

CHEMISTRY IN EVERYDAY LIFE

Preface

“ Life without chemistry would have been impossible “. In this chapter we will learn about various chemical compounds, widely used in our daily life. It is important to know the idea about fats, oil, wax, soaps and detergent while reading organic chemistry.

After successful completion of this chapter you should be able to –

- (i) Various types of medicines used.
- (ii) Different dyes & their applications
- (iii) Varieties of soaps.
- (iv) Method of preparation of soaps.
- (v) Detergents and its activity.

This book consists of theoretical & practical explanations of all the concepts involved in the chapter. Each article followed by a ladder of illustration. At the end of the theory part, there are miscellaneous solved examples which involve the application of multiple concepts of this chapter.

Students are advised to go through all these solved examples in order to develop better understanding of the chapter and to have better grasping level in the class.

Total No. of questions in Chemistry in Everyday life are -	
In Chapter Examples	10
Solved Examples	05
Total No. of questions	15

1. CHEMICAL IN MEDICINES ::

1.1 Chemotherapy :

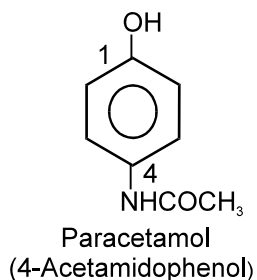
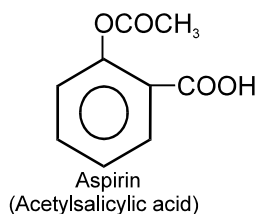
The branch of science which deals with the treatment of diseases using suitable chemicals is known as **chemotherapy**.

1.2 Classification of Medicines :

Medicines are generally classified according to the purpose for which they are used. The different terms thus used along with examples are given below :

1.2.1 Antipyretics :

Chemicals which are used to bring down the body temperature during high fever are called antipyretics. On taking these medicines, the person gets a lot of perspiration. A few well known examples of antipyretics are Aspirin, Phenacetin and Paracetamol,



Novalgin is another well known antipyretic. Quinine has also some antipyretic effect. Paracetamol is preferred over aspirin as an antipyretic since aspirin gets hydrolysed to salicylic acid in the stomach. The salicylic acid thus produced may cause ulcer in the stomach walls where from the bleeding may take place.

1.2.2 Antimalarials :

Chemical substances which are used to bring down the body temperature during malaria fever are called antimalarials. Originally quinine (an alkoid) was the only drug known to be effective against malaria. Nowadays, a number of synthetic drugs are used for the purpose. These are Chloroquine, Paraquine, Primaquine etc.

1.2.3 Analgesics :

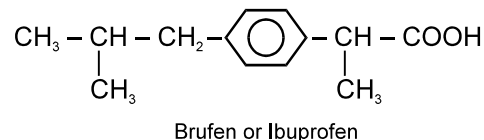
Medicines used for getting relief from pain are called analgesics. These are of two types

(i) Narcotics and

(ii) Non-narcotics

(i) **Narcotics** : Drugs which produce sleep and unconsciousness are called narcotics. These are mostly opium products. Opium contains alkaloids such as morphine and codeine which are very effective analgesics. Morphine diacetate (commonly known as Heroin) is the most widely used analgesic.

(ii) **Non-narcotics** : The most important non-narcotic analgesics are butazolidine and brufen or ibuprofen.



Aspirin, Phenacetin, and Novalgin act both as antipyretic as well as analgesic. They are quite effective and give immediate relief from pain and fever.

1.2.4 Antiseptics and Disinfectants :

(i) **Antiseptics** : The chemicals which kill or prevent the growth of micro-organisms are called **antiseptics**. These are not harmful to living tissues and can be safely applied on wounds, cuts, ulcers, diseased skin surfaces. These are also used to reduce odours resulting from bacterial decomposition of the body or in the mouth. They are, therefore mixed with deodorants, face powders and breath fresheners.

(ii) **Disinfectants** : The chemical substances which are used to kill microorganisms but they cannot be applied on living tissues are called **disinfectants**. These are commonly applied to inanimate objects such as floors, instruments, etc.

The same substance can act as disinfectant as well as antiseptic depending upon its concentration. For example, a 0.2% solution of phenol acts as antiseptic and its 1% solution acts as disinfectant.

The common examples are :

(i) Cl₂ is used for making water fit for drinking at a concentration 0.2 to 0.4 ppm.

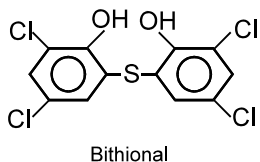
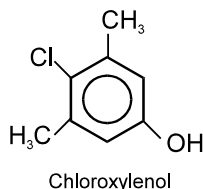
(ii) Dettol is an antiseptic. It is a mixture of chloroxylenol and terpineol in a suitable solvent.

(iii) Bithional is antiseptic which is generally added to medicated soaps to reduce the odour produced

by bacterial decomposition of organic matter on the skin.

(iv) Iodine is powerful antiseptic. It is used as a tincture of iodine which is 2 - 3% iodine solution of alcohol-water.

(v) Some organic dyes are also effective antiseptics. These are used for the treatment of infectious diseases. The common examples of antiseptic dyes are gentian violet and methylene blue.

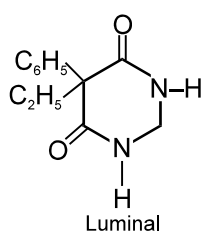
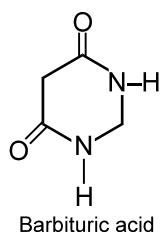


1.2.5 Tranquilizers :

The chemical substances used to cure mental diseases are called **tranquilizers**. These are used to release mental tension and reduce anxiety. These are the constituents of sleeping pills. They act on higher centres of nervous system. These are also called **psychotherapeutic drugs**. These drugs make the patient passive and help to control their emotional distress or depression. These also help to restore confidence and the patients work with full capacities which they already have.

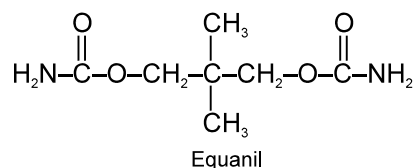
(i) **Hypnotics** : These are also known as tranquilizers and are used to reduce mental tension and anxiety. These induce sleep. These are components of sleeping pills (sedatives)

Ex.



(ii) **Non Hypnotics** : They reduce tension and anxiety. These do not induce sleep. Equanil is also an important tranquilizers used in depression and hypertension.

Ex. Choldiazepoxide, Meprobamate.

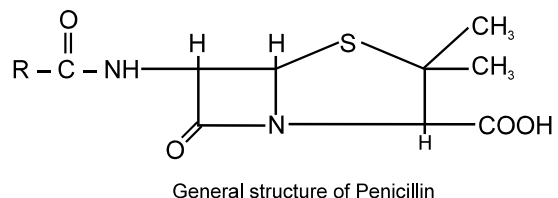


It may be noted that different terms are used for drugs which are used to cure mental diseases.

1.2.6 Antidepressants : These drugs are given to patients with shattered confidence. These produce a felling of well being and confidence in the person of depressed mood. Therefore, these are also called mood booster drugs. The common examples are Vitalin, Cocaine, Methedrine etc.

1.2.7 Antibiotics :

These are the chemical substances which are produced by micro-organisms (bacterial, fungi and moduls) and can inhibit the growth or even destroy other micro-organisms. The first successful antibiotic produced was penicillin. It was discovered by Alexander Fleming in 1920. The general formula of penicillin is $C_9H_{11}O_4 SN_2R$ where R may be different for different members. For example.



With the substitution of different R groups, about six natural penicillins have been isolated so far. for example.

Penicillin	Nature of R
Penicillin G or Benzyl penicillin	$\text{C}_6\text{H}_5\text{CH}_2\text{-}$
Penicillin F	$\text{CH}_3\text{-CH}_2\text{-CH}$ $= \text{CH-CH}_2\text{-}$
Penicillin K	$\text{CH}_3\text{-(CH}_2\text{)}_6\text{-}$
Ampicillin	$\text{C}_6\text{H}_5\text{-CH-NH}_2$

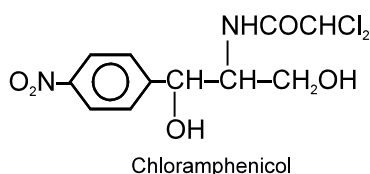
Ampicillin and amoxycillin are some modifications of penicillins. It may be noted that many patients develop allergy to penicillin. Therefore, it is essential to test the patient for sensitivity (allergy) to penicillin before it is administered.

Penicillin has narrow spectrum. These can be used for curing sore throat, gonorrhoea, rheumatic fever, local infections, etc.

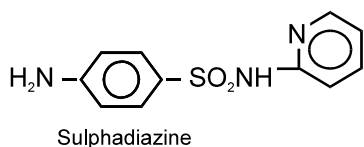
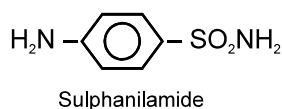
In India the important centres which manufacture Penicillin are – Hindustan Antibiotics, Pimpri and Indian Drugs and Pharmaceuticals, Rishikesh.

Streptomycin is also an antibiotic used for the treatment of tuberculosis, meningitis, pneumonia, local infections, etc.

Broad spectrum antibiotics : These are the antibiotics which are effective against a variety of diseases. The common examples are Tetracycline, Chloromycetin and Chloramphenicol which are effective against a variety of diseases. Therefore, these can be used for curing typhoid, acute fever, dysentery, whooping cough, pneumonia, eye infection, certain urine infection. The structure of chloramphenicol is :



Sulpha drugs : These have great antibacterial powers and are used as medicines for various diseases. These are also antibiotics and protect the body against micro-organisms. These are used against diseases such as pneumonia, tuberculosis, diphtheria, etc. Some important sulpha drugs are sulphadiazine, sulphanilamide, etc.



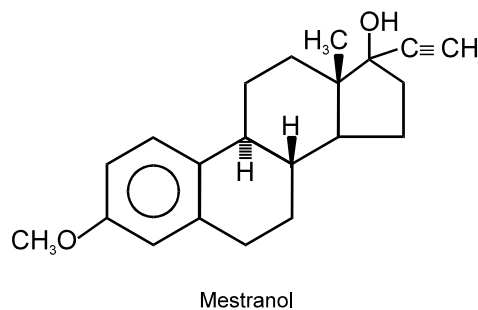
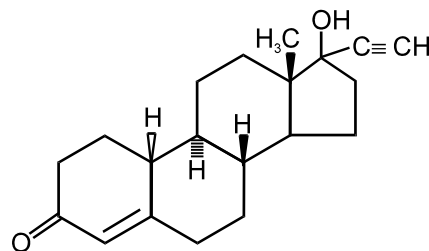
1.2.8 Germicides :

These are the chemical substances used to kill germs, fungi and virus. The common examples of germicides are phenol, cresols, formaldehyde, DDT, potassium permanganate solution, (1%) chlorine, bleaching powder, hydrogen peroxide, etc.

1.2.9 Anti-fertility drugs :

Chemical substances which are used to check pregnancy in women are called anti-fertility drugs or birth control drugs or oral contraceptives.

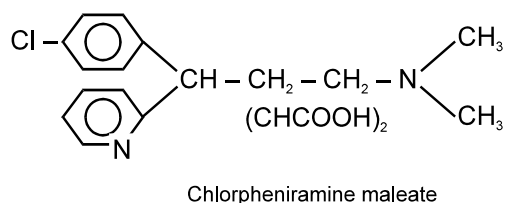
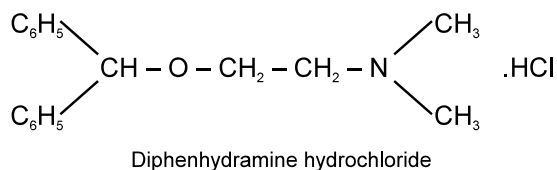
All these drugs contain chemicals related to female sex hormones having a steroid ring structure. Most of these contain a combination of an estrogen and a progesterone. For example, a common brand name Enovid E contains norethindrone (a progestin) mestranol or ethinylestradiol monomethyl ether (an estrogen). All such drugs are expected to have side effects and hence should be used only under proper medical advice.



1.2.10 Antihistamines :

The drugs which have been used to fight allergy are called **antihistamines**. These are so called because they check the production of histamines.

Thus, antihistamines are widely used for treatment to hay fever, conjunctivitis, nasal discharges, irradiation sickness, motion sickness (air, sea, road), nausea in pregnancy and post operative vomiting. The antihistamine drugs which are widely used are diphenhydramine hydrochloride, Cetrizine, Chlorpheniramine, Promethazine hydrochloride etc. The structure of some of these are given below :



1.2.11 Antacids :

Antacids are substances that decrease gastric acidity by neutralising hydrochloric acid. They are compared quantitatively in terms of their acid-neutralising capacity. These usually contain salts of Al, Mg and Na. These are of the following two types :

- (a) Systemic antacid
- (b) Non-systemic antacid

(a) Systemic antacids : Systemic antacids like sodium bicarbonate decrease acidity but cause systemic alkalosis due to absorption of bicarbonate. Hence acid-base balance is disturbed. Further excess sodium may cause oedema and cardiac failure in patients with renal or cardiac dysfunction.

(b) Non-systemic antacids : These may contain one or more of the following compounds : $\text{Al}(\text{OH})_3$, $\text{Mg}(\text{OH})_2$, MgCO_3 , CaCO_3 , magnesium trisilicate, magaldrate etc. These antacids are not absorbed after administration and hence acid-base imbalance is minimal.

Examples based on

Medicine

- Ex.1** Which of the following is not an antipyretic ?
 (A) Asprin
 (B) Paracetamol
 (C) Barbituric acid
 (D) Phenacetin

Ans(C)

Sol. Barbituric acid & derivatives are sedatives.

- Ex.2** The drug that relieve or decrease pain is called
 (A) Analgesic (B) Antipyretic
 (C) Tranquillizer (D) Hypnotics

Ans(A)

Sol. Analgesic are commonly called pain killers.

- Ex.3** Which of the following is used for the treatment of tuberculosis ?
 (A) Veronal (B) Aspirin
 (C) Chloroquine (D) Streptomycin

Ans(D)

Sol. T.B. is a bacterial disease

- Ex.4** Which of the following is an analgesic ?
 (A) Chloramphenicol (B) Penicillin
 (C) Paracetamol (D) Streptomycin

Ans(C)

Sol. Paracetamol is used as analgesic and Antipyretic

- Ex.5** Which of the following is a hypnotic drug ?
 (A) Luminal (B) Diclofenac
 (C) Brufen (D) Phenol

Ans(A)

Sol. Hypnotic Tranquilizers induce sleep

- Ex.6** Various phenol derivatives, tincture of iodine (2 – 3% I_2 in water/alcohol) and some dyes like methylene blue are
 (A) Antiseptics (B) Disinfectants
 (C) Analgesics (D) Antipyretics

Ans(A)

Sol. Antiseptics can be applied on wounds

Ex.7 Which of the following is a broad spectrum antibiotic ?

- (A) Streptomycin (B) Penicillin
(C) Ampicillin (D) Chloremphenicol

Ans(D)

Sol. Spectrum refers to range of organism attacked

2. DYES ::

Dyes are chemical substances used to impart colours to the textiles, foodstuffs, silk, wool and other objects. The discovery of dyes has provided glamour in our modern life. All coloured substances are, however, not dyes. A substance can act as a dye if it satisfies the following conditions :

- It must have a suitable colour.
- It must be able to fix itself permanently to the material being dyed.
- When fixed, it must be fast to light and washing.
- It must be resistant to the action of water, soap, acids and alkalies or other solvents used in dry cleaning etc.

2.1 How a dye exhibits colour ? :

A dye is an organic compound which can absorb a certain portion of the visible light (400 – 750 nm) falling on it. The rest of the light is reflected. The colour of the reflected light gives the colour of the dye which is complementary to the colour of the light absorbed. The colour of the visible light absorbed and the complementary colour reflected are given in Table.

WAVE LENGTH (nm)	COLOUR ABSORBED	COLOUR REFLECTED (Complementary colour)
400 – 435	Violet	Yellow green
435 – 480	Blue	Yellow
480 – 490	Green-blue	Orange
490 – 500	Blue-green	Red
500 – 560	Green	Purple
560 – 580	Yellow green	Violet
580 – 595	Yellow	Blue
595 – 605	Orange	Green blue
605 – 750	Red	Blue green

From the above table, it is clear that if a dye absorbs electromagnetic radiations corresponding to yellowish green, it will appear violet which is the complementary colour of yellowish green. Similarly if a dye absorbs blue colour it will appear yellow which is the complementary colour of blue. Thus dyes impart colour to a fabric by absorbing the complementary colour.

(i) Chromophores : In general, the intrinsic colour of any compound is due to the presence of certain groups containing multiple bonds. These groups which impart colour to a compound are called chromophores. Some examples of chromophores are :

NO_2 (nitro), $\text{N}=\text{O}$ (nitroso), $\text{N}=\text{N}$ (azo) quinonoid structures etc.

(ii) Auxochromes : At the same time, there are certain groups which themselves are not chromophores but deepen the colour when introduced into coloured compounds. Such groups which deepen the colour of a coloured compound are called auxochromes. Some examples of auxochromes are :

OH , NH_2 , NHR , NR_2 , Cl , CO_2H etc.

2.2 Classification of Dyes :


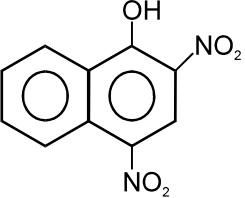
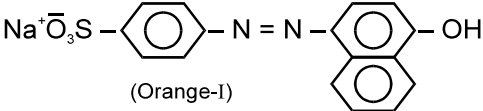
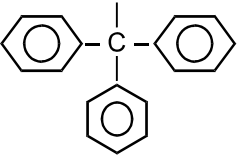
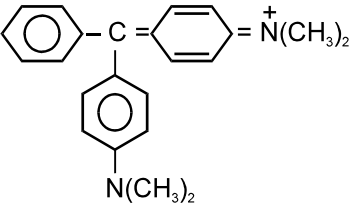
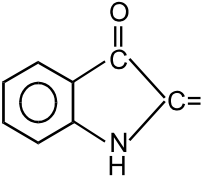
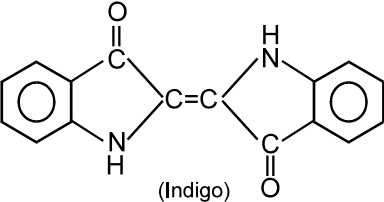
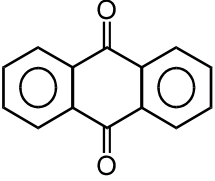
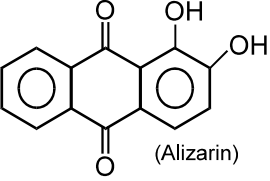
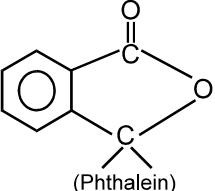
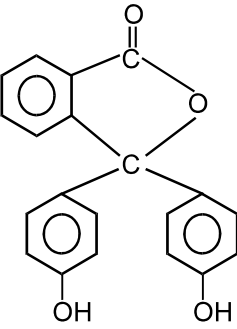
Dyes can be classified in a number of ways as briefly described below :

2.2.1 Natural and synthetic Dyes :

Since early times, man has been trying to extract dyes from the plants for using them to beautify his cloths. Such dyes are known as natural dyes. Two examples of natural dyes known since early times are indigo (a blue dye) and alizarin (a red dye). India has been the main producer and exporter of indigo. However, natural dyes have only limited shades. Hence, nowadays, most of the dyes used are the synthetic dyes which can have a variety of shades. Most of these dyes are aromatic compounds obtained from coal-tar. Hence these are also called coal-tar dyes.

2.2.2 Classification of Dyes based on their Constitution (Chemical classification) :

On the basis of chemical constitution, the variety of dyes is so large that a long list can be prepared. However some important classes based on the characteristic structural units present in them are given in Table.

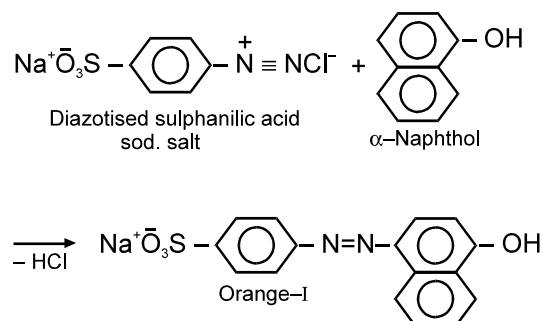
Type	Structural unit	Example
1. Nitro dyes		 <p>(Martius yellow)</p>
2. Azo dyes	$-\text{N}=\text{N}-$ (Azo)	 <p>(Orange-1)</p>
3. Triphenylmethane dyes	 <p>(Triphenylmethane)</p>	 <p>(Malachite green)</p>
4. Indigoid dyes	 <p>(Indigoid)</p>	 <p>(Indigo)</p>
5. Anthraquinone dyes	 <p>(Anthraquinone)</p>	 <p>(Alizarin)</p>
6. Phthalein dyes	 <p>(Phthalein)</p>	 <p>(Phenolphthalein)</p>

2.3 Classification of dyes on the basis of their applications :

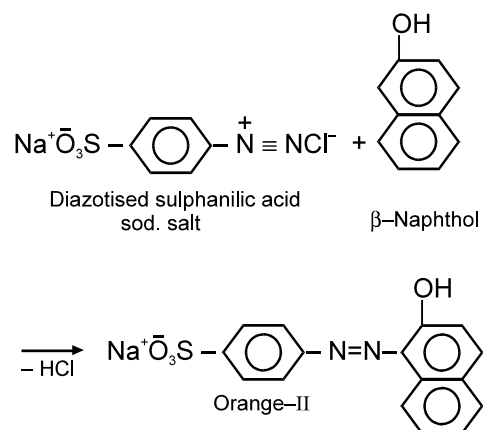
The dyes are classified into the following types on the basis of their applications :

2.3.1 Acid dyes :

The sodium salts of azo dyes containing sulphonic acid ($-\text{SO}_3\text{H}$) and carboxylic acid ($-\text{CO}_2\text{H}$) groups are called **acid dyes**. These dyes are applied to the fabric from their acid solutions and are used to dye wool, silk, nylon and acrylic fibres. These do not have affinity for cotton and hence cannot be used to dye cotton. Typical examples of acid dyes are orange – I, orange – II, methyl orange, methyl red and congo red. The dye orange – I is prepared by coupling diazotised sulphanilic acid with α -naphthol.



The dye orange – II is similarly obtained by coupling diazotised sulphanilic acid with β -naphthol.

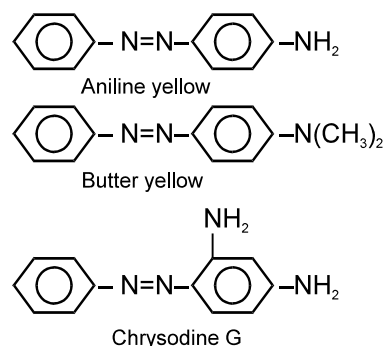


Similarly, congo red is obtained by coupling tetrazotised benzoic (4, 4' – diaminodiphenyl) with two molecules of naphthionic acid (4 – aminonaphthalene – 1 – sulphonic acid).

2.3.2 Basic dyes :

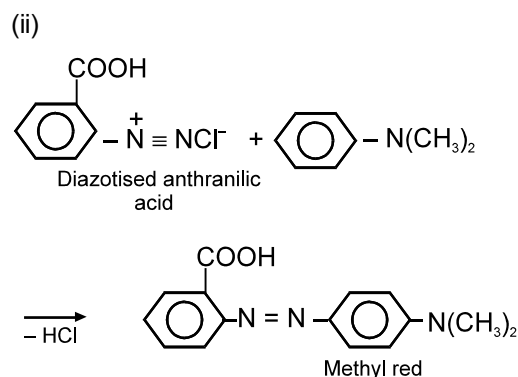
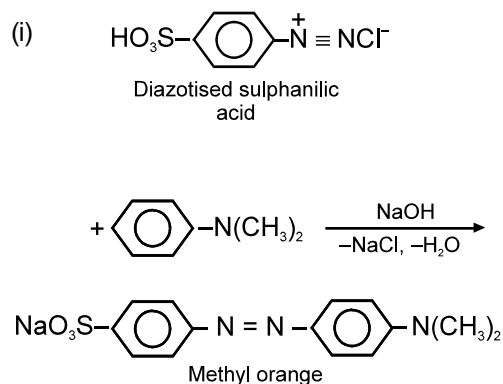
These dyes are the salts of the coloured bases containing amino groups ($-\text{NH}_2$ or $-\text{NR}_2$) as the auxochromes. These include azo and triphenylmethane dyes. In the acid solution, these

amino groups form water soluble cations which then react with anionic sites present on the fabrics and thus get attached to them. Modified nylons and polyesters can be dyed with these dyes. Some common examples of this class are aniline yellow, butter yellow, chrysodine G (structures given below) and malachite green



Chrysodine G is an orange dye and is obtained by coupling benzenediazonium chloride (1 mole) with m-phenylenediamine. It is generally used to dye silk, wool, cotton, leather and paper.

Methyl Orange and methyl red are obtained by coupling N, N-dimethylaniline with diazotised sulphanilic acid and diazotised anthranilic acid respectively :



2.3.3 Direct dyes :

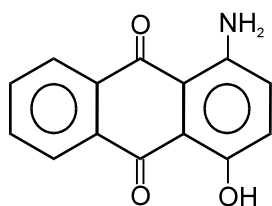
As the name suggests, these are those dyes which can be directly applied to the fabric from an aqueous solution. These are most useful for fabrics which can form hydrogen bonds with the dyes. Thus these are usually used for dyeing cotton, wool, silk, rayon and nylon.

2.3.4 Disperse dyes :

These are water insoluble dyes and are applied to the fabric in form of a dispersion of the finely divided dye in a soap solution in the presence of some stabilizing agent such as pheno, cresol or benzoic acid. These dyes are used to dye synthetic fibres and as nylons, polyesters and polyacrylonitrile fibres.

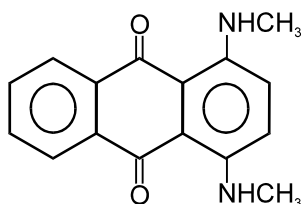
These dyes belong to the class of monoazo dyes and anthraquinone dyes. Important examples of disperse dyes (anthraquinone dyes) are :

(i) Cellitone fast pink B and



1-Amino-4-hydroxyanthraquinone
(Cellitone fast pink B)

(ii) Cellitone fast blue B

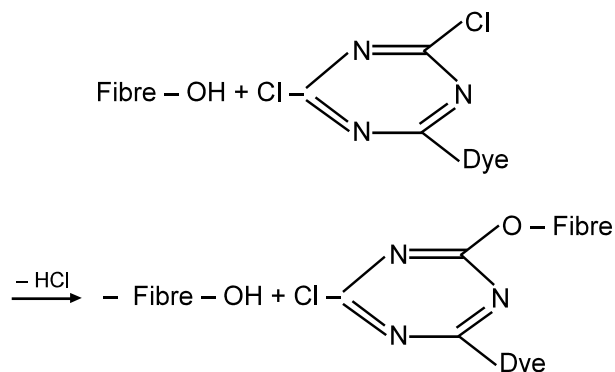


1,4-Di(methylamino)anthraquinone
(Cellitone fast blue B)

2.3.5 Fibre reactive dyes :

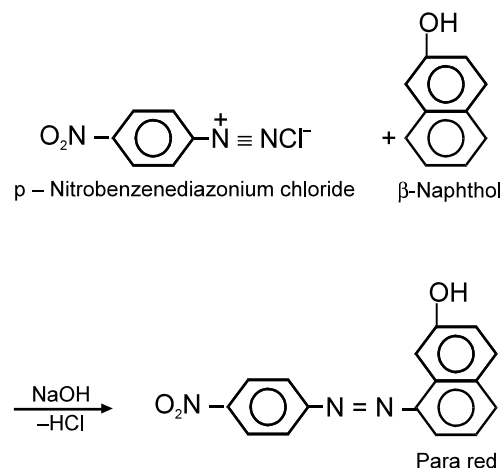
These are those dyes which contain a reactive group which combines directly with the hydroxyl or amino group of the fibre. Because of the formation of permanent chemical bonds between the fibre and the dye, the colour of the dyed fabric

is fast and has a long life. Cotton, wool or silk can be dyed with this type of dyes. Dyes which are derivatives of 2, 4-dichloro-1, 3, 5-triazine are important examples of fibre reactive dyes.



2.3.6 Ingrain dyes :

These are water insoluble azo dyes which are produced in situ on the surface of the fabric by means of coupling reaction. The fabric to be dyed is soaked in an alkaline solution of a phenol or naphthol and is then treated with the solution of a suitable diazonium salt to produce an surface adsorption of the dye on the fabric, the colour is not very fast. These dyes are generally used for dyeing cotton, silk, nylon and polyester. An example of this type of dye is para red.



2.3.7 Vat dyes :

These are insoluble dyes which are first reduced to a colourless soluble form (leuco compound) in large vats with a reducing agent such as alkaline sodium hyposulphite and then applied to the fabric. The fabric to be dyed is first soaked in the alkaline solution of sodium hyposulphite and then oxidised

to the insoluble coloured from by exposure to air or by some oxidising agents such as chromic acid or perboric acid. These dyes are mainly used to dye cotton fibres. A well known example of vat dyes is indigo.

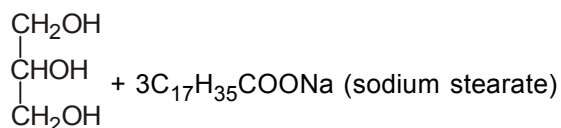
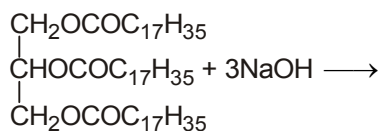
2.3.8 Mordant dyes :

These dyes do not dye the fabric directly but require a mordant. The mordant, in fact, acts as the binding agent between the fibre and the dye. For acid dyes, metal ions are used as mordants but for basic dyes, tannic acid is used as the mordant. These dyes are primarily used to dye wool.

SOAPS & DETERGENTS ::

INTRODUCTION

- Sodium salts of higher fatty acids like stearic acid, oleic acid, palmitic acid etc. are called hard soaps and the potassium salts of these fatty acids are called soft soaps.
- Soaps are prepared by hydrolysis of higher fatty acids.
- A higher proportion of salts of saturated acids (palmitic, stearic etc.) gives Hard soaps, while a higher proportion of salts of unsaturated acids (oleic acid) yields soft soaps.
- Alkaline hydrolysis of oils or fats by NaOH or KOH gives glycerol and sodium or potassium salt of the fatty acid. This reaction is known as **saponification**.



3. SOAPS ::

3.1 Types of soaps :

- Hard soaps** – These are obtained from cheap oils and fats using sodium hydroxide. These contains free alkali and are used for washing purposes.

- Soft soaps** – These are obtained from good oils using potassium hydroxide. These do not contain free alkali and are used as toilet soaps, shaving cream, in shaving sticks and shampoo.
- Transparent soaps** : These are formed by dissolving toilet soaps in alcohol and evaporating the filtrate. They contain glycerol.
- Medicated soaps** : Toilet soaps containing some medicinal important substance are called medicated soaps.
- Metallic soaps** : These are soaps of metals other than sodium and potassium.

3.2 Manufacture of soap :

Generally three processes are adopted for manufacture of soap.

- The cold process** : The soap of good quality is not obtained by this method as glycerol, alkali and oil remain with the soap. This is an expensive method. In this method oil is taken in an iron vessel and heated to about 50°C. Calculated amount of sodium hydroxide is added to it slowly by stirring the mixture. The whole mixture is kept overnight which gets solidified and then is cut into pieces. Glycerol remains in the mixture in this method.
- The hot process** : The following processes are involved in this method :

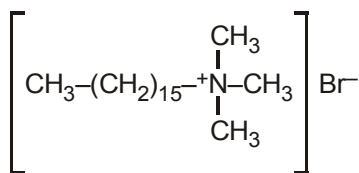
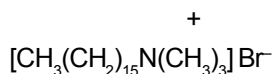
Saponification : A mixture of oil and alkali is heated in iron vessels by steam coils. The oil gets hydrolysed and a mixture of soap, glycerol, oil and water is obtained.

Salting out of soap : A saturated solution of sodium chloride is added to the mixture obtained above. Due to common ion effect soap separates out and floats on surface of the solution. Soap is separated from the solution and glycerol is recovered from the mother liquor. The mother liquor is known as **spent-lye**. Soap so obtained is washed with a small amount of water to remove the alkali. After some time it solidifies and then it is cut into pieces.

- Modern method** :- Glycerides of fatty acids are hydrolysed by water at higher temperatures in presence of catalyst to give glycerol and higher fatty acids. These are separated and fatty acids are reacted with NaOH or Na₂CO₃ at higher temperature to form its sodium salt. When lime or ZnO are used as catalyst, the method is known as **Itner process** and if sulphuric acid or aromatic

(ii) **Cationic detergents :**

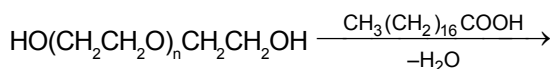
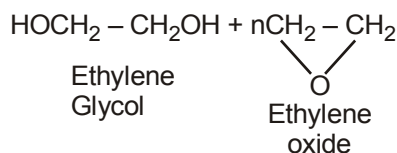
e.g., cetyltrimethylammonium bromide, i.e.,



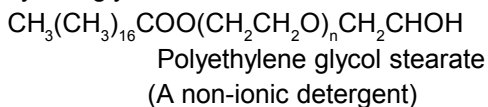
Cetyltrimethylammonium bromide
(Cationic detergent used in hair conditioner)

(iii) **Non-ionic detergents :**

Example



Polyethylene glycol



Examples
based on

Soaps & detergents

Ex.8 The term LABS abbreviates as-

- (A) Laboratory
- (B) Lauryl acidic benzene sulphate
- (C) Linear alkyl benzene sulphonate
- (D) None

[Ans. C]

Sol. The term is used in chemical industries for detergents.

Ex.9 Hard soaps are-

- (A) Sodium salts of higher fatty acids
- (B) Potassium salts of higher fatty acids
- (C) Calcium salts of higher fatty acids
- (D) Magnesium salts of higher fatty acids

[Ans. A]

Sol. These are called hard soaps.

Ex.10 Sodium dodecyl benzene sulphonate is used as a-

- (A) Pesticide
- (B) Soap
- (C) Fertilizer
- (D) Detergent

[Ans. D]

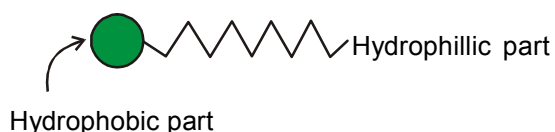
Sol. It is $\text{C}_{12}\text{H}_{25}\text{C}_6\text{H}_4\text{SO}_3\text{Na}$ having $-\text{SO}_3^-$ group.

SOLVED EXAMPLES

- Ex.1** Soaps are-
- (A) Alkyl benzene sulphonates
 - (B) Sodium salts of long chain carboxylic acids.
 - (C) Glycerides
 - (D) Glyceric ester of higher fatty acids.

(Ans. B)

- Sol.** Soaps are sodium salts of long chain fatty carboxylic acids e.g. sodium oleate $C_{17}H_{33}COO^- Na^+$ Similarly sodium stearate is a soap of a saturated fatty acid $C_{17}H_{35}COOH$. Sodium palmitate is $C_{15}H_{31}COOH$. Soaps form micelle in which there is one hydrophobic part and another is hydrophilic part



- Ex.2** Which of the following statements is not correct-
- (A) Soaps act by lowering surface tension between water and oil/insoluble material.
 - (B) The soap form insoluble salt with Ca^{+2} ions.
 - (C) The COO^- group in soaps acts as hydrophilic and alkyl chain as hydrophobic.
 - (D) Soaps work more efficiently in hard water than in soft water.

(Ans. D)

- Sol.** The incorrect statement is, "soaps work more efficiently in hard water than in soft water". Soaps actually do not give foams in hard water due to formation of insoluble salts like calcium stearate and magnesium stearate with hard water containing impurities of Ca & Mg carbonates and bicarbonates.

- Ex.3** Which of the following is an incorrect statement-
- (A) Nonionic detergents are neutral.
 - (B) The hydrophilic portion of a nonionic detergent functions by a hydrogen bonding mechanism.
 - (C) Cationic detergents have a positively charged water soluble portion.
 - (D) LABS detergent are not biodegradable.

(Ans. D)

- Sol.** The incorrect statement is that LABS detergents are not biodegradable. Actually all detergent are not bio-degradable and they cause pollution and hazardous to human civilization.

- Ex.4** The incorrect statement about detergents is-
- (A) Inorganic phosphate is added to the detergent powders for the removal of Calcium salts.

- (B) Sodium peroxoborate added to the detergent powder acts as bleaching agent
- (C) Sodium sulphate is added to the detergent powder to increase bulk
- (D) Fluorescers are the organic compounds which act as foaming agent.

(Ans. D)

- Sol.** The incorrect statement about detergent is that, fluorescers are the organic compounds which act as foaming agents. Actually fluorescers are optically whitening agents which cause the clothes white and impart whitening in it. These are also known as fluorescent brighteners. They are stilbene derivatives.

- Ex.5** Which of the following statements is not true for detergents-

- (A) ABS is anionic detergent
- (B) Cetyl trimethyl ammonium bromide is cationic detergent
- (C) Poly ethylene glycol stearate is nonionic detergent
- (D) None

(Ans. D)

- Sol.** All statements are true.

