

Agilan

EDUCATION REGULATION 1981

FOR THE

DIPLOMA COURSE IN PHARMACY

(Regulations framed under section 10 of the Pharmacy Act, 1948)

(As approved by the Government of India, Ministry of Health vide letter No. V. 13016/1/80-PMS dated 25th June, 1981 and notified by the Pharmacy Council of India vide No. 14-55/79 Pt-I/PCI/4235-4650 dated 8th July, 1981)

PHARMACY COUNCIL OF INDIA

COMBINED COUNCILS' BUILDING

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EDUCATION REGULATIONS OF THE PHARMACY COUNCIL OF INDIA

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PHARMACY COUNCIL OF INDIA

New Delhi the 8th July 1981

F. No. 14-55/79-Pt. I/PCI.—In exercise of the powers conferred by section 10 of the Pharmacy Act, 1948 (8 of 1948), the Pharmacy Council of India, with the approval of the Central Government, hereby makes the following regulations, namely:—

CHAPTER 1

1. *Short title and commencement.*—(1) These regulations may be called the Education Regulations, 1981.

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

2. *Qualification for a Pharmacist.*—(1) The minimum standard of education required for qualification as a pharmacist shall be Diploma in Pharmacy (Part I) and Diploma in Pharmacy (Part IIA and Part IIB) or any other qualification approved by the Pharmacy Council of India as being equivalent to Diploma in Pharmacy (Part I) or Diploma in Pharmacy (Part IIA and Part IIB), as the case may be.

(2) Diploma in Pharmacy (Part I and Part IIA) shall consist of a certificate of having passed the course of study given in Chapter 2 of these regulations.

(3) Diploma in Pharmacy (Part IIB) shall consist of a certificate of having completed a course of practical training as given in Chapter 3 of these regulations.

CHAPTER 2

Diploma in Pharmacy (Part I and Part IIA)

3. *Minimum qualification for admission to the course.*—Any person who wishes to be admitted as a student to the course of study for Diploma in Pharmacy (Part I), shall produce to the head of the institution, imparting the training in accordance with these regulations, evidence of having passed—

(a) matriculation examination for a high school examination or a secondary school leaving certificate examination with chemistry, physics and mathematics ; or

(b) any other examination accepted by the Pharmacy Council of India as equivalent to any of the above examinations.

4. *Duration of the course.*—The course of training shall be of two academic years' duration consisting of approximately one thousand hours (including the time spent on sessional examinations) in each academic year spread over a period of about one hundred and eighty working days.

5. *Courses of study.*—(1) The courses of study for Diploma in Pharmacy (Part I) and Diploma in Pharmacy (Part IIA) shall include the respective subject as given in the Table below. The number of hours to be devoted to each subject for its teaching (lecture and practical), shall not be less than that noted against it in columns (2) and (3) of the said Table:—

TABLE

Diploma in Pharmacy (Part I)

Subjects to be taught	No. of hours of lecture	No. of hours of practical work
(1)	(2)	(3)
General Chemistry	50	75
Organic Chemistry	75	50
Physics	75	50
Biology	75	75
English	100	—
Physiology including Anatomy and Health Education	50	50
	425	300

Diploma in Pharmacy (Part IIA)

Subjects to be taught	No. of hours of lecture	No. of hours of practical work
(1)	(2)	(3)
Pharmaceutics-I	50	100
Pharmaceutics-II	50	100
Forensic Pharmacy and Ethics	50	—
Pharmaceutical Chemistry-I	25	75
Pharmaceutical Chemistry-II	75	50
Pharmacognosy	50	50
Pharmacology	100	25
	400	400

(2) The detailed syllabus of each of the subjects in the said Table shall be as specified in Appendix A to these regulations.

6. *Special provisions relating to certain persons.*—Irrespective of the date of these regulations having come into force in any State but not later than 31st August, 1981, the persons practising for not less than two years in hospitals, dispensaries and other institutions where regular dispensing of drugs is done and possess Matriculation or other equivalent qualification and are desirous of taking up the course of training for Diploma in Pharmacy (Part I) and Diploma in Pharmacy (Part IIA) shall be permitted to appear at the examination for Diploma in Pharmacy (Part I) and Diploma in Pharmacy (Part IIA) at intervals of six months, only if they have to the satisfaction of the head of the institution attended, in substance, the regular course in an approved institution imparting full time or part time tuitions by day or evening classes.

7. *Approval of course of study.*—The course of regular academic study given under regulation 5 shall be conducted by an authority in a State, which shall be approved by the Pharmacy Council of India under sub-section (1) of section 12 only if it provides adequate arrangements for teaching in regard to building, accommodation, equipment and teaching staff as specified in Appendix-B to these regulations.

8. *Examinations.*—(a) There shall be two examinations for Diploma in Pharmacy (Part I) to examine students in the first year course and the examination for Diploma in Pharmacy (Part IIA) to examine students in the second year course. Each examination may be held twice every year. The examinations shall be of a written and practical (which may include oral) nature as indicated in the Table to regulations 9 and 10.

(b) A candidate, who appeared in all the subjects of first year or of the second year but failed in some subjects shall be deemed to have been exempted from re-appearing in the subject(s) in which he has passed.

9. *Eligibility for appearing at the examination for Diploma in Pharmacy (Part I).*—Only such student who produces certificate from the head of the institution concerned in proof of his having regularly and satisfactorily followed the first year course of study by attending not less than 75 per cent of the classes held (both in theory and in practical separately of each subject) shall be eligible for appearing at the examination for Diploma in Pharmacy (Part I) which examination shall be conducted in accordance with the scheme specified in the Table below:—

TABLE

Examination for Diploma in Pharmacy (Part I)

Subjects of examination	Total marks for theory including sessional	Total marks for practical examination including sessional
(1)	(2)	(3)
General Chemistry	100	100
Organic Chemistry	100	100
Physics	100	100
Biology	100	100
English	100	—
Physiology including Anatomy and Health Education	100	100
	600	500

- NOTES : 1. Each written examination shall be of three hours' duration.
2. Examiners shall be at liberty to examine students orally during the practical examinations and take cognisance of their performance when marking their papers.
3. Each theory paper or practical examination is construed as a subject.

10. *Eligibility for appearing at the examination for Diploma in Pharmacy (Part IIA).*—Only such student who produces certificate from the head of the institution concerned in proof of his having regularly and satisfactorily followed the second year course of study by attending not less than 75 per cent classes held (both in theory and in practical separately of each subject) and having successfully passed the examination for Diploma in Pharmacy (Part I) shall be eligible for appearing at the examination for Diploma in Pharmacy (Part IIA) as given in the Table below. If, however, the student has completed the first year course and appeared in all subjects in the Diploma in Pharmacy (Part I) examination, his failure in not more than two theory papers and two practicals shall not debar him from attending the second year course :

Provided that the result of Diploma in Pharmacy (Part IIA) examination of such candidate shall be declared only after he passes all the subjects of examination for Diploma in Pharmacy (Part I) :

Provided further that a student who has passed—

- The intermediate examination in science, or
- the first year of a three years' degree course in science, or
- 10+2 examination (academic stream) in science, or
- an examination accepted by the Pharmacy Council of India as being equivalent to any of the above examinations,

shall be eligible for admission directly into the second year class of the Diploma in Pharmacy (Part IIA) :

Provided also that a student entering the course under the second provision shall be required to attend classes, appear and pass in those subjects as prescribed for the Diploma in Pharmacy (Part I) in which he has not previously passed at an equivalent examination. This may be done simultaneously with or independently of the Diploma in Pharmacy (Part IIA) course and examinations depending on the capability of the student and the facilities available to him before he becomes eligible for securing the Diploma in Pharmacy (Part IIA).

TABLE

Examination for Diploma in Pharmacy (Part IIA)

Subjects of examination	Total marks for theory including sessional	Total marks for practical examination including sessional
(1)	(2)	(3)
Pharmaceutics I	100	100
Pharmaceutics-II	100	100
Forensic Pharmacy and Ethics	100	—
Pharmaceutical Chemistry-I	100	100

(1)	(2)	(3)
Pharmaceutical Chemistry-II	100	100
Pharmacognosy	100	100
Pharmacology	100	100
	700	600 580

NOTES : 1. Each written examination shall be of three hours' duration.

2. Examiners shall be at liberty to examine students orally during the practical examinations and take cognizance of their performance when marking their papers.

3. Each theory paper or practical examination is construed as a subject.

11. *Marks for passing in the examinations.*—(a)

(i). A regular record of both theoretical and practical class work and examinations conducted in an institution imparting training for the course for Diploma in Pharmacy (Part I) and Diploma in Pharmacy (Part IIA) shall be maintained for each student and 20 per cent of the total marks for each paper in theory and 40 per cent of the total marks for each paper in practical shall be allotted to these records.

(ii) There shall not be less than three periodic examinations during the year. The highest aggregate of minimum of two performances shall form the basis of calculating the average for computation of sessional marks.

(iii) The following system should be followed in allotting marks for the sessional practical examinations :

The actual performance in the examination... 60

Day to day class work including journal record upto the day of examination... 40%

(iv) The average sessional marks thus calculated should be made available to all examiners in a practical subject at the commencement of the relevant examination in both the Diploma in Pharmacy (Part I) and Diploma in Pharmacy (Part IIA) examinations.

(b) A student shall not be declared to have passed the above examinations unless he secures at least 33% marks in English and at least 40% marks in each of the remaining subjects separately in the written tests (including sessional record) and at least 45% marks in the practical tests (including sessional record) in each subject. The candidate securing 75% marks or above in any subject or subjects shall be declared to have obtained distinction in that subject or those subjects provided he passes in all the subjects in the same examination.

12. *Approval of examinations.*—The examinations mentioned in regulations 8 to 10 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. Such approval shall be granted only if the examining authority concerned fulfils the conditions as specified in Appendix-C to these regulations.

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13. *Certificate of passing examination for Diploma in Pharmacy (Part IIA).*—A certificate for having passed the examination for the Diploma in Pharmacy (Part IIA) shall be granted by the examining authority to a successful student.

CHAPTER 3

Diploma in Pharmacy (Part IIB)

(Practical Training)

14. *Period and other conditions of practical training.*—(1) After the satisfactory completion of the Diploma in Pharmacy (Part IIA), or any other course accepted as being equivalent by the Pharmacy Council of India, a person shall be eligible to undergo practical training in one or more of the following institutions, namely:—

(i) hospital;

(ii) pharmacy;

(iii) a chemist and druggist; and a drug manufacturer licensed under the Drugs and Cosmetics Rules, 1945, framed under the Drugs and Cosmetics Act, 1940 (23 of 1940).

(2) No institution referred to in sub-regulation (1), shall be eligible to impart practical training unless it fulfils the conditions specified in Appendix D of these regulations.

(3) In the course of practical training, the person shall acquire—

(i) working knowledge of keeping of records required by various Acts affecting the profession of pharmacy, and

(ii) practical experience in—

(a) the manipulation of pharmaceutical apparatus in common use;

(b) the recognition of chief crude drugs and chemical substances used in medicine;

(c) the reading, translation and copying of prescriptions including checking of doses;

(d) the dispensing of prescriptions illustrating the commoner methods of administering medicaments; and

(e) the storage of drugs and medical preparations.

(4) The practical training period shall be not less than seven hundred and fifty hours spread over a period of not less than three months, provided that not less than 375 hours are devoted to actual dispensing of prescriptions.

15. *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 persons 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 Institution agreeing to impart the training (hereinafter referred to as the Apprentice 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 filled with the Apprentice Master (if he so desires) or with the trainee pending completion of the training.

16. *Certificate of passing Diploma in Pharmacy (Part IIB).*—On completion of the apprentice period, the Apprentice Master shall fill SECTION IV of the second copy and third copy of the Contract Forms 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 IIB).

17. *Transitory Provisions.*—Irrespective of the date of these regulations having come into force in any State but not later than 31st August, 1981, the experience gained by the persons practising for not less than two years in hospitals, dispensaries and other institutions where regular dispensing of drugs is done, shall be treated as being equivalent to the practical training under these regulations.

CHAPTER 4

18. *Certificate of Diploma in Pharmacy.*—A certificate of Diploma in Pharmacy shall be granted by the examining authority to a successful candidate on producing certificates of having passed the Diploma in Pharmacy (Part IIA) and Practical Training for Diploma in Pharmacy (Part IIB).

19. *Miscellaneous.*—(a) Any course of pharmaceutical training which does not cover in full the courses of study included in these regulations shall not be considered for approval under section 12.

(b) Persons who have passed a course of study in Pharmacy not covering in full the subjects containing in these regulations shall not be considered as having passed the examination for Diploma in Pharmacy (Part IIA) unless they produce a certificate from an approved institution that they have passed an examination in such subject as required by these regulations.

20. *Repeal and savings.*—(1) The Education Regulations, 1972 (hereinafter referred to as the said regulations) published by the Pharmacy Council of India vide No. 14-21/71-PCI dated 6th December, 1972 and notified in the Gazette of India Part III, Section 4, No. 1 dated 6th January, 1973 are hereby repealed.

(2) Notwithstanding such repeal—

(a) anything done or any action 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 Pharmacy 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.

APPENDIX A

[See regulations 5(2)]

1. The entire syllabus (except for Pharmaceutics-I, Forensic Pharmacy and Ethics) should be treated in an elementary manner supplemented by practical demonstrations.

2. Books referred to in the syllabus are meant to be the latest editions.

3. For first year subjects except Physiology including Anatomy and Health Education, the standard should fall between the standard of the Central Board of Secondary Education and that of Inter Science of the Indian Universities. The standard for second year course and Physiology including Anatomy and Health Education has been indicated at the end of the syllabus on each subject.

GENERAL—CHEMISTRY

Theory (50 hours)

1. Structure of Atom:

Planetary structure of atoms, energy levels, Valency.

2. Chemical periodicity:

Periodic law, periodic table, size of atoms and ions.

3. Radioactivity:

Nuclear structure, Nucleids, Nuclear reactions, Radioactivity, Properties of radiations.

4. Chemical bonding and molecular shape:

Concept of orbital overlap in bond formation, Sigma and pi bond, hybridisation, electrovalent, Covalent bond, Polarity and dipole moment, co-ordination, complexation and chelation, Hydrogen bond.

5. Chemical Equilibrium:

Homogenous and heterogenous reactions, Chemical equilibrium, law of mass action, factors influencing the chemical equilibrium, Le Chatelier's principle.

6. Ionic equilibrium:

Ionisation equilibrium in aqueous solutions, solubility product, common ion effect.

7. Acids and Bases:

Modern concepts of acids and bases, ionisation constants of acids and base, strong and weak acids or bases, acid base equilibrium,

Ionisation of water, pH and pOH, Acid base titrations, Choice of indicators, hydrolysis of salts, buffer solutions numerical problems based on above.

8. Chemical Kinetics :

Rates of reactions—Symbolic expression (excluding derivations) and units; Factors influencing rate of reactions, nature of reactants, temperature, catalyst, radiation

9. Properties of Ions in Solution:

Electrolysis, Faraday's laws, Electrolytic (conductance) (Specific, equivalent and molar Conductance).

10. Oxidation and Reduction :

Electronic concept of oxidation and reduction, hydrogen electrode, sign of potential, Electro-chemical series, Half cell and Potential, Nernst's equation (excluding derivation), equilibrium constants for oxidation and reduction reactions, Redox titrations.

11. States of Matter :

Kinetic theory of gases, intermolecular forces and intermolecular distances. critical temperature and critical pressure; liquids—viscosity rheology, surface tension; solids—allotropy, sublimation.

12. Solutions:

Definition and types of solutions; Solute and solvent, Expressing concentration of solution, solubility and factors affecting it. Raoult's Law, Boiling point elevation and freezing point depression, Determination of molecular weight, Osmotic pressure, Isotonic solutions.

13. Surface Chemistry:

Adsorption of gases and solutes on solid surfaces, colloidal states of matter, multi-molecular and macromolecular colloids, preparation and properties of colloids (electrical and optical), interfacial tension.

Books Recommended :

1. L.M. Atherdon "Bentley and Driver's Text Book of Pharmaceutical Chemistry", Oxford University Press, London.
2. M.L. Schroff, "Pharmaceutical Chemistry Part I—Principle", National Book Centre, P-76, Sunderi Mohan Avenue, Calcutta-700014.

Practicals (75 hours)

1. Laboratory Techniques :

Crystallisation, sublimation, weighing and calibration of volumetric apparatus.

2. Qualitative Analysis:

Analysis of simple inorganic salts to detect the anion and cations.

3. Quantitative Analysis :

Preparation of 0.1 N HCl and its standardization with Na_2CO_3 AR.

Preparation of 0.1 N NaOH and its standardization with succinic acid AR.

Preparation of 0.1 N KMnO_4 and its standardization with sodium oxalate AR.

Preparation of 0.1 N H_2SO_4 and its standardization with NaOH solution of known strength.

Determination of strength of ferrous sulphate solution with the help of standard KMnO_4 solution.

Preparation of 0.1N $\text{Na}_2\text{S}_2\text{O}_3$ and its standardization with potassium dichromate AR.

ORGANIC CHEMISTRY

Theory (75 hours)

1. General Introduction and Nomenclature:

Quantitative determination of elements, empirical molecular and structural formulae, organic nomenclature.

2. Hydrocarbons (Saturated) :

Alkanes, tetrahedral nature of carbon, sp^3 hybridization, preparation and reactions of alkanes, isomerism; liquid paraffin, hard paraffin cyclopropane

3. Hydrocarbons (Unsaturated):

Alkenes : sp^2 hybridization preparation of alkenes, properties and chemical reactions, Markonikov's rule, *cis* and *trans* isomerism, dienes.

Alkynes : Sp hybridization, preparation, properties and chemical reactions of acetylene.

4. Alcohols :

Definition and classification preparation properties and chemical reactions of alcohols, fermentation, manufacture of ethyl alcohol, proof spirit, denatured alcohol, glycol glycerol.

5. Ethers :

Definition, preparation, properties and reactions of ethers; diethyl ether; anaesthetic ether thioether; vinyl ether.

6. Aldehydes and Ketones :

Definition and nomenclature, preparation of aldehydes and ketones, properties and chemical reactions of aldehydes and ketones, polymerization formaldehyde solution, paraldehyde, chloral hydrate acetone.

7. Carboxylic Acids :

Classification and structure, preparation, properties and chemical reactions of monocarboxylic acids, acetic acid, trichloroacetic acid, oleic acid, oxalic acid, succinic acid, tartaric acid, lactic acid, citric acid, optical isomerism.

8. Carboxylic Acid Derivatives :

Structure of acyl halides, acid anhydrides, acid amides, esters, esterification, ethyl acetate, sodium lauryl sulphate.

9. Halo Hydrocarbons :

Preparation and reactions of alkyl halides and Grignard's reagent, ethyl chloride, chloroforms.

10. Amines :

Definition and classification, preparation, properties and chemical reactions and amines; quaternary ammonium salts.

11. Benzene and other Aromatic compounds :

Benzene, resonance and structure; substitution of benzene, *o*, *m*, *p*, isomers, electrophilic substitution reactions; preparation and properties of nitrobenzene, benzenesulphonic acid, chlorobenzene, toluene, aniline, diazotisation reactions, preparation and properties of phenol, benzaldehyde, acetophenone, benzoic acid, salicylic acid and cinnamic acid.

12. Fused ring Hydrocarbons :

Classification and nomenclature of different fused ring system (naphthalene, anthracene, phenanthrene and steroidal skeleton).

13. Fats and Oils :

Definition, uses, analysis (pharmacopoeial standards).

14. Proteins and Amine Acids :

Proteins, polypeptides and amino acids—definitions, hydrolysis, peptide bond, qualitative tests and colour reactions, essential amino acids.

15. Carbohydrates and Glycosides :

Classification, qualitative tests, structure of glucose, lactose (excluding derivation).

16. Alkaloids :

General introduction, classification and examples from pharmacopoeia.

Books Recommended :

1. L. M. Atherdon, "Bentley and Driver's Text Book of Pharmaceutical Chemistry", Oxford University Press, London.

Practicals (50 hours)

1. Laboratory Techniques :

Determination of melting and boiling points; distillation, steam distillation.

2. Qualitative Analysis :

Identification of simple organic compounds excluding preparation of derivatives.

Books Recommended :

1. F.G. Mann and B. C. Saunders, "Practical Organic Chemistry", Longman Green and Co. Ltd. London.

PHYSICS

Theory (75 hours)

NOTE : This course is to be covered without mathematical derivations.

1. Mechanics

1.1 Measurement in Physics :

Introduction to physics, measurement of physical quantities, accuracy in measurement, errors in measurement. Types of errors and minimising them in experimentation. Significance testing.

1.2 Graph and its utility in Experiments :

Graph to represent relationship between two parameters, plotting and drawing a graph, Slope as a rate measure. Straight line graph, significance of intercepts. Generation of data from the graph.

1.3 Rate of variation :

Concepts of displacement, Average and instantaneous velocity (introduce limit

$$\frac{s}{t} \text{ as } \frac{ds}{dt}$$

Applications such as fluid flow, rate of reaction, dependence of drug effectiveness on a component etc.

1.4 Energy and Power :

Concept of work, kinetic energy, potential energy, heat, light, electrical, nuclear energies (qualitative). Conservation of energy. Power and its calculation, Effect of energy transfer on biological and chemical systems.

1.5 Rotational Motion :

Circular motion of a particle, angular velocity and its relation with linear velocity, Central force and centrifuge, rotational inertia and energy.

1.6 Vibration of Bodies :

Simple harmonic motion (Qualitative), time period frequency, amplitude and energy of vibrations. Generation of waves and transfer of energy.

1.7 Viscosity and Surface Tension :

Concept of viscosity in liquids, its dependence on temperature, measurement of coefficient of viscosity (high and low), concept of surface tension, capillary action, water proofing and wetting.

1.8 Pressure and its Measurement :

Concept of pressure, Absolute and gauge pressures, Manometers.

1.9 Temperature and its Measurement :

Concept of temperature, thermometers—glass, bimetal, thermocouple, Resistances (including thermistor) and Pyrometer. Selection of a thermometer.

1.10 Measurement of Quantity of Heat :

Concept of heat, calorimetry, radiation correction in measurement.

1.11 Change of State :

Change of State, Latent heat, effect of pressure on boiling point, super heated steam and its application in sterilisation.

2. Sound and Light :

2.1 Mechanical Waves :

Longitudinal and transverse waves, Longitudinal sound waves, Ultrasonic waves, Production of ultrasonic waves, Applications to emulsification, sterilisation, compaction etc.

2.2 E.M. Waves :

Nature of Electromagnetic waves, origin of Electromagnetic waves, Rectilinear propagation of Electromagnetic waves, Electromagnetic spectrum. Methods of production and uses of Infra red, U. V., X-Rays and Rays.

3. Optical Instruments

Sources of light, image formation by lenses and mirrors (revision), refractive index (as C vacuum/ C medium), dispersion, U. V., visible, I.R. Spectra and prism materials, Spectrometer, refractometer, compound microscope. Concept of optical diffraction, grating spectra, spectrophotometer. Concepts of polarisation and optical activity, polarimeter.

4. Electricity

4.1 Current Electricity :

Charges, concept of current and resistance Alternating current, Ohm's law (A.C. and D.C.)

4.2 D.C. Circuits :

Kirchoff's laws, Wheatstone Bridge, measurement of E.M.F. with potentiometer, pH meter.

4.3 Circuit Elements :

Capacitance, its behaviour in A.C. and D.C. Circuits, Electromagnetic induction; behaviour of inductance in A.C. and D.C. circuits.

NOTE 1 : Use I. S. Units only.

NOTE 2 : As far as possible no derivations be used. Stress may be laid on concepts.

NOTE 3: Use Quantitative calculations as much as possible.

Books Recommended:

The following books indicating the level of the course may be referred to:

1. George Gamow and John. M. Cleveland—Physics Foundations and Frontiers—Prentice Hall India Limited.

2. R. L. Weber, K. V. Manning and M. W. White McGraw Hill Kogakusha—College Physics.

3. P. S. A. C. Physics—N. C. E. R. T., New Delhi.

4. N. C. Harris and E. M. Hemmerling—Introductory Applied Physics.

Practicals (50 hours).

1. Errors and significant figures. Study the types of errors encountered in experimental work and methods of computing percentage error, and study the meaning of significant figures and their application in the observations, and computations of experimental work.

2. Measurement of length and mass. Learn the use of—

(a) the vernier caliper and the micrometer in measuring length and

(b) the laboratory balance in the determination of mass.

3. Measurement of density of liquids.

4. Measurement of density of a solid or powder (of interest to pharmacist).

5. To study law of conservation of energy for Joule's Calorimeter.

6. Viscosity measurement of low viscosity fluid by capillary flow method.

7. Viscosity measurement of high viscosity fluid by Stoke's method.

8. Measuring surface tension by capillary rise method.

9. Construction of a U tube manometer and measurement of pressure of compressed air.

10. Measurement of Specific heat and Melting point of wax.

11. To find latent heat of fusion of a solid of interest.

12. Measurement of refractive index on an organic liquid by spectrometer.

13. Study of optical activity of a suitable liquid using polarimeter.

14. (a) Measurement of resistance using Voltmeter and Ammeter.

(b) Study the behaviour of series and parallel resistance.

15. Measurement of resistivity of a material using Wheatstone bridge.

16. Measurement of E. M. F. using potentiometer.

17. Construction and calibration of a thermocouple thermometer using potentiometer.

18. Electrical conductivity of electrolytes using A. C. Bridge.

19. Study of microscope.*

20. Study of the usage of multimeter.*

Note: *Indicates, the experiment is a study experiment and no measurements need to be emphasised.

Books Recommended:

The following books indicating the level of the course may be referred to:

1. M. Nelkon and J. M. Ogborn—Advanced level Practical Physics : ELBS
2. White and Manning—Experimental College physics Mc Graw Hill, student edition.

BIOLOGY

Theory (75 hours).

1. Relevan of Biology to Pharmaceutical Sciences.
2. Historical backgrounds.
3. Modern concepts of Biology, Molecular, Physiological and Biochemical aspects.
4. Structure and function of simple and complex tissues of plants and animals, important ergastic substances in cells.
5. Broad division of plant and animal kingdoms with special emphasis on the sources of drugs and pharmaceutical aids.
6. Fundamental principle of Microbiology, classification, isolation and staining techniques, pathogenic organisms of common diseases, Methods of culturing microbes.
7. Study of the following groups of drug yielding plants:

Algae and Fungi.

Families: Polypodiaceae, pinaceae, Emphedraceae, Liliaceae, Zingiberaceae, Renunculaceae, Papvaraceae, Leguminosae, Rutaceae, Umbelliferae, Apocyanaceae, Labiatae, Solanaceae.

8. General morphology of plants parts such as leaves, stems, flowers, fruits, seeds, underground parts of angiosperms.
9. Elementary plant physiology. Factors promoting growth of economic plants.
10. Study of following groups of animals producing disease in man selecting relevant examples from each group:

Rhizopoda, Sporozoa, Ciliata, Trematoda, Costoda, Tematoda, Arachnida, Insecta, Amphibia Reptiles.

11. Study of the anatomy and physiology of rabbit and frog.

12. Poisonous and hallucinogenic plants.

Practicals (75 hours).

1. Identification of important medicinal plants belonging to families covered in theory including study of important morphological features.
2. Study of histological characters of plant and animal tissues.
3. Identification of different classes of ergastic pinciples found in plant.
4. Study of various group of bacteria and fungi including examples from antibiotic producing species.
5. Dissecting of rabbit and Frog for the study of digestive, circulatory and urinogenital systems.
6. Identification of poisonous ad pathogenic plants and animals.

Books Recommended:

Foundations of Modern Biology Series (12 Nos.) Published by Prentice-Hall of India (P) Ltd., New Delhi.

ENGLISH

(100 hours)

This course aims at developing skills of reading comprehensions and writing free and guided composition. It also aims at enabling the student to master the techniques involved in writing business correspondence.

The course will be divided into three parts:

1. Basic Language:

An intensive course in grammer, spelling, punctuation, pronunciation, elementary comprehension and composition.

2. Reading Prescribed text:

The text book will be used for detailed reading, comprehension, grammer, pronunciation, vocabulary, expression, translation and topics for discussion (Translation here involves translating the sense rather than transliteration. The foreign students, if any, will be required to do precise writing).

3. Business Correspondence:

Writing of business and official (formal) letters in connection with the profession. The students will be introduced to ways of writing business/official letter, correction of letters, rewriting letters etc., as a part of developing their comprehension and composition skills.

NOTE: The examination paper at the final examination should :—

1. be based on text.
2. have more objective type of questions than essay type questions.
3. provide for adequate weightage of comprehension and guided composition.

The marks may be distributed in following manner.

1. Grammatical features	20
2. Reading Comprehension.	
(a) Comprehension	14
(b) Composition	6
(c) Translation	10
3. Business Correspondence	20
Total	70

Books Recommended :

1. W. Stannard Allen- Living English Structure Orient longman, Calcutta.
2. D. H. Spencer and H. Pant—Guided composition Exercises—Orient Longman, Calcutta.
3. Kenneth Methold and Chantana Methold M.D.—Practice in Medical English—Longman Group Limited, London (1975).

PHYSIOLOGY INCLUDING ANATOMY AND HEALTH EDUCATION

Theory (50 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 mitochondria and microsomies.
3. Elementary tissues of the body i. e. epithelial tissues, muscular tissues, connective tissue and nervous tissues.
4. Structure and function of skeleton. Classification of joints and their function joint disorder.
5. The Blood, Composition of blood, functions of blood elements. Blood groups 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.
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 its parts, functions and reflection, Anatomy and Physiology of autonomic nervous system.
12. Elementary knowledge of structure and functions of the following organs of taste, organ of smell, eye and skin. Physiology of pain.
13. Digestive system, Names of the various parts of digestive system and their functions. Structure and functions of liver physiology of digestion and absorption.
14. Principles of nutrition and vitamins.
15. Endocrine glands and Hormones. Location of the gland its hormones and their functions. Pituitary, thyroid, Adrenals and pancreas.
16. Concept of health and disease, basic principles of rural and health sanitation. Population problems, family planning programmes, principles underlying family planning methods and types of contraceptives Brief outline of bacterial, rickettial, viral, fungal, protozoal infection, worm infestation and prevention of contagious diseases.

Practicals (50 hours).

1. Study of the human skeleton.

2. Study with the help of charts and models of the anatomy of the following systems and organs:

- (a) Digestive system
- (b) Respiratory system
- (c) Cardiovascular system
- (d) Urinary system
- (e) Male and Female 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 T L C, DLC and malarial parasite.
5. Determination of clotting time of blood, erythrocyte sedimentation rate and Haemoglobin value.
6. Analysis of urine.
7. Recording of body temperature, pulse, heart rate and blood pressure.
8. Practice in first aid and emergency treatment in shock and snake bite.
8. Identification of surgical instruments.
10. Identification of various contraceptive devices.

Books Recommended:

1. Sears. W. Gordon-Anatomy, Physiology for Nurses Edward Arnold (Publishers) Limited, 41, Midlow Street, London W. I.
2. Best and Taylor: The Living Bodies, Asia Publishing House, Bombay or Fourneaux's Human Physiology. Longman Green and Co., London.
3. Material published by the Ministry of Health family planning and V.D. (Department of Family Welfare) may be used.

PHARMACEUTICS—I

Theory (50 hours)

A. Dosage Forms :

1. Physical properties of drugs influencing design of dosage forms.
2. Chemical characteristics of drugs versus formulation.
3. Absorption, distribution, biotransformation and elimination of drugs.
4. Bioavailability concepts, dosage form factors affecting bioavailability.
5. Additives in dosage forms as exemplified by surfactants hydrocolloids, diluents, vehicles, bases, stabilisers, preservatives, coloring agents, flavouring agents, sweetening agents etc.
6. Monophasic liquid dosage forms, techniques of enhancing solubilities of drugs in vehicles, other problems involved in preparation and stability of liquids. Review of different types of monophasic liquids forms as illustrated by liquids for

internal use, lotions, sprays, inhalations, eye lotions and eye drops, ear drops, nasal drops, throat paint etc.

7. Biphasic liquid dosage forms :

Emulsions and suspensions.

Emulsions—types, identification, selection of emulgents, preparation and stability.

Suspensions—Flocculated and non-flocculated suspensions, selection of wetting, suspending and dispersing agents, preparation and stability.

8. Semisolid dosage forms (ointments and suppositories) : Ointments—Ointment bases, factors governing selection of ideal base, preparation of ointments, creams, jellies etc. Stability of packaging.

Suppositories—Suppository bases, selection of ideal base, preparation of suppositories, problems of stability and packing.

9. Solid dosage forms—(Bulk and Unit dosage forms) : Bulk—Powders, incorporation of different ingredients, preparation of different varieties of powders such as powders for internal use effervescent powders, dusting powders, snuffs, dentifrices etc.

Tablets—Development of formulae of different kinds of tablets such as soluble tablets, effervescent tablets, lozenge tablets, suppository tablets, hypodermic tablets etc. Preparation of tablets including coating and polishing. Evaluation of tablets.

Capsules—Hard and Soft gelatin capsules, their filling and sealing use of capsules as substitutes for suppositories and for packaging of ophthalmic ointments.

10. Parenteral Preparations : Considerations involved in development of formulae. Physical, Chemical and biological contaminants in parenteral products. Isotonicity and specific gravity adjustments of parenteral products. Evaluation of products with reference to pyrogenicity and sterility.

11. Sustained Action dosage forms : Principles involved in development of sustained action dosage forms.

B. Dispensing :

1. Prescription—Reading and understanding of prescriptions, Latin terms commonly used, calculations involved in dispensing of some typical preparations, conversions of metric quantities to imperial system and vice versa.

2. Incompatibilities in prescriptions : Physical, Chemical and Therapeutic.

3. Posology.

C. Hospital Pharmacy :

1. Hospital Pharmacy—Definition and functions, organisation, location, layout, planning, staff, space, equipment.

2. Pharmaceutical Services in Outpatient Department Location, layout, receipt and issue systems, cost; recovery and service charges. Prepacking

of drugs; advantages, factors determining pack size.

3. Pharmaceutical Services in Inpatient Department: Layout, personnel, drug distribution systems, unit dose etc. Maintenance of records of issue and use of narcotics and dangerous drugs, ward stock medicines, emergency drugs, routine inspection of drugs stocks in ward.

4. Medical Stores : Objectives, layout, facilities procedure for procurement of drugs and supplies from medical stores depot, manufacturers, distributors, local market, Procedure and limits of emergency purchases.

5. Licensing procedure for procuring and stocking of alcohol and narcotics, sampling for quality control, methods to avoid duplication and disposal of slow moving drugs dead stock, stock arrangement.

Practicals (100 hours)

Dispensing of atleast 100 products covering a wide range of preparation such as mixtures, emulsions, lotions, liniments, E.N.T. preparations, ointments, suppositories, powders, incompatible prescriptions etc.

Books Recommended :

1. Mithal : Text Book of Pharmaceutical Formulation, Birla Institute of Technology and Sciences, Pilani.
2. The Pharmacopoeia of India.
3. National Formulary of India.
4. Cook and Martin : Remington's Pharmaceutical Sciences, Mack Publishing Co., Easton, Pennsylvania, 18042.
5. Pharmacopoeia of United States, Mack Publishing Co., Easton, Pennsylvania.
6. Cooper and Gunn : Dispensing for Pharmaceutical Standards, Pitman Publishing House, London.
7. British Pharmaceutical Codex.
8. Lyman R.A.—American Pharmacy (Vols. I & III) J.B. Lippincott and Co., Philadelphia.
9. Scovilles—Art of Compounding, McGraw Hill Book Company, New York.
10. Husa Pharmaceutical Dispensing, Mack Publishing Co., Easton, Pennsylvania 18042.
11. The British Pharmacopoeia.
12. The Pharmacopoeia of U.S.S.R.
13. Hospital Pharmacy, William E. Hassan, Lea and Febiger.
14. Mirror's Hospital Pharmacy, Francko, Latio-lais, Francke and Hospital Pharmacists, Washington, D.C. American Society.
15. "Professional Pharmacy Part II" Schroff Firstones Enterprises, Calcutta.
16. Remingtons Pharmaceutical Sciences, Mack Publishing Co., Pennsylvania.
17. Extra Pharmacopoeia Martindale.

18. Journals such as Indian Journal of Hospital Pharmacy.
19. Indian Pharmaceutical Guide—Pamposh Publication.

PHARMACEUTICS—II

Theory Practicals (50 hours)

A. Industrial Pharmacy :

1. Particle size reduction, methods, equipments, grading of powders.
2. Mixing and Homogenisation : Mixing of solid, semi-solid and liquid products Mixing and homogenising equipment, viscosity of liquids, concepts of surface tension.
3. Filtration and classification of liquid products, various types of filtering devices used in pharmaceutical industry.
4. Heat processes an exemplified by evaporation, desiccation, distillation, sublimation, freeze drying etc.
5. Extraction processes such as Maceration, Percolation, Soxhletation etc.
6. Methods of sterilization involving various forms of energy such as Heat and Radiations. Sterilization by means of chemicals substances. Sterilization by filtration.
7. Processing of tablets.
8. Processing of capsules.
9. Proceeding of perenteral products. Layout of sterile products area. Precautions for aseptic work. Filling, sealing and sterilization of ampoules vials and I.V. Fluid containers.
10. Concept of immunisation vaccines, sera, toxoids, their preparation.
11. Containers and closures inclusive of aerosol packaging.

B. Management :

1. Pharmaceutical marketing : Functions, buying, selling, transportation, storage, finance, feedback information, channels of distribution—wholesales, retail departmental store, multiple shop, mail order business. Salesmanship. Advertisement and window display. Market research. Recruitment, training, evaluation and compensation to the pharmacist.
2. Material management : Meaning, importance and objectives. Purchasing and storage. Inventory control.
3. Accountancy and Finance : General Principle of double entry book keeping. Forms of invoices, cash book, ledger. Preparation of trial balances, balance sheet, profit and loss statements. Importance of finance, financial planning, sources of finances, analysis of financial statements.

Practical (100 hours)

Preparation of a range of pharmaceutical products such as simple and concentrated waters, infusions, spirits, tinctures, extracts, tablets, parenteral preparations etc.

Books Recommended :

1. Cooper and Gunn's Tutorial Pharmacy ; The Kothari Book Depot (Regd.), Bombay 400 012.
2. Remington's Pharmaceutical Sciences ; Mack Publishing Co; Eastern, Pennsylvania.
3. Hospital Pharmacy, William E. Hasson, Lea and Febiger.
4. Mirror to Hospital Pharmacy, Francko, Latio-lais; Francko, and Co, Hospital Pharmacists, Washington D.C. American Society.
5. "Professional Pharmacy, Part II", Schroff; Five Stars Enterprises, Calcutta.
6. Remingtons Pharmaceutical Sciences, Mack Publishing Co ; Easion, Pennsylvania.
7. Extra Pharmacopoeia Martindale.

FORENSIC PHARMACY AND ETHICS

Theory (50 hours)

An objective study of the following :

- (a) The Drugs and Cosmetics Act, 1940 and the Rules made thereunder.
- (b) The Dangerous Drugs Act, 1930.
- (c) The Pharmacy Act, 1948.
- (d) The Drugs and Magic Remedies (Objectionable Advertisements) Act, 1954.
- (e) The Medicinal and Toilet Preparations (Excise Duties) Act, 1955.
- (f) The Drugs (Prices Control) Order, 1979.
- (g) The Shops Act of the State.
- (h) The Medical Termination of Pregnancy Act, 1971.
- (i) The Poisons Act, 1919.
- (j) The Prevention of Cruelty to Animals Act.
- (k) The Insecticides Act.
- (l) The Code of Pharmaceutical Ethics framed by Pharmacy Council of India.

Books Recommended :

1. Code of Pharmaceutical Ethics—Pharmacy Council of India, P.B. No. 7020, New Delhi 110 002.
2. Mithal, B.M.—A text book of Forensic Pharmacy—National Book Centre, P-76, Dr. Sundari Mohan Avenue, Calcutta.

PHARMACEUTICAL CHEMISTRY—I

Theory— (25 hours)

1. Pharmacopoeial monograph of drug, tests for purity, sources of impurities in Pharmacopoeial substances, official limit and quantitative tests.
2. An elementary study of inorganic pharmacopoeial substances with sufficient emphasis on general properties and stability, storage, conditions, uses and pharmaceutical preparations of important inorganic medicinal agents including radio-pharmaceuticals and pharmaceutical aids.

3. As regards the assay procedures, the following substances will be covered :

Ammoniated mercury, Boric acid, Sodium oxalate, sodium bicarbonate, Ferrous sulphate, Hydrogen peroxide, Potassium permanganate, Antimony potassium tartrate, Chlorinated lime, Copper sulphate, Iodine, Sodium chloride, Bismuth oxychloride, Yellow mercuric oxide, Ammonium chloride, Magnesium sulphate, Zinc sulphate, calcium gluconate.

BOOKS RECOMMENDED :

1. L.M. Atherdon, "Bentley and Driver's Text Book of Pharmaceutical Chemistry", Oxford University Press, London.
2. "Pharmacopoeia of India" Ministry of Health, Government of India, New Delhi.
3. "British Pharmacopoeia", Her Majesty's Stationery Office, London.
4. "British Pharmaceutical Codex", the Pharmaceutical Press, 1, Lambeth High Street, London SE1 7 JN
5. J.H. Block, E.B. Roche, T.O. Soine & Co., Wilson; "Inorganic Medicinal & Pharmaceutical Chemistry" Lea & Febrigers, Philadelphia.

Practicals (75 hours)

1. Quantitative Analysis :

Assays on the following compounds will be done :

Solution of Ammonia, Boric acid, sodium bicarbonate, Sodium carbonate, Ferrous sulphate, Hydrogen peroxide, chlorinated lime, Copper sulphate, Strong and weak solution of iodine, Sodium chloride injection, Ammonium chloride, Magnesium sulphate, Sodium sulphate.

2. Performance of limit tests for chloride, sulphate, lead, iron and arsenic.
3. General acquaintance with physical instruments like Refractrometer, Polarimeter, Photoclectric colorimeter and pH meter.

BOOKS RECOMMENDED :

1. Pharmacopoeia of India, Ministry of Health, Government of India, New Delhi.
2. A.H. Beckett and J.B. Senlake, "Pharmaceutical Chemistry", Asia Publishing House, Bombay.

PHARMACEUTICAL CHEMISTRY II

Theory— (75 hours)

An introduction to nomenclature of organic chemical systems with particular reference to heterocyclics.

The following topics will be covered at the elementary level with sufficient emphasis on chemical nomenclature of simpler compounds, stability, general properties and storage conditions, uses and forms of important pharmacopoeial organic compounds :

Anti-infective agents, sulfonamides and sulphones with antibacterial action, antibiotics antimalarials, Drugs acting on central nervous system, adrenergic agents, cholinergic agents, autonomic blocking agents,

diuretics, cardiovascular agents, hypoglycemic agents, coagulants and anticoagulants, local anaesthetics, histamine and antihistaminic agents, analgesic agents, and anti-pyretics, nonsteroidal antiinflammatory agents, hormones, vitamins, steroidal drugs, anti-thyroid drugs, surfaceactive agents, and diagnostic agents, miscellaneous organic pharmaceuticals.

Books Recommended :

1. L.M. Atherdon, "Bentley and Driver's Book of Pharmaceutical Chemistry" Oxford University Press, London.
2. Pharmacopoeia of India, Ministry of Health, Government of India, New Delhi.
3. "British Pharmaceutical Codex". The Pharmaceutical Press, 1, Lambeth High Street, London SE1 7 JN.
4. C.O. Wilson, O. Gisvold and F.F. Doerge, "Text Book of Organic Medicinal and Pharmaceutical Chemistry", J.B. Lippincot & Co., East Washington Square, Philadelphia, P.A.

Practical (50 hours)

1. Qualitative Analysis :

Performance of qualitative tests for alkaloids, carbohydrates, glycosides, proteins and amine acids and tannins.

2. Tests for identity and purity of selected drugs.

Books Recommended :

1. F.G. Mann and B.C. Saunders, "Pharmaceutical Organic Chemistry", Longmans Green and Co., Limited; London.
2. "Pharmacopoeia of India", Ministry of Health, Government of India, New Delhi.
3. A.H. Beckett and J.B. Stenlake, "Pharmaceutical Chemistry", Asia Publishing House, Bombay.

PHARMACOGNOSY

Theory (50 hours)

1. Definition, history and scope of Pharmacognosy.
2. Drugs, technical products and pharmaceutical aids derived from plants and animals. Study of various systems of classification of drugs from natural origin.
3. Official methods of drug evaluation.
4. Study of the important diagnostic features, active constituents, tests for identity, uses and substitutes of the following drugs :
 - (a) Honey, starch, absorbent cotton, acacia, tragacanth, agar, ispaghula, pectins, guar gum and bael.
 - (b) Digitalis, urguinea, senna, aloes, rhubarb, glycyrrhiza, Dioscorea, mustard, bitter almond, artemesia and cantharides, chrysarobin, kalmegh, picorrhiza, psoralen, pyrothium and quillaia.
 - (c) Arachis oil, castor oil, linseed, shark liver oil, tokum butter, lanolin and beeswax, chaulmogra oil and sesame oil.

(d) Umbelliferous fruits, lemongrass oil, lemon peel, nutmeg, cloves, cinnamom eucalyptus, menthol, camphor, and turpentine oil, saussurea, cardamom, cassia, chenopodium oil, dill, jatamansi, fresh lemon peel, mentha oil, fresh and dried orange peel, rasna and turmeric.

(e) Ginger, podyphyllum resin, benzoin, storax, capsicum, resin, balsam of tolu, and male fern, cannabis, tar, myrrh and asafoetida.

(i) Tannic acid and black catechu, Myrobalan and asoka bark.

(j) Lobelia, solanaceous drugs, cocaine, cinchona, opium, ipecacuanha, rauwolfia vinca, nux vomica ergot, physostigma, aconite, ephedra, colchicum and kurchi, aswagandha, chirata, valerian, vasaka, punarnava and vidang.

(k) Amla, kapur, kachari, kesar, gokhru, pipal babchi, bahera, brahmi, satavari, lehsun, vaj, shankhpushpi, arjun, tulsi, pudina and benafsha.

5. Study of surgical fibres, sutures and dressings.

Practical—(50 hours)

1. Gross identification of drugs.

2. Organoleptic examination and physical and chemical tests of the following : Starch, honey, acacia, agar, digitalis, senna, arachis oil, beeswax, turpentine oil, cloves, cinnamon, fennel, coriander, benzoin, catechu, belladonna, cinchona, ipecacuanha, ergot, nux vomica, ephedra, rauwolfia, colchicum, gelatin and shark liver oil, liquorice, quillaia, pyrethrum, kalmegh, linseed, turmeric, jatamansi, vidang, aswagandha, kurchi and asoka bark.

3. Identification of fibres and evaluation of surgical dressings.

Books Recommended :

1. Denston T.C.—A text book of pharmacognosy—Sir Issac Pitman & Sons; London.
2. Wallis T.E.—A text book of Pharmacognosy—J.A. Churchill & Co., 104, Gloucester Place, London, W.I.
3. Trease G.E.—A Text book of Pharmacognosy, Balliere Tindal & Cox, 7, Henrietta Street, London, W.C. 2.
4. Youngken—A Text book of Pharmacognosy.
5. Wallis T.E.—Practical Pharmacognosy—J.A. Churchill & Co ; 104, Gloucester Place, London W.I.
6. Shah C.S., Qadry J.S.—A text book of Pharmacognosy—M/s B.S. Shah, 1183, Pankore Road, Ahmedabad.

PHARMACOLOGY

Theory (100 hours)

I. Scope of Pharmacology.

II. Routes of administration of drugs (with special reference to their advantages and disadvantages) and techniques of their administration.

III. Various process of absorption of drugs and the factors affecting them. Disposition of drugs.

IV. General mechanism of drug action and factors which modify drug action.

V. Basic principles and importance of drug interactions.

VI. **Pharmacological classification of drugs** : The discussion on drugs should emphasise the following aspects. Drugs and their marketed preparations therapeutic uses, doses and dosage regimen, adverse effects, contraindications, toxicity and interaction with other drugs.

1. Drugs action on the central nervous system :

(i) General anaesthetics, adjuncts to anaesthesia, intravenous anaesthetics.

(ii) Narcotic analgesics, drugs used in rheumatism and gout, sedatives and hypnotics, psychopharmacological agents anticonvulsants and analoptics.

(iii) Centrally acting muscle relaxants and anti-parkinsonism agents.

(iv) Drug dependence and abuses of drugs.

(v) General symptoms and management of poisoning treatment of barbiturate and opium alkaloids, poisoning.

2. Local anaesthetics.

3. Drug acting on autonomic nervous system :

Cholinergic drugs : anticholinergic drugs. Symptoms and treatment of solanaceous drugs poisoning. Choline esterase inhibitors : symptoms and treatment of insecticide poisoning. Sympathomimetic amines, adrenergic receptor blockers, neurone blockers and ganglion blockers.

Drugs used in myasthenia gravis and neuromuscular blockers.

4. Drugs acting on eye : Mydriatics, cycloplegic drugs used in glaucoma.

5. **Drugs acting on Respiratory system** : Bronchodilators, nasal decongestants, expectorants and antitussive agents.

6. **Autocoids** : Physiological role of histamine and serotonin. Histamine and antihistamine.

7. **Cardiovascular drugs** : Cardiotonics : antiarrhythmic agents, antianginal agents, antihypertensive agents, peripheral vasodilators and drugs used in atherosclerosis.

8. **Drugs action on the Blood and the Blood-forming organs** : Haematinics; anticoagulants, haemostatics, blood substitutes and plasma expanders.

9. **Drugs affecting renal function** : Diuretics.

10. **Hormones and Hormone/antagonist** : Hypoglycaemic agents, antithyroid drugs, sex-hormones and oral contraceptives.

11. **Drugs action on digestive system** : Antacids and drugs used in peptic ulcer, purgatives and laxatives, antidiarrhoeals, anorectal preparations emetics, anti-emetics, antispasmodics and miscellaneous gastro intestinal agents.

12. Heavy metals and metal antagonist : Symptoms and management of mercury, lead and copper poisoning.
13. Chemotherapy of microbial diseases : Sulphonamides, penicillins, streptomycin broad spectrum and other antibiotics. Antitubercular agent, antileprosy agents, antifungal agents, antiviral drugs.
14. Chemotherapy of protozoal diseases.
15. Chemotherapy of cancer.

PRACTICAL DEMONSTRATIONS (25 hours)

1. Effect of Na⁺, K⁺, Ca⁺⁺, acetyl choline and adrenaline on frog's heart.
2. Effect of acetylcholine on rectus abdominus muscle of frog or guinea-pig ileum.
3. Effect of digitalis on frog's heart in systolic stand still.
4. Effect of hypnotics in mice.
5. Effect of convulsants and anticonvulsant in mice.
6. Effect of local anaesthetics using rabbit conneal method and sollamon's method.
7. Effect of mydriatics and miotics on rabbit's eye.
8. Effect of anthelmintics on earthworm.
9. Effect of diuretics in rabbit.
10. Effect of antihistamines on anaphylactic shock in guinea-pig.
11. Taming effect of chlorpromazine.
12. Effect of tubocurarine on nerve-muscle preparation.

BOOKS RECOMMENDED :

1. Derasari and Brahmkar : Elements of Pharmacology.
2. B.C. Bose : Text Book of Pharmacology, Scientific Book Agency, Calcutta.
3. A M A Drug Evaluations Publishing, Sciences Group, Inc.

APPENDIX—B

(See regulation 7)

CONDITIONS TO BE FULFILLED BY THE ACADEMIC TRAINING INSTITUTION

Any authority in India applying to the Pharmacy Council of India for approval of 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 hygienic 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) Biology, Physiology and Pharmacognosy laboratory;

- (2) Physics Laboratory;
- (3) Chemistry and Pharmaceutical Chemistry laboratory; and
- (4) Pharmaceutics Laboratory.

In addition to the laboratories, balance room, aseptic room or cabinet, animal house, 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, fume cupboards be provided wherever necessary.

In science colleges except for pharmaceutics laboratory all other laboratories may be shared with other departments.

(B) STAFF

Principal/Head of the department should not be engaged in teaching for more than 10 hours a week, and the work load of other members of teaching staff should not be more than 20 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
Lecturer (Part-time) (In English)	—One

However, for institutions running one year course (See regulation 10), the following staff is required :

* Professor/Reader	—One
Senior Lecturers/ Lecturers	—Four

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

The minimum qualifications of the Principal/Head of the Institution/Department, and the teachers is given below:

Principal/Head of the
Institution/Department
(Professor/Reader)

Basic pharmaceutical degree with post-graduate qualification and five years experience. (Ten years' experience for the professors).

Subject	Minimum qualifications of teachers in order of preference		
	I	II	III
General Chemistry	M. Pharm (Pharm. Chem.)	B. Pharm with 3 years' ex- perience	Nil
Organic Chemistry			
Pharmaceutical Chemistry I and II			
Physics	M.Sc. (Physics)	Nil	Nil
Biology and Pharmacognosy	M. Pharm (Pharmacog- nosy)	B. Pharm. with 3 years' experience	Nil
English	M.A.(Eng.)	Nil	Nil
Pharmaceutics-I	M. Pharm. (Pharma- ceutics)	B. Pharm. with 3 years' experience	Nil
Pharmaceutics-II			
Forensic Pharmacy and Ethics			
Physiology in- cluding Anatomy and Health Edu- cation Pharmacology.	M. Pharm (Pharmacology/M.Sc. Pharmacology)	B. Pharm. with 3 years' experience	M.B.B.S with 1 year experience

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

Non-Teaching Staff

Adequate supporting non-teaching staff consisting of technicians, Laboratory assistants, Laboratory attendants, besides ministerial staff should be provided.

(c) EQUIPMENT

LABORATORY FOR PHARMACOGNOSY (including Biology)

Particulars	Quantity
A. Special Equipment and Instruments—	
1. Microscope Dissecting	15 Nos.
2. Charts	100 Nos.
3. Models	50 Nos.
4. Permanent slides	100 Nos.
5. Slides and Coverslips.	30 Gross
B. General Glassware	
C. Misc. Laboratory apparatus and appliances.	

LABORATORY FOR PHYSICS:

Particulars	Quantity
1. Vernier calipers	6 Nos.
2. Micrometers	6 Nos.

Particulars	Quantity
3. Balances and weight boxes	4 Nos.
4. Specific gravity bottles	6 Nos.
5. Joules Calorimeter	3 Nos.
6. Travelling microscopes	4 Nos.
7. Large measuring cylinders	3 Nos.
8. Mercury	1 Kg.
9. Calorimeters	6 Nos.
10. Spectrometers	1 No.
11. Na. lamp with transformer	1 No. + 1 spare
12. Hollow prisms	6 Nos. + 2 spare
13. 12 v battery (car)	1 No.
14. Battery charger	1 No.
15. Ammeters 0-1A and Ammeters 0-5A milli Ammeter 0-10 MA	6 Nos.
16. Voltmeters 0-3V 2 Nos. Voltmeters	4 Nos.
17. Dial type wheatstone bridges	2 Nos.
18. Resistance boxes (dial type)	6 Nos. Max. around 10,000 ohm
19. Potentiometers wire type dial type	4 Nos. (2 Nos. dial type)
20. Galvanometers (600A S. D. with coal resistance about 30.	6 Nos.
21. Super sensitive galvanometers	2 Nos.
22. Transformers Primary 220 V/S, 12V.	3 Nos.
23. Transformers 12V Sec. 500MA	8 Nos.
24. Multimeters	2 Nos.
25. Optical bench	1 No.
26. Conductivity bridges	2 Nos.
27. Power supply D. C. 0-150V 10 mA	1 No.
28. Standard Cell	2 Nos.
29. Steam Generator	4 Nos.
30. Slinky springs	2 Nos.
31. Bimetal thermometer	1 No.
32. E. M. Spectrum chart	1 No.
33. U. V. and Infrared lamps.	1 No. each
34. Prisms (glass)	2 Nos.
35. Constant pressure head tanks	3 Nos.
36. Rheostats 10, 5A, 20, 2A, 1001A	2 Nos. each
37. Consumables	Lumpsum

LABORATORY FOR PHARMACEUTICS:

Particulars	Quantity
A. Special Equipment and Instruments:	
1. Hot extraction (Soxhlet) equipment	1 No.
2. Conial percolators	15 Nos.
3. Tincture press	1 No.
4. Hand grinding mill	1 No.
5. Motor driven disintegrator	1 No.
6. Ball mill motor driven	1 No.
7. Tablet machine	3 Nos.
8. Tablet coating pans 12" die with hot air blower etc.	1 No.
9. Polish pan 12" dia	1 No.
10. Tablet Hardness tester (e.g. Monsanto and pfizer types)	One of each type
11. Disintegration test apparatus	1 No.
12. Granulating sieves	20 Nos.
13. Tablet counting device	1 No.
14. Dissolution rate test equipment	1 No.
15. Friabilator	1 No.
16. Collapsible tubefilling equipment	1 No.
17. Capsule filling machine	1 No.
18. Prescription balances (preferably torsion type with a removable glass pan suitable for weighing 60 gm to 10 gm and sensitivity 5 gm for one division indicator shifting on the index plate)	30 Nos.
19. Balances preferably torsion type with removable glass pan suitable for weighing 5, 10 to 120 gm., sensitivity 30 mgm for 1 division deviation on index plate.	5 Nos.
20. Water deionization equipment.	1 No.
21. All glass distillation sets incorporating entrainment for making water for injection	
22. Ampoule washing devices (One or more of different types).	
23. Ampoule filling and sealing devices (One or more of different types)	
24. Sinter glass filters No. G. 3 G. 4, G. 3/5 or equivalents	15 of each grade.
25. Mlilipore filters different grades	3 of each grads.
26. Autoclaves	2 Nos.
27. Hot air sterilizer	2 Nos.
28. Incubators	1 No.

Particulars	Quantity
29. Aseptic cabinet	2 Nos.
30. Rabbit cages and rabbit holders	6 Nos.
31. Clarity test equipment for ampoules	1 No.
32. Waring blender	2 Nos.
33. Sieves for powder sifting Nos. 10, 16, 22, 30, 44, 60, 8t, 100, 120	15 each
34. Laboratory centrifuge	1 No.
35. Ointment slabs and spatulas	30 Nos.
36. Pestle and mortar (Porcelain)	30 Nos.
37. Pestle and mortar (glass)	30 Nos.
38. Suppository moulds	15 Nos.
B. General Glassware and other equipments.	
C. Chemicals etc.	

LABORATORY FOR PHARMACEUTICAL CHEMISTRY

(including General and Organic Chemistry)

Particulars	Quantity
A. Special Equipment and Instruments:—	
1. Refractometer	1 No.
2. Polarimeter	1 No.
3. Photoelectric Calorimeter	1 Nos.
4. pH meters	2 Nos.
5. Atomic models	3 Seats
6. Analytical balances.	15 Nos.
7. Physical balances	5 Nos.
8. Platform balance	2 Nos.
9. Weight Box (analytical)	10 Nos.
10. Weight Box (physical)	5 Nos.
11. Periodic table Chart	1 No.s
B. General Glassware.	
C. General Metallic Ware	
D. Chemicals	

LABORATORY FOR PHARMACOLOGY

(including Physiology)

A. Special Equipment and Instruments—	
1. Haemoglobinometers	15 Nos.
2. Haemocytometer	15 Nos.
3. Student isolated organ bath	2 Nos.
4. Sherrington's recording drum	1 No.

NOTE:
requir
more

Particulars

Quantity

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 Government. It shall ensure that discipline and decorum of 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 examiners and staff to conduct and invigilate the examinations; and

(d) such 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 shall communicate to the Secretary, Pharmacy Council of India not less than six weeks in advance the dates fixed for examinations, the time-table for such examinations, so as to enable the Council to arrange for inspection of the examinations.

APPENDIX—D

[See regulation 14 (2)]

CONDITIONS TO BE FULFILLED BY THE INSTITUTION TO
BE RECOGNISED FOR GIVING PRATICAL TRAINING

1. The Institution, where practical training is given to student pharmacists, shall from time to time, if required, furnish such information as may be needed by the Pharmacy Council of India about the staff, accommodation and equipment of the institution concerned and its working.

2. The Institution shall permit the Inspectors of the Pharmacy Council of India to inspect the premises at any reasonable time while the work is proceeding therein.

3. The Institution shall entrust some member or members of its staff, who shall be registered pharmacist (s), to look after the student pharmacists. Such members of the staff shall be responsible in this behalf to the Head of the Institution concerned.

5. Histological slides
6. Blood pressure apparatus 2 Nos.
7. Stathoscopes 2 Nos.
8. First aid equipment 2 sets
9. Contraceptive devices 1 set
10. Dissecting instruments 15 sets
11. Operation table 1 No.
12. Surgical instruments 1 set

B. Model (Anatomical, Pharmacological and Diseases)

C. Chats

D. Anatomical specimen
(Human brain, heart, kidney, liver and spleen.)

E. Human skelton

F. General Glassware

G. Drugs and Chemicals

H. Miscellaneous laboratory apparatus and appliances,

I. Recording Kymograph

GENERAL LIST OF EQUIPMENT

1. Distilled Water Stills 2 Nos.
2. Vacuum Pump 1 No.
3. Refrigerator 1 No.
4. General fittings equipment for the Museum.
5. Compound Microscopes 10 Nos.
6. Microscope with oil immersion. 2 Nos.

AUDIO VISUAL AIDS

1. Overhead Projectors 2 Nos.
2. Slide-cum-film strip projector 1 No.

MUSEUM

Every institution shall maintain a museum of crude drugs, herbarium sheets, botanical specimens of the drugs and plants 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 as also the current pharmaceutical journals. There should be adequate place in the library for students and staff to refer to books.

NOTE: The above requirements are the minimum requirements, and the institute is free to provide more physical and teaching facilities.

4. The Institution shall provide such opportunity, accommodation, apparatus, materials and books of reference as may be required to enable the student pharmacists to undergo the practical training properly.

5. The number of student pharmacists that may be taken in any hospital, pharmacy and chemist and druggist and a drugs manufacturer licensed under the Drugs and Cosmetics Rules, 1945 made under the Drug and Cosmetics Act, 1940 shall not exceed two where there is one registered pharmacist engaged in the work in which the student pharmacist is undergoing practical training; where there is more than one registered pharmacist similarly engaged, the number shall not exceed one for each additional such registered pharmacist.

6. The Institution wishing to be recognised under regulation 14 shall apply in writing to the Secretary, Pharmacy Council of India stating its desire, to be so recognised.

7. Having satisfied that the institution shall follow the conditions laid down in these rules, the Pharmacy Council of India shall grant such recognition.

8. In the event of any question arising as to the interpretation or observance of these conditions the decision of the Pharmacy Council of India shall be final.

APPENDIX—E

[See regulation 15(1)]

PRACTICAL TRAINING CONTRACT FORM FOR PHARMACISTS

SECTION I

This form has been issued _____

(Name of student pharmacist)

son of/daughter of _____

residing at _____ who has produced evidence before me that he/she is entitled to receive the Practical Training as set out in the Education Regulations framed under section 10 of the Pharmacy Act, 1948.

Date : _____ The Head of the Academic Training Institution

SECTION II

I _____ accept

(Name of the student pharmacist)

of _____

(Name of the Apprentice Master)

(Name of the Institution)

Hospital of Pharmacy) as my Apprentice Master for the above training and agree to obey and respect him/her during the entire period of my training.

(Student Pharmacist)

SECTION III

I, _____ accept

(Name of the Apprentice Master)

'as a

(Name of the student pharmacist)

trainee and I agree to give him/her training facilities in my organisation so that during his/her training he/she may acquire :—

1. Working knowledge of keeping of records required by the various Acts affecting the profession of pharmacy; and
2. Practice experience in—
 - (a) the manipulation of pharmaceutical apparatus in common use ;
 - (b) the recognition of chief crude drugs and chemical substances used in medicine;
 - (c) the reading, translation and copying of prescriptions including the checking of doses;
 - (d) the dispensing of prescriptions illustrating the commoner methods of administering medicaments; and
 - (e) the storage of drugs and medicinal preparations.

I also agree that a Registered Pharmacist shall be assigned for his/her guidance.

(Apprentice Master)

(Name and address of the Institution)

SECTION IV

I certify that _____

(Name of the student pharmacist)

has undergone _____ hours training spread over _____ months in accordance with the details enumerated in SECTION III.

(Head of the Organisation or Pharmaceutical Division)

SECTION V

I certify that _____ has

(Name of student pharmacist)

completed in all respect his practical training under regulation 14 of the Education Regulations framed under section 10 of the Pharmacy Act, 1948. He had his practical training in an Institution approved by the Pharmacy Council of India.

Date : _____

(Head of the Academic Institution)

(Devinder K. Jain)

Secretary-cum-Registrar
Pharmacy Council of India
New Delhi-110 002

[भारत के राजपत्र, भाग III—खण्ड 4 में दिनांक 13 फरवरी 1988 को प्रकाशित]

फार्मोसी कौंसिल आफ इंडिया

नई दिल्ली, दिनांक 22 दिसम्बर 1987

सं० फा० सं० 14-21/81(भाग-1)-पी० सी० आई०---
भारतीय भेषजी परिषद्, भेषजी अधिनियम, 1948 (1948 का 8) की धारा 10 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, केन्द्रीय सरकार के अनुमोदन से, विनियमन, 1981 का और संशोधन करने के लिए निम्नलिखित विनियमन बनाती है, अर्थात्:-

1. (1) इन विनियमों का संक्षिप्त नाम शिक्षा (संशोधन) विनियम, 1987 है।

(2) ये राजपत्र में प्रकाशन की तारीख को प्रवक्त होंगे।

2. शिक्षा विनियम 1981 में--

- (1) विनियम, 11 के खण्ड (क) के उपखण्ड (1) में, 30 प्रतिशत" और "40 प्रतिशत" अंकों और शब्दों के स्थान पर--

"20 प्रतिशत" अंक और शब्द रखे जाएंगे।

- (2) परिशिष्ट ख में (ख) कर्मचारीबुन्द "उपशीर्ष" के नीचे,--

(क) सारणी में--

विषय	अधिमानता के क्रम में अध्यापकों की न्यूनतम अर्हताएं		
	1	2	3
सामान्य रसायन विज्ञान	भैषजिक विज्ञान में मास्टर	भैषजिक विज्ञान में स्नातक	शून्य
कार्बनिक रसायन भैषजिक रसायन 1 और 2	(भैषजिक रसायन)	और 3 वर्ष का अनुभव	

प्रविष्टि के स्थान पर निम्नलिखित प्रविष्टि रखी जाएगी, अर्थात्--

विषय	अधिमानता के क्रम में अध्यापकों की न्यूनतम अर्हताएं		
	1	2	3
सामान्य रसायन विज्ञान कार्बनिक रसायन	भैषजिक विज्ञान में मास्टर	भैषजिक विज्ञान में स्नातक	एम० एस० सी० (कार्बनिक रसायन) और एम० एस० (भैषजिक रसायन)
	भैषजिक रसायन)	और 3 वर्ष का अनुभव	और 3 वर्ष का अनुभव
भैषजिक रसायन-1	भैषजिक विज्ञान में मास्टर	भैषजिक विज्ञान में स्नातक	शून्य
भैषजिक रसायन-2	(भैषजिक रसायन)	और 3 वर्ष का अनुभव	

(ख) सारणी के नीचे विद्यमान परन्तुक के पश्चात् निम्नलिखित परन्तुक रखा जाएगा, अर्थात् :-

"परन्तु यह और कि अनुसूचित जाति/अनुसूचित जनजातियों के प्रवर्ग के अभ्यर्थियों की वाबत अनुभव की अवधि को केवल

एक वर्ष तक शिथिल किया जा सके।"

देवेन्द्र कुमार जैन, सचिव,
भारतीय भेषजी परिषद

PHARMACY COUNCIL OF INDIA

New Delhi-110002, the 22nd December 1987

No. 14-21/81(Pt.I)-PCI.—In exercise of the powers conferred by section 10 of the Pharmacy Act, 1948 (8 of 1948), the Pharmacy Council of India with the approval of the Central Government, hereby makes the following regulations further to amend the Education Regulations 1981, namely :—

1. (1) These regulations may be called the Education (Amendment) Regulations, 1987.

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

2. In the Education Regulations 1981,—

(i) in sub-clause (i) of clause (a) of regulation 11, for the figures and words "30 per cent" and "40 per cent", the figures and words, "20 per cent", shall be substituted;

(ii) In Appendix B, under the sub-heading ' (B) STAFF',—

(a) in the Table, for the entry—

Subject	Minimum qualifications of teachers in order of preference		
	I	II	III
General Chemistry Organic Chemistry Pharmaceutical Chemistry I & II	M. Pharm (Pharm. Chem.)	B. Pharm with 3 years experience	Nil
The following entry shall be substituted—			

Subject	Minimum qualification of teachers in order of preference		
	I	II	III
General Chemistry Organic Chemistry	M. Pharm (Pharm Chem. her.)	B. Pharm with 3 years experience	M. Sc. (Org. Chem.) and M. Sc. (Pharm. Chem.) with 3 years experience
Pharmaceutical Chemistry I Pharmaceutical Chemistry II	M. Pharm (Pharm. Chem.)	B. Pharm with 3 years experience	Nil

(b) below the Table, after the existing proviso, the following proviso shall be substituted, namely :—

one year only in respect of the candidates belonging to the category of the Scheduled Caste/Scheduled Tribes."

Sd/- ILLEGIBLE

Secretary

Pharmacy Council of India

"Provided further that the experience may be relaxed to