

PHARMACY COUNCIL OF PAKISTAN

**Pharmacy Council of Pakistan
(Examination for Registration in Register “B”)
Regulations, 2006.**

Government of Pakistan
Ministry of Health

NOTIFICATION

Islamabad, the 18th March , 2006.

SRO 298/2006. – In exercise of the powers conferred by sub-section (2) of section 17 of the Pharmacy Act, 1967 (XI of 1967), the Pharmacy Council of Pakistan, with the precious approval of the Federal Government, is pleased to make the following regulations, namely:-

CHAPTER I. – PRELIMINARY

1. Short title and commencement and application.- (1) These regulations may be called the Pharmacy Council of Pakistan (Examination for Register in Register “B”) Regulations, 2006.

(2) They shall come into force at once.

2. Definitions.- (1) In these regulations, unless there is any thing repugnant in the subject or context,-

(a) “Examination for Registration in Register “B” means an examination for Registration conducted by a provincial pharmacy council leading to registration in Register “B”; and

(b) “Student” means a student enrolled for the examination for Registration in Register “B”.

(2) The other words and expression used but not defined herein shall have the same meaning as are assigned to them in the Pharmacy Act, 1967 (XI of 1967).

CHAPTER II.-- OBJECTIVES

3. General Objectives.-- (1) The general objectives regarding the course of studies for Registration in Register “B” should be to prepare a health caring and community oriented personnel competent to deal with the common health problems of the people in a scientifically sound and cost effective manner using appropriate technology and holistic approach under the guidance and supervision of a qualified graduate pharmacist.

(2) A student after the examination for Registration in Register “B” should be able to assume his role and perform his functions and communicate effectively.

(3) The Course of study for the examination for Registration in Register “B” should be integrated as far as possible.

4. Cognitive domain (knowledge) regarding Course for Registration in Register “B”.- A student after passing the examination for Registration in Register “B” should have the concept and basic introduction and knowledge of-

- (a) preventive and therapeutic measures for management of health and disease;
- (b) legal aspects and basic principles of pharmacy practice;
- (c) present and future health problems of community and solutions of such problems through planning, implementation, critical evaluation and research in preventive programs;
- (d) the role of socio-cultural background, socio-economic factors, and changing environment in health and illness;
- (e) Concept and knowledge of drugs and their development;
- (f) Therapeutic uses of drugs and medicines;
- (g) Toxicological manifestation of drugs and their side effects;
- (h) Management of drugs administration; and
- (i) Pharmaceutical care.

5. Psychomotor domain (skills) regarding Course of Studies for the Examination for Registration in Register “B”.- (1) A student at the conclusion of his study should be able to-

- (a) assist the pharmacists in compounding and dispensing the pharmaceutical preparations;
- (b) assist the pharmacist in filling, packing and labeling of dispensed medicaments;
- (b) assist pharmacist in compounding the pharmaceutical preparations;
- (d) assist pharmacist in filling, packing and labeling of dispensed medicaments;
- (e) assist the pharmacist in the supply and storage of drugs, surgicals and miscellaneous items in dispensaries, pharmacies, medical stores, laboratories and in hospital wards and other medical supplies as per system.;
- (f) assist pharmacist in preparing and issuing demands/requests for drugs and other medical items from wards and other departments in hospitals;

- (g) keep inventory records showing the movement of drugs and other medical items in pharmacies and medical stores with special emphasis to their quantities and expiries;
- (h) properly communicate with other staff of the health care team;
- (i) refer to library and reference books to collect information whenever needed;
- (j) gain the required skills to assist the community pharmacist;
- (k) appreciate the need to update his knowledge through active participation in continuing education programs;
- (l) will perform any other duty assigned to him by the pharmacist;
- (m) acquire understanding of pharmaceutical manufacturing in order to assist the production pharmacist;
- (n) be able to assist production pharmacist in normal activities related to manufacturing; and
- (o) acquire understanding of proper storage conditions.

6. Affective domain (character and attitudes) regarding Course for Registration in Register “B”.- A student at the conclusion of his Course for Registration in Register “B” should be able to-

- (a) display virtues and personal character such as sense of responsibility towards patients, community and colleagues;
- (b) respect patient’s right of confidentiality;
- (c) recognize his professional limitations;
- (d) develop and maintain good relations with patients and all persons concerned in the delivery of health care;
- (e) educate, guide and help in adoption of preventive and curative measures against disease;
- (f) improve his professional knowledge, skills and attitudes.

CHAPTER III.- ADMISSION TO EXAMINATION OR REGISTRATION IN REGISTER “B”.

7. Number of admissions, etc.- (1) The optimum number of admissions of students for the Examination for Registration in Register “B” shall be as approved by the Pharmacy

Council of Pakistan keeping in view the capacity of lecture rooms, the number of seats available in laboratories and keeping in view the demand of qualified personnels.

8. Minimum academic requirements for admissions to Examination for Registration in Register “B”.- (1) The following shall be the minimum academic qualifications for admission of a candidate to the examination for registration in Register “B”, namely:-

i) The candidate should have passed the Matriculation Examination (Secondary School Certificate Examination) with Science, from a Pakistani university or an equivalent examination of a Board of Intermediate and Secondary Education in Pakistan;

Or

(ii) the candidate should have passed an examination of a foreign university or examining body, which in scope and standard is equivalent to the Matriculation Examination with Science (Secondary School Certificate Examination) of a Board of Intermediate and Secondary Education in Pakistan.

CHAPTER IV.- OBJECTIVES OF CURRICULUM.

9. General principles and objectives regarding curriculum and teaching.- (1) The following general principles shall be observed while evaluating students for the examination for registration in Register “B”, namely:-

(a) Students should be able to recognize and manage common problems, and make appropriate referrals;

(b) the role of new developments in the drug delivery system may be kept in mind while working out the details of curriculum;

(c) the examination for the Part I and II will be conducted separately.

(2) Integration should be promoted between basic subjects, pharmaceutical subjects and different pharmacy subjects.

CHAPTER V.- EXAMINATIONS.

10. Objectives of evaluation through examinations.- (1) Evaluation of the knowledge and skills will be done through Examinations. The Examination shall be spread in two parts i.e. Part – I and Part-II. These examinations shall be held as and when as decided by the Provincial Pharmacy Council with the approval of the Central Pharmacy Council. After a period of one year after appearing in Examination for Part-I, the student will be eligible to appear in the Examination for Part-II. Which will be conducted after a gap of one year.

(2) The purpose of evaluation through examination should be to, -

(a) certify that students have successfully completed the training and have achieved the objectives of educational program; and

(b) motivate and encourage students to direct their own learning.

(3) In order to achieve the objectives of evaluation through examinations, it shall be mandatory to adopt the following processes, namely:-

- (a) no student shall be allowed to sit in Part – II Examination, unless he has passed the Part-I examination;
- (b) not more than three chances shall be allowed for passing each examination;
- (c) the percentage of pass marks in each subject should not be less than fifty per cent in theory and fifty per cent in practical;
- (d) no grace mark should be allowed in any examination;
- (e) there should not be more than two examinations in a year;
- (f) the performance of candidates in all evaluations and examinations should be carefully supervised;
- (g) forty percent of each paper shall consist of the multiple choice questions (MCQs), while the rest 60% will be short structured essays, extended essays, etc;
- (h) in all examinations sufficient time should be assigned to practical work in order to test the thoroughness of knowledge and practical skills of students;
- (i) a student who appears for examination in any subject and passes in theory but fails in practical or vice versa, shall reappear only in theory or, as the case may be, in practical in which he fails;
- (j) a student who appears for examination in any subject and fails both in theory as well as practical, shall have to reappear in both theory and practical; and
- (k) a student who appears in an examination and passes in one or more subjects shall not have to reappear for examination in such subjects provided that he passes the subjects in which he fails in a stipulated time period.

CHAPTER VI.- EDUCATIONAL FACILITIES

11. Requirement of educational facilities.- In order to impart good education there shall be provided and maintained adequate educational facilities at pharmacy institutions particularly in the following fields, namely:-

- (a) **Teaching staff:** Properly qualified and properly committed teaching staff should be provided on the basis of a minimum teacher student ratio of 1:10. Pharmacy institutions should have a faculty development plan and a career structure. Good teachers should be rewarded appropriately. Teachers should be provided with adequate support staff and equipment including access to computers. Pharmacy institutions should develop organized teacher's exchange programs with other pharmacy institutions at home and abroad. Training programs for teachers should be compulsory. All the faculty members must have a first degree in Pharmacy and a valid registration with the Pharmacy Council. The institution shall allocate suitable funds for enabling their permanent faculty members to attend at least two scientific moots in year in the relevant fields for the purpose of "Continued Education" within the country or abroad;
- (b) **Education:** Pharmacy education shall be imparted as a science which supports development of faculty; and a facility which supports functions of faculty as educators, and students as learners. Educational activities should involve determination of strategy, use of large variety of audio-visual aids, teaching techniques and computers. A large number of principles of learning have to be applied to the design and practice of teaching. Objective oriented and properly structured evaluation techniques shall be made to become an integral part of the educational process.
- (c) **Physical facilities:** purposely built building with dedicated facilities for the education of Pharmacy shall be a pre-requisite. Lecture theaters should have adequate physical facilities for the whole class;
- (d) **Conference rooms:** Conference rooms should be available to promote teacher-student interaction which is necessary for developing and promoting habits of group activity and team- work.
- (e) **Laboratories:** Laboratories should be well-equipped with both simple and high technology for demonstration and experimentation and may be mono-disciplinary or multi-disciplinary.
- (f) **Libraries:** Libraries should be comfortable and well stocked with standard reference printed matter including access to journals. Libraries should also include books on humanities, community problems,

psychology, occupational health, etc. Library Science should be utilized to train students in proper reading habits and use of library. Audio-visual libraries should be developed. Dedicated internet facilities shall also be provided;

- (g) **Evaluation:** Pharmacy institutions should develop structured and supervised Bachelor of Pharmacy Course with an organization within the faculty to ensure appropriate selection, training and evaluation of students. A system for internal evaluation of training program, and appropriate and adequate facilities for teaching the course shall also be ensured.
- (h) **Community oriented health care:** Community health facilities like BHUs should be acquired in the vicinity of pharmacy institutions either on the basis of integration or collaboration, for conducting part of the clinical training. For the practice of proper community-oriented health care, students should actually participate in the primary health care of community under the guidance of clinical teachers in various disciplines. It is essential that students develop the concept of integrated problem-based health care to deal with common health problems in real community environments.
- (i) **Finance:** Adequate financial provision should be made for the maintenance and development of pharmacy institution.
- (j) **Dean/ Chairman:** The head of the Pharmacy institution shall at least hold bachelor degree in Pharmacy or a first professional degree in pharmacy, as the case may be;
- (k) **Administrative organization:** The administrative organization of pharmacy institution should be prompt, effective and problem solving in the form of a governing body with non-lapseble budget.
- (l) **Study tours:** Study tours shall be organized during the course of studies at appropriate intervals.

CHAPTER VII - COURSES OF STUDY AND DISTRIBUTION OF SUBJECTS AND PRACTICALS FOR EXAMINATION FOR REGISTRATION IN REGISTER “B”.

12. Courses of study for Examination for Registration in Register “B”. – The details regarding course contents of each subject/paper will be as under:

ANATOMY & PHYSIOLOGY (WRITTEN)

Paper I

Part- I

100 (20 + 80) Marks

Anatomy

1. Introduction to Anatomy
2. Anatomical Terminologies
3. Surface Anatomy

Physiology

1. Introduction to Physiology
2. Structure of Cell and Tissues of the Body
 - i) Bone Structure, Types of Bones and Joints
 - ii) Muscles (Structure of Skeletal, Smooth & Cardiac Muscle)
3. BLOOD: Composition of blood (RBC, WBC and Platelets), Fate of Red Blood cells, Blood groups, Rh factors, E.S.R. Blood coagulation, Anaemias.
4. CIRCULATORY SYSTEM: Properties of the cardiac muscle. Heart beat. Cardiac cycle. ECG. Blood pressure. Pulse. Haemorrhage. Lymph.
5. RESPIRATORY SYSTEM: Mechanics of respiration. Pulmonary ventilation. Lungs volume and capacities. Carriage of O₂ and CO₂ by the blood. Regulation of breathing (Nervous & Chemical control).
6. SKIN: Structure, Functions of skin, Temperature regulation by Skin.
7. DIGESTIVE SYSTEM: Introduction to Digestive juices-saliva, Gastric juice, pancreatic juice, Bile and intestinal juices; their composition. Movements of the stomach and intestines. Functions of liver and gall bladder.
8. URINARY SYSTEM: Urine formation and composition of urine.
9. PHYSIOLOGY OF NERVE AND MUSCLE: General introduction to Nervous and Muscular system.
10. NERVOUS SYSTEM: General introduction to Nervous and Muscular system.
11. SPECIAL SENSE: Introductory knowledge of structure and functions of the special senses.
12. ENDOCRINOLOGY: Definition of Hormone. Nature, Function and action of Hormone.

BIOCHEMISTRY & MICROBIOLOGY (WRITTEN)

Paper 2

Part- I

100 (50 + 50) Marks

BIOCHEMISTRY (50 marks)

- 1 General Introduction and Basic Biochemical Principles

2. General introduction, Basic Chemistry, Nature and Classification and functions of :
Carbohydrates, Lipids, Proteins and Amino acids, Nucleic acids, Vitamins, Hormones, Enzymes
3. Role of Vitamins, Physiological role of Fat-soluble Vitamins (A, D, E and K) and Water-soluble Vitamins (Thiamin, Riboflavin, Pantothenic acid, Niacin, Pyridoxal phosphate, Biotin Folic acid, Cyanocobalamin - members of B-complex family - and Ascorbic acid)
4. Introduction to Biotechnology and Genetic Engineering
5. Acid-Base and Electrolyte Balance in Human body.

MICROBIOLOGY (50 marks)

1. Introduction and Scope of Microbiology
2. Nomenclature and classification of Micro-organisms.
(I) The Bacteria:
a.. Classification of Bacteria. B. .Culture Media, Bacterial cultures and staining Methods.
(II) The Viruses: Nomenclature and Classification of Viruses
(III) Introduction to Fungi/Yeast/Molds:
3. Introduction to Microbiology of air, water and soil.
4. Sterilization/Disinfection.
a. Introduction to sterile area and clean area. b. Methods and application in pharmacy
5. Fermentation. Pharmaceutical Products produced by fermentation process.
6. Definitions of the following:
Immunity, autoimmunity and tolerance. Antigen. Antibodies. Antigen-Antibody reactions. Hypersensitivity and allergy.
7. Vaccines and Sera: Introduction and aims. Types of Vaccines.

PHARMACOGNOSY (WRITTEN)

Paper 3

Part- I

100 Marks

1. Introduction and scope of Pharmacognosy.
2. Classification of crude drugs.
3. Terminology used in Pharmacognosy.
4. Evaluation of crude drugs i.e. organoleptic, physical, chemical and biological.
5. Introduction, case history, skin test, treatment and mechanism of allergy.
6. Enzymes obtained from plant source (Phyto-enzymes)
7. General introduction of poisonous plants with special reference to Pakistan.

8. Separation and isolation of plant constituents: An introduction to chromatography and chromatographic techniques e.g.
 - a. Column chromatography.
 - b. Paper chromatography.
 - c. Thin Layer chromatography.
9. Introduction to Extraction and Extraction techniques
10. General introduction, classification and medicinal uses of important plants containing:
 - a. Glycosides
 - b. Alkaloids
 - c. Volatile Oils (essential oils)
 - d. Resins and Resin combinations
 - e. Carbohydrates
 - f. Tannins
 - g. Lipids (fixed oils, fats and related compounds, waxes)

PHARMACEUTICS-I (General, Physical and Dispensing) (WRITTEN)

Paper 4	Part- I	100 Marks
1.	Introduction of Pharmacy in relation to Hospital Pharmacy, Clinical Pharmacy, Retail Pharmacy, Industrial Pharmacy and Forensic Pharmacy.	
2.	History of pharmacy with special reference to contribution of Muslim scientists to Pharmacy.	
3.	An introduction of various official books used in Pharmacy.	
4.	Surface Tension, Viscosity, Ionization, pH, pH indicators, buffers, Isotonic solutions and their applications in Pharmacy.	
5.	Introduction and application to the following processes in Pharmacy Adsorption, Calcination, Centrifugation, Crystallization, Decantation, Deliquescence, Dessication, Distillation, Efflorescence, Elutriation, Evaporation, Exsiccation, Fusion, Ignition, Levigation, Lyophilization, Sublimation, Trituration, Vaporization,	
6.	Introduction to Various Dosage Forms	
7.	Basic Principles of Compounding and Dispensing Including: Weights and Measures. Calculations for compounding and Dispensing. Containers and closures. Prescription-Handling, Filling, Interpretation. Labeling.	
8.	Extemporaneous Dispensing of Solutions, suspensions, emulsions, creams and ointments, pastes and gels, suppositories and pessaries, powders and granules, oral unit dosage form.	
9.	Introduction to Aseptic Dispensing and TPN Dispensing	
10.	Introduction to Incompatibility	

ANATOMY & PHYSIOLOGY (PRACTICAL)

Paper 5

Part- I

100 (20 + 80) Marks

Anatomy

1. Study of Human Skeleton
2. Histological Examination of Slides: Epithelium, Connective Tissues and Muscles

Physiology

1. Blood

- | | |
|---|-----------------------------|
| i) Determination of Haemoglobin (Hb) | ii) Determination of E.S.R. |
| iii) R.B.C. Count. | iv) W.B.C. Count. |
| v) D.L.C. (Differential Leucocyte Count). | vi) Bleeding Time. |
| vii) Coagulation Time. | viii) Blood groups. |

2. Respiration:

- | | |
|-----------------------------------|--|
| i) Determination of Tidal volume. | ii) Demonstration of Artificial Respiration. |
|-----------------------------------|--|

3. C.V.S.

- | | |
|---------------------------------|---|
| i) Recording of Arterial Pulse. | ii) Recording of Arterial Blood Pressure. |
| iii) Electro-cardiogram. | |

4. Eye

- i) Visual and Acuity for far vision and near vision.
- ii) Field of vision (Perimetry).

BIOCHEMISTRY AND MICROBIOLOGY (PRACTICALS)

Paper 6

Part- II

100 (50 + 50) Marks

BIOCHEMISTRY (50 marks)

1. Qualitative analysis of Carbohydrates, Lipids and Sterols (Cholesterol), Blood analysis
2. Quantitative analysis of Carbohydrates-Glucose (reducing sugar) and any other carbohydrate using Benedict method.
3. Analysis of normal and abnormal components of Urine - Sugar, Uric acid and Cholesterol

MICROBIOLOGY (50 marks)

1. Sterilization of Glassware.
2. Preparation of general and selective media and culturing of microorganisms.
3. Total and viable counts of microorganism.
4. Staining of Bacteria: Gram method
5. Microbiological analysis of air, water and soil.

PHARMACOGNOSY (PRACTICALS)

Paper 7	Part- I	100 Marks
---------	---------	-----------

1. Introduction of the entire and broken parts of the plant drugs (Macro and organoleptic characters).
2. Microscopic examination of powders and sections of plant drugs.
3. Extraction of the active constituents of crude drugs and chemical tests for their identification.
4. Isolation and Demonstration of Chromatographic Techniques.

PHARMACEUTICS-I (General, Physical and Dispensing)) PRACTICALS

Paper 8	Part - I	100 Marks
---------	----------	-----------

1. Experiments to demonstrate some of physico-chemical processes like simple distillation, steam distillation, crystallization, Dialysis.
2. Preparation of Buffer solutions and isotonic solution
3. Determination of %age composition of solutions by specific gravity method.
4. Partition-coefficient, surface tension, viscosity
5. Practical introduction to prescription, interpretation and Labeling.
6. Dispensing of various dosage forms.

PHARMACEUTICS-II (Industrial and Quality Control) (WRITTEN)

Paper 1	Part- II	100 Marks
---------	----------	-----------

1. General introduction to the following processes and equipment used:
Mixing, Size Reduction, Drying, Filtration, Evaporation, Compression, Rheology.
2. A Brief introduction to the formulation and manufacturing of Solid, Semisolid, Liquid and Parenteral Dosage forms
3. An introduction to the added substances like Preservatives, antioxidants, solubilizer, suspending agents, buffers, stabilizers etc.
4. Filling, Packaging and various materials used for packaging
5. An understanding of quality control of Pharmaceuticals.
6. Quality assurance system adopted in pharmaceutical industry.
7. Storage of Pharmaceutical and Packaging materials
8. Documentation in Pharmaceutical Industry

9. **STUDY TOUR:**

To visit various hospitals, retail pharmacies, pharmaceutical industries and medicinal plant collection will be an integral part of the syllabi.

PHARMACOLOGY (WRITTEN)

Paper 2	Part- II	100 Marks
---------	----------	-----------

1. Introduction to Pharmacology:
2. Routes of drugs administration
3. Posology, Dose calculations, Yong's Formula and Clark's Formula, Factors modifying the action & dosage of drugs.
4. General introduction to the drugs acting on various systems along with an explanation of one Prototype drug:
 - a. Autonomic Nervous System
 - b. Central Nervous System
 - c. Gastrointestinal Tract
 - d. Respiratory System
 - e. Cardiovascular System
 - f. Genito-Urinary System
5. Introduction to Autacoids and their Antagonists
6. Introduction to Drugs used in Anaesthetics
7. Introduction to Chemotherapy
7. Introduction to Toxicology

PHARMACEUTICS-III (Hospital and Community Pharmacy) (WRITTEN)

Paper 3	Part- II	100 Marks
---------	----------	-----------

1. Pharmaceutical and Medical Terminologies used in Hospital and Community Pharmacy
2. Introduction to Hospital Pharmacy
3. Hospital and its Organization
 - i) Classification of Hospitals.
 - ii) Clinical Departments
 - iii) Nursing, Dietetic, Pathology, Blood Bank, Radiology and other supportive services etc.
 - iv) Pharmacy's role in the Hospitals.
4. An introduction to the Hospital Formulary.
5. Dispensing to Inpatients and Outpatients.
6. Safe use of Medication in the Hospital.
7. Introduction to Distribution and Control of Hospital Medicines.
8. An introduction to Health Accessories and Surgical Supplies.

9. General Introduction to Community Pharmacy, Definitions and Background.
10. Public Health and Community Pharmacy:
 - a) Epidemiology & its Control
 - b) Preventive Health (EPI & CDC)
 - b) Family Planning
 - c) Health Policy & National Drug Policy
11. Patient Education and Counselling
12. Pharmacy Layout Design:
 - a) Objectives
 - b) Types of Pharmacies
 - c) Consumer goods and purchases
 - d) Classes of Layout designs.
13. Management of Pharmaceutical and Hospital Waste

SOCIAL BEHAVIOUR, LAW AND ETHICS (WRITTEN)

Paper 4	Part- II	100 Marks
---------	----------	-----------

1. An Introduction to Behavioral Sciences
 - a. Principals of Social Behaviour
 - b. Developmental stages of the life cycle
 - c. Hereditary, cultural and environmental influences on behaviour
 - d. Mental health and applied psychology
2. Importance of Communication skills
 - a. Principals of Verbal and Non-verbal Communication
 - b. Recognition and response to verbal and non-verbal communication
 - c. Adaptations for Individualized needs
 - d. Application of Electronic Technology
 - e. Fundamental writing skills.
3. Introduction to Law and Ethics
 - a. Legal guidelines/requirements for Health care
 - b. Risk Management
 - c. Pharmacy Law/Ethics and related issues
4. An introduction to Manual of Drug Laws
 - a. Drug Act 1976
 - b. Pharmacy Act 1967
 - c. Punjab Drug Rules 1988
 - d. The Dangerous Drugs Act, 1930
 - e. Shops and Establishment Ordinance, 1969
 - f. The Poisons Act, 1919.
5. An introduction to Management
 - a. Promotion
 - b. Advertising and Salesmanship
 - c. Sales Management

COMPUTER

Paper 5	Part- II	Total Marks : 100
---------	----------	-------------------

Theory :	: 50
Practical	: 50

1. Fundamentals basic concepts of computers
 - (a) General learning, knowledge, and fluency with computer terms and usage.
 - (b) Disk
 - (c) Disk operating systems and Windows
 - (d) Computer languages
 - (e) Modems and networking

2. Preliminary Introduction of following packages
 - (a) PC Tools
 - (b) Norton Utilities
 - (c) Graphics
 - (d) Data base
 - (e) Spread sheet packages like Excel and Lotus
 - (f) Any one of popular word processor like Microsoft word

3. Patient Data/Drug Data
 - (a) Record keeping
 - b) Data Analysis

PHARMACEUTICS (INDUSTRIAL) PRACTICALS

Paper 6	Part- II	100 Marks
---------	----------	-----------

1. Manufacture of Tablets by wet granulation. Manufacture of Tablets by Slugging.
2. Manufacturing of Capsules
3. Manufacturing of Syrups, Suspensions and Emulsions
4. Ampoule filling, sealing and sterilization
5. Quality Control Tests of Tablets
Disintegration, Dissolution, Friability, Hardness and thickness tests, Determination of weight variation in tablets, Density of powder, Particle size analysis.
8. Clarity and leakage tests in injectables.

NOTE: The candidates are required to work for 200 hours in a Hospital, Factory, Shop or Dispensary during summer vacation. They must maintain a diary of work signed daily by the Manager.

PHARMACOLOGY (PRACTICALS)

Paper 7	Part- II	100 Marks
---------	----------	-----------

1. Preparation of standard solution.
 - a. Ringer solution.
 - b. Tyrode solution.
 - c. Krebs solution.
 - d. Normal saline solution.

2. To demonstrate the effects of Adrenaline and Acetylcholine on Frog's heart.
3. To study the effects of Adrenaline on Rabbit's Eyes.
4. To study the effects of Homatropine on Rabbit's Eyes.
5. To study the effects of Pilocarpine on Rabbit's Eyes.
6. To study the effects of Local Anaesthetic drug (e.g Cocaine) on Rabbit's Eyes.
7. To study the anticoagulant effects of Heparin and oral anticoagulants on Rabbits.

13. Distribution of subjects and practicals for Part I Examination.-The distribution of various subjects and practicals for the Part – I of the Examination for Registration In Register “B” shall be as specified in column (3) of the table below and the relevant examination paper number as specified in column (2) of the said table and the relevant marks for each paper as specified in column (4) thereof, namely:-

TABLE
Part - I

S. No.	Paper No.	Description.	Marks.
(1)	(2)	(3)	(4)
SUBJECTS			
1.	I	Anatomy and Physiology	100 (20+80)
2.	II	Biochemistry and Microbiology	100 (50+50)
3.	III	Pharmacognosy	100
4.	IV	Pharmaceutics–I (General, Physical and Dispensing)	100
PRACTICALS			
5.	V	Anatomy and Physiology	100 (20+80)
6.	VI	Biochemistry and Microbiology	100 (50+50)
7.	VII	Pharmacognosy	100
8.	VIII	Pharmaceutics–I (General, Physical and Dispensing)	100

13. Distribution of subjects and practicals for the Part - II Examination.- The distribution of various theory subjects and practicals for the Part –II of the examination for registration in Register “B” shall be as specified in column (3) of the table below and the relevant examination paper number as specified in column (2) of the said table and the relevant marks for each paper as specified in column (4) thereof, namely :-

TABLE
Part - II

S. No.	Paper No.	Description.	Marks.
(1)	(2)	(3)	(4)
SUBJECTS			
1.	I	Pharmaceutics-II (Industrial and Quality Control)	100
2.	II	Pharmaceutics-III (Hospital and Community Pharmacy)	100
3.	III	Pharmacology	100
4.	VI	Social Behaviour, Law and Ethics	100
5.	V	Computer	50
PRACTICAL			
6.	VI	Pharmaceutics-II (Industrial and Quality Control)	100
7.	VII	Pharmacology	100
8.	VIII	Computer	50