Ph.D – Pharmaceutical Sciences Entrance Test Syllabus

QUESTION PAPER FORMAT

<table>
<thead>
<tr>
<th>#</th>
<th>TYPE</th>
<th>MAXIMUM MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>WRITTEN</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>PART A – Research Methodology</td>
<td>50 Marks (25 Questions of 2 Marks Each)</td>
</tr>
<tr>
<td>b</td>
<td>PART B – Technical Paper</td>
<td>50 Marks (25 Questions of 2 Marks Each)</td>
</tr>
<tr>
<td>II</td>
<td>VIVA-VOCE</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>PART C – Technical Interview</td>
<td>50 Marks</td>
</tr>
</tbody>
</table>

Ph.D – Pharmaceutical Sciences Entrance Test Syllabus

PART A

EPHM001: RESEARCH METHODOLOGY

(COMMON TO ALL PROGRAMS)

Unit-I (8 hrs)


PROBLEM STATEMENT: Defining the research problem - Selecting the problem - Necessity of defining the problem - Techniques involved in defining the problem;

LITERATURE SURVEY: Importance of literature review in defining a problem - Survey of literature - Primary and secondary sources - web as a source - searching the web - Identifying gap areas from literature review; Development of working hypothesis.

HYPOTHESIS: Definition of hypothesis, Basic concepts, variables-Dependent and independent variables, Development of working hypothesis; deriving objectives of research

Unit-II (12 hrs)

SAMPLE & SAMPLING DESIGN: Sample- Sampling - Types of sampling: Non-prbability sampling; Probability sampling; simple random samplingsystemic sampling; stratified sampling; cluster sampling; Sampling and non-sampling errors

RESEARCH DESIGNS: Research design; Need of research design - Basic Principles; Features of good design – Important concepts relating to research design; Different research designs: Exploratory; descriptive & diagnostic studies; Case-control studies; longitudinal studies; cross-sectional studies; cohort studies; hypothesis-testing research studies;
ELEMENTS OF DATA AND STATISTICS

Unit -III (10 hrs)

REPORT: Structure and components of scientific reports; Types of report; Technical reports and thesis

SCIENTIFIC ARTICLE WRITING:
Title preparation – Importance of title; need for specific titles; List of authors and addresses – order of names; defining the order with example; Abstract writing-Key words; How to write introduction- Rules; exceptions; Materials and methods: Purpose; materials; methods; tables and figures; Result and Discussion writing: content of results; Discussion writing: Components of discussion; factual relationships; strengths and limitations; significance of paper; Summary and conclusions - Stating Acknowledgements: Ingredients of the acknowledgements; courtesy; Citation of the References: Rules; electronics aid; in-text citation; styles of referencing

Unit- IV (10hrs)

RESEARCH ETHICS:
Values, Ethics & Moral; Profession and professionalism; Tenets of Ethics; What is Research Ethics?; Why lecture on Research Ethics? Conducting and reporting of science/engineering; Relationship in research groups; Hazards to good scientific practice; scientific misconduct


Unit- V (12 hrs.)

TECHNICAL COMMUNICATION
Importance of effective communication; English language and its importance; Elements of communication cycle - Active listening: Meaning and art of listening; listening and empathy in communication; Why don’t we listen (reasons for poor listening); poor listening habits; Qualities of a good listener; Active versus passive listening; Barriers for effective listening; tips for effective listening.

EFFECTIVE SPEAKING
Confidence, clarity and fluency; Manipulating paralinguistic features (Rate, volume, pitch , pause); Barriers to speaking; Public speaking

EFFECTIVE ORAL PRESENTATION STRATEGIES
Planning; Preparation; Tips for creating an impact on audience; Modes of delivery: Extemporaneous; Impromptu; Controlling nervousness and stage fright; Slide preparation

References:
1. Research Methodology: Methods & Techniques
2. An introduction to Research Methodology
3. Doing Science: Design, Analysis and Communication of Science Research
   Valielaivan, Oxford University Press, 2009
4. Technical Communication Principles and Practice
PART B:

EPMH015: TECHNICAL PAPER.

UNIT- I.  
(a) Electro Magnetic Spectrum, Definition, equation and applications of Beer’s law, Hook’s law & Bragg’s Law.  
(b) Principles of various spectroscopic analytical techniques like UV-Visible I.R, Fluorimetry, Nephelo- Turbidimetry, NMR and Mass Spectroscopy.

UNIT-II.  
Principle and applications of various chromatographic techniques like GC, HPLC, HPTLC, Ion Exchange, Size Exclusion and Electrophoresis.

UNIT-III. Introduction to dosage forms: Classification and definitions. Commonly used vehicles, essential adjuvants like stabilizers, colorants and flavorants with relevance to monophasic liquid dosage forms.

a) Suspensions: Definition, classification, advantages and disadvantages, additives used in suspension, stability of suspension.

b) Emulsions: Definition, classification and identification of types of emulsions, additives used in emulsions, mechanism of action of emulsifying agents, stability of emulsions.

UNIT- IV.  
(a) Powders and granules: Classification, advantages and disadvantages and methods of mixing of powders.

(b) Tablets: Types of Tablets, Excipients used in tablets. Sugar coated tablets, film coated tablets, quality control tests.

(c) Capsules: Types of Capsules, raw materials for gelatin capsule shell, storage conditions of capsules.

d) Novel drug delivery systems: advantages and disadvantages, concepts, types of drug delivery systems, Applications of microspheres, liposomes, niosomes, nanoparticles

UNIT-V.  
a) Pharmacokinetics- The dynamics of drug absorption, distribution, metabolism and elimination.

b) Pharmacodynamics- Molecular mechanisms of drug action (general). Drug toxicity and poisoning.

UNIT- VI.  
Scope and relevance of preclinical and clinical trials. Adverse drug reactions (ADRs). Role of pharmacovigilance ability in ADR monitoring. Receptors- Adrenergic, cholinergic, histaminergic and dopaminergic receptors.

UNIT-VII.  

Physicochemical properties in relation to biological action- Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein Binding and Bioisosterism.
UNIT-VIII.

- Sulphonamides
- Antitubercular agents
- Antimalarial agents
- Classification of antibiotics
- Concept of Prodrug

UNIT-IX.

a) Principle and Applications of different extraction & isolation methods viz., Maceration, Percolation, Soxhlet extraction, microwave extraction, supercritical fluid extraction.

b) Adulteration and evaluation of crude drugs:- Different methods of adulteration: Evaluation of drugs by organoleptic, microscopic, physical, chemical and biological methods.

c) Phytoconstituents: - Definition, classification, and pharmaceutical importance of: alkaloids, glycosides, steroids.

d) Quality control and Standardization of herbal drugs: Significance and determination of Extractive values, Ash values, Heavy metals, Pesticidal residue and microbial load in herbal preparations

UNIT-X.

a) Plant tissue culture: - Growth media, Plant growth regulators, Callus & Suspension cultures, immobilization, hairy root culture. Transgenic plants and their applications, Plant tissue culture as source of secondary metabolites.

b) Enzymes: - Biological sources and uses of: Papain, Bromelain, Urokinase, and streptokinase.

Reference Books:

UNIT- I & II.


UNIT-III & IV.


UNIT-V & VI.


UNIT-VII & VIII.


UNIT-IX & X.