

# Swami Ramanand Teerth Marathwada University, Nanded



**B. O. S. In Chemistry**

**B. Sc. First Year Semester-I & II  
Dyes and Drugs**

**In force from June - 2009**

**B. Sc. First Year (Semester I & II)**  
**DYES AND DRUGS**  
**Syllabus**

Semester	Paper	Course No.	Course	Periods/week	Total Periods	Marks
I	I	CHDD-101	Introduction to Dyes	3	45	60
	II	CHDD-102	Introduction to Drugs	3	45	60
II	III	CHDD-103	Introduction to Dye Intermediates	3	45	60
	IV	CHDD-104	Introduction to Purity of Drugs and Biostatistics	3	45	60
	V	CHDD-105	Laboratory Course-I	4	120	60

Theory papers 60 marks (External 50 marks and internal 10 marks)

**DYES AND DRUGS**  
**Semester – I**  
**Paper: I**  
**Introduction to Dyes (CHDD-101)**

**Marks: 60**

**Periods: 45**

**UNIT I**

**1. Introduction to Dyes:**

**08 p**

- i) Introduction - Definition of dye. Difference between dye and other colouring matter. Requisites of true dye.
- ii) Historical development from natural to synthetic dyes.
  - a) Era of natural dyes.
  - b) Era of synthetic dye.
- iii) Nomenclature of dyes.
  - a) Commercial naming of dyes.
  - b) Colour index and naming of dyes.

**UNIT II**

**2. Classification of dyes:**

**14 p**

- i) Introduction to classification of dyes
- ii) Classification of dyes on the basis of application to fiber.
  - a) Acid dyes b) Basis of cationic dyes c) Direct dyes d) Mordant or adjective dyes e) Azoic dyes f) Oxidation dyes g) Ingrain dyes. h) Vat dyes i) Sulphur dyes j) Disperse dyes k) Reactive dyes l) Solvent dyes m) synthetic fibre dyes n) Solubilised val dyes o) Sulphurised va! Dyes p) Disperse reactive dyes.

**UNIT III**

**1. Textile fibers:**

**06 p**

- i) Different types of fibers:
  - a) Cotton b) Wool c) Silk d) Cellulose acetate e) Polyamide f) Polyester g) Polyacrylonitrile h) Polyolefin.

**2. Interaction of dye with fibers:**

**05 p**

- i) Ionic interaction.
- ii) Hydrogen bonds.
- iii) Vander Waal's interaction.

**UNIT IV**

- iv) Covalent bonds.

**3. Basic Operation in dyeing process and Methods of dyeing:**

**12 p**

- i) Basic Operation in dyeing process.
  - a) Preparation of the fibers.
  - b) Preparation of the dye bath.
  - c) Application of the dye.
  - d) Finishing.
- ii) Methods of Dyeing -
  - a) Direct dyeing.
  - b) Vat dyeing.
  - c) Mordant dyeing.
  - d) Disperse dyeing.
  - e) Formation of dye on fibers.
  - f) Dyeing of the wool with acid dyes.
  - g) Dyeing with reactive dyes.

**DYES AND DRUGS**  
**Semester – I**  
**Paper: II**  
**Introduction to Drugs (CHDD-102)**

**Marks: 60**

**Periods: 45**

**UNIT I**

**1. Introduction to Drugs**

**12 p**

- i) Concept of Drug and Qualities of an ideal drug,
- ii) Some important terms used in study of drugs –
  - a) Pharmacy, pharmacology and pharmacophore, pharmacodynamics and pharmacodynamic agents. b) Metabolite and anti-metabolite. c) Pathogen, pathogenicity, chemotherapy and chemotherapeutic agents.
- iii) Historical evolution' from natural lo synthetic drugs.
- iv) Classification of drugs on the basis of their therapeutic actions -
  - 1) Drugs acting on central nervous system.
  - 2) Drugs stimulating or blocking the peripheral nervous system.
  - 3) Drugs acting on the cardiovascular, chematopoietic and renal system.
  - 4) Chemotherapeutic drugs. 5) Vitamins 6) Hormones.

**UNIT II**

**2. Relation of Functional Croup and Biological activity**

**11 p**

Effect of following on biological activity –

- a) Alkyl group b) Hydroxyl group c) Acidic (-COOH and -SO.11) croups
- d) Halogen c) nitro and nitrite group f) amino group g) nitrile group h) unsaturation
- i) Isomerism (structural isomerism and stereoisomerism)

**UNIT III**

**1. Medicinal Microbiology.**

**14 p**

- i) Introduction to medicinal microbiology.
- ii) Classification of bacteria, pathogenic and non-pathogenic bacteria.
- iii) Study of pathogenicity and chemotherapy of -
  - a) *Salmonella* b) *Clostridium* c) *Pseudomonas* d) *Shigella* e) *Mycobacterium*
  - f) *Entamoeba hystolytica*

**UNIT IV**

**2. Immunity.**

**08P**

- i) Introduction and importance.
- ii) Immunity –
  - a) Innate immunity, consideration at species, race and individual level. Factors deciding innate immunity.
  - b) Acquired immunity.
    - 1. Active immunity (Vaccines, types of vaccines)
      - a) Prophylactic b) Curative c) Diagnostic.
    - 2. Passive immunity (Serum, preparation of immune sera, hazards of serum therapy.

## DYES AND DRUGS

Semester – II

Paper: III

Introduction to Dye Intermediates (CHDD-103)

Marks:60

Periods: 45

### UNIT I

#### 1. Dyestuff intermediates (Aliphatic):

12 p

A) Aliphatic compounds -

- 1) methyl alcohol
- 2) ethyl alcohol
- 3) ethylene glycol
- 4) glycerol
- 5) chloroform
- 6) chloroacetic acid
- 7) ethyl acetate
- 8) acetic anhydride
- 9) maleic anhydride
- 10) acetyl chloride
- 11) acetaldehyde
- 12) acetone

### UNIT II

#### Dyestuff intermediates (Aromatic):

12 p

1. Aromatic compounds as dyestuff intermediates -

- 1) nitrobenzene
- 2) dinitrobenzene
- 3) benzene sulphonic acid
- 4) naphthalene-1-sulphonic acid and naphthalene-2-sulphonic acid
- 5)  $\alpha$ -naphthol sulphonic (crocein acid and schaffer acid)
- 6) sulphanillic acid
- 7) naphthionic acid
- 8) p-nitroaniline
- 9) aniline by reduction of nitrobenzene
- 10) chlorobenzene from benzene
- 11) phenol from chlorobenzene
- 12) salicylic acid from phenol
- 13) acetophenone from benzene
- 14) benzyl alcohol from toluene
- 15) benzaldehyde from toluene.

### UNIT III

#### 1. Colour and chemical constitution of dyes.

12 p

- i) Study of Bathochromic, Hypsochromic, hypochromic and hyperchromic effect with examples.
- ii) Colour and chemical constitution - Definition of colour, colour and wavelength of radiation, colour absorbed and colour visualized with respect to wavelength region.
- iii) Relation between colour and chemical constitution —
  - a) Armstrong theory (qimionoid theory) and its limitations.
  - b) Witt's theory (Chromophore-Auxochrome theory. – Chromophore, Independent Chromophore, Dependent Chromophore, Chromogenes, Auxochromes and type of Auxochromes

### UNIT IV

#### 4.1. Study of raw material used in dye industries.

03 p

i) Source of primaries -

- a) Coal tar- Extraction of coal tar primaries by fractional distillation.
- b) Petroleum - extraction of primaries from petroleum source.

#### 4.2. Non textile uses of dyestuff.

06 p

- i) Leather dyes
- ii) Paper dyes
- iii) Food colours
- iv) Solvent
- v) Wood dyes
- vi) Medicinal dyes
- vii) Dyes for photography
- viii) Cosmetic dyes.
- ix) Dyes as indicators and reagents,
- x) Fluorescent dyes.
- xi) Coloured smokes.
- xii) Camouflage colours.

## DYES AND DRUGS

Semester – II

Paper: IV

Introduction to purity of Drugs and Biostatistics (CHDD-104)

Marks: 60

Periods: 45

### UNIT I

#### 1. Dosage form and Routes of Administration.

08 p

- i) Introduction to dosage forms.
- ii) Variety of dosage forms.
- iii) Importance of dosage forms, iv) Routes of administration of drugs.
- v) Advantages and disadvantages of oral route of administration,
- vi) Advantages and disadvantages parenteral route of administration.

### UNIT II

#### 2. Purity of pharmaceutical substances and limit test.

10p

- i) Introduction.
- ii) Permissible impurities in pharmaceutical substances.
- iii) Test for purity
- iv) Limit test for - a) Chloride b) Sulphate c) Lead d) Iron e) Arsenic.

### UNIT III

#### 3. Assay of drugs.

07 p

- i) Introduction, Types of assay. ii) Chemical assay
- iii) Biological assay a) principles of bio-assay b) Methods of bio-assay
- c) Types of biological systems.
- iv) Comparison of chemical assay and biological assay.
- v) Immunological assay.

### UNIT IV

#### 1. Bio-Statistics

20 p

- i) Introduction to bio-statistics and its importance
- ii) Explanation of the terms with examples a) Population b) Biological variables c) Mean d) Mode e) Median f) Accuracy G) Precision h) Arithmetic mean i) Geometric mean j) Standard deviation k) Mean deviation l) Range m) Normal distribution n) Probability o) Sampling
- iii) Numericals on 1) Mean 2) Mode 3) Median 4) Standard deviation 5) Mean deviation 6) Arithmetic mean 7) Probability

**DYES AND DRUGS**  
**Semester – II**  
**Paper: V**  
**LABORATORY COURSE I ( CHDD – 105)**

**Marks: 60**

**Periods: 120**

**A. Dyes**

1. Preparation of dye intermediates

a) Nitrobenzene b) m-dinitrobenzene c) p-bromoacetanilide d) dibenzal acetone  
e) 2,4,6 –tribromo aniline, f) p-nitro actanilide.

2. Preparation of dyes

a) Phenyl azo- $\beta$ -naphthol b) Picric acid c) Orange II d) Methyl red  
e) Aniline yellow f) Butter yellow

**B. Drugs**

1) Assay of following commercial samples

1. Boric acid 2. Sodium bicarbonate 3. Ferrous sulphate 4. Hydrogen peroxide 5. Iodine solutions (strong and weak) 6. Ascorbic acid

2) Preparation of drugs

i) Aspirin ii) Iodoform iii) Paracetamol iv) Acetanilide

Note: 16 Experiments are to be covered.

**Reference Books:**

1. Synthetic dyes : Grudeep R. Chatwal.

2. Synthetic Dyes : K. Venkatraman Vol. I, Academic Press , New York.

3. Chemistry of Dyes and Principles of Dying : V.A. Shenai, Sevak Publication, Bombay

4. Introduction to dyes : Rastogi

5. Natural and Synthetic organic chemistry : O.P.Agrawal

6. Synthetic Drugs : Grudeep R. Chatwal.

7. An introduction to drugs , Singh and Rangnekar

8. British Pharmacopea

9. Indian Pharmacopea

10. Pharmacology and pharmacotherapeutics : Satoskar and Bhandarkar

11. Practical Organic Chemistry : Singh , Gupta and Bajpai

12. Practical Organic chemistry : I Vogel

13. Practical Pharmaceutical chemistry A.H. Beckett and J.B. Stelnake

QUESTION PAPER FORMAT

**FACULTY OF SCIENCE**  
B. Sc. First Year EXAMINATION  
Semester Pattern

Dyes and Drugs

**Time: 2 Hrs.**

**Maximum Marks: 50**

N. B.:

- (i) *Attempt all questions.*
- (ii) *Use of logarithmic table and calculator is allowed.*
- (iii) *Figures to the right hand side indicates full marks.*
- (iv) *Questions No.1 should be attempt only once on page number three of answer book with complete answer.*

<b>Q. 1</b>	<b>Answer any <i>three</i> of the following</b>	<b>15</b>
	a) .....	
	b) .....	
	c) .....	
	d) .....	
	e) .....	
<b>Q. 2</b>	<b>A</b>	<b>08</b>
	OR	
	A	
	B	<b>07</b>
	OR	
	B	
<b>Q. 3</b>	<b>Objective type-(MCQ, fill in the blanks, match of the following, true or false)</b>	<b>10</b>
	<b>10 bits</b>	
<b>Q. 4</b>	<b>Write short notes on any two of the following</b>	<b>10</b>
	i) .....	
	ii) .....	
	iii) .....	