	2
4.	General filling equipment for the museum	Adequate	Adequate
5.	Compound microscopes	20	20
6.	Oil immersion microscope	11	2
7.	Over head projector	1	1
8.	Slide cum strip projector	1	1
9.	Projection screen	1	1

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MUSEUM

Every institution shall maintain a museum of crude drug harbarium sheets, botanical specimens of the drugs and plant mentioned in the course. In addition, the following are recommended:-

1. Coloured slides of medicinal plants:
2. Display of popular patent medicines; and
3. Containers of common usage in medicines.

LIBRARY

Every institution shall maintain a library which should contain books mentioned in the syllabus and also the current pharmaceutical journals. There should be adequate place in library for students and staff to refer books.

NOTE:

The above requirements are the minimum requirements and the Institute is free to provide more physical and Teaching facility.

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EDUCATION REGULATIONS OF THE PHARMACY COUNCIL OF INDIA.

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APPENDIX-C

(See regulation-18)

CONDITIONS TO BE FULFILLED BY THE EXAMINING AUTHORITY

1. The Examining Authority shall be either a statutory Indian University or a body constituted by the Central or State Govt. It shall ensure that discipline and decorum by the Examinations are strictly observed at the examination centres.

2. It shall permit the Inspector or Inspectors of the Pharmacy Council of India to visit and inspect the examinations.

3. It shall provide:

   a) Adequate rooms with necessary furniture for holding written examinations;

   b) Well-equipped laboratories for holding practical examinations;

   (c) an adequate number of qualified and responsible examiner and staff to conduct and invigilate the examination; and

   (d) Suchm other facilities as may be necessary for efficient and proper conduct of examinations.

4. It shall, if so required by a candidate, furnish the statement of marks secured by a candidate in the examinations after payment of prescribed fee, if any, to the Examining authority.

5. It shall appoint examiners whose qualifications should be similar to those of the teachers in the respective subjects as shown in Appendix-B.

6. In pursuance of sub-section (3) of section 12 of the Pharmacy Act, 1948, the Examining Authority

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1.5 HUMAN ANATOMY AND PHYSIOLOGY

Theory (75 Hours)

1. Scope of Anatomy and Physiology.
   Definition of various terms used in Anatomy.
2. Structure of cell, function of its components with special reference to mitochonaria and microsomes.
3. Elementary tissues of the body, i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue.
4. Structure and function of skeleton. Classification of joints and their function, joint disorder.
5. Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood.
6. Name and functions of lymph glands.
7. Structure and functions of various parts of the heart. Arterial and venous system with special reference to the names and positions of main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders.
8. Various parts of respiratory system and their functions. Physiology of respiration.
9. Various parts of urinary systems and their functions, structure and functions of kidney. Physiology of Urine formation. Pathophysiology of renal diseases and oedema.

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10. Structure of skeletal muscle. Physiology of muscle contraction. Names, positions, attachments and functions of various skeletal muscles. Physiology of neuromuscular junction.

11. Various parts of central nervous system, brain and parts, functions and reflex action. Anatomy and Physiology autonomic nervous system.

12. Elementary knowledge of structure and functions of organs of taste, smell, ear, eye, and skin. Physiology of part.

13. Digestive system: Names of the various parts of dig system and their functions. Structure and functions of liver physiology of digestion and absorption.

14. Endocrine glands and Hormones. Location of the gland their hormones and functions.

Pituitary, thyroid, Adrenal and Pancreas.

15. Reproductive system- Physiology and Anatomy of Reproductive system.