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## CARBONIC ANHYDRASE INHIBITORS

- These are the agents which inhibit Carbonic anhydrase, thus lowering  $H^+$  ion Sodium exchange in renal tubules.
- So that there occurs increased excretion of Sodium & Bicarbonate ion in the urine which explains its diuretic effects.

e.g. Acetazolamide, dichlorophenamide.

## H<sub>2</sub>OH \* CEILING \* DIURETICS

- 18 शुक्रवार
- These are the agents which act on thick ascending limb of the loop of Henle.
  - Because of this these agents are sometimes termed as loop diuretics.
  - They produce intense diuresis of short duration.

e.g. Furosemide, Ethacrynic acid.

## FUROSEMIDE

• Brand name:- Lasix, Furo.

Structure:-

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## FILL IN THE BLANKS:

- Lasix is brand name for furosemide.
- Example of Carbonic anhydrase Inhibitors is Acetazolamide or Dichlorophenamide.
- High ceiling diuretics act on thick ascending loop (Henle loop).
- Diuretics are mainly used in treatment of Hypertension and Edema.
- Furosemide is derivative of Anthranilic acid.

## POTASSIUM SAVING DIURETICS:

सोमवार

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- It is also called as sulphoramid diuretics.
- These are weak diuretics, spironolactone, triamterene & amiloride are the examples of potassium saving diuretics.
- They cause mild Na<sup>+</sup> excretion without significantly affecting the potassium excretion.
- Inure fure they are called Potassium saving diuretics.

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अप्रैल 2018

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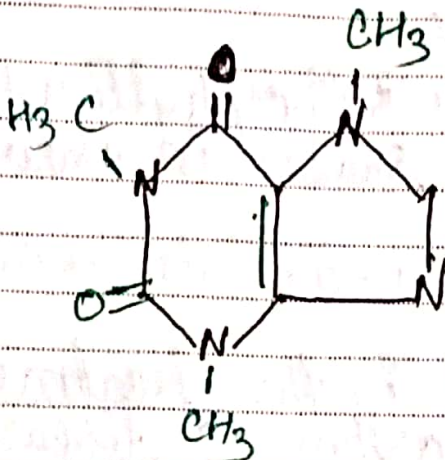
29

(2)

- These have stimulating action of CNS. Caffeine is most potent among xanthine derivatives.

~~Structure~~ CAFFEINE

### STRUCTURE



### Properties

- white crystalline powder
- Bitter taste
- It sparingly soluble in water but very soluble in boiling water

सोमवार

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### STORAGE

It should be stored in air-tight containers.

### USES

Caffeine is especially used for its effects on CNS for producing a state of wakefulness & for enhancing mental activity.

- It also brings about stimulation of respiratory centre.
- It is used in headache along with other analgesics such as aspirin.

- The drugs which to increase the activity of various part of Central nervous system are collectively called as CNS Stimulants or Analeptics.
- These agents are used in elevating the CNS activity in order to lessen narcosis brought about by the excess of depressant drugs.
- Some of analeptics stimulates respiratory centre. & they increase the rate & depth of respiration.
- Are used respiratory stimulants in respiratory distress after anaesthesia.

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शनिवार

CLASSIFICATION

- The CNS Stimulants are classified as:-
- ① Natural Compounds ② Synthetic Compounds.

NATURAL Compound

- Purines are widely distributed among natural products. (Eg. in uric acid, Coffee, Tea, Cocoa, Nucleic acid & Enzymes)
- They are 2, 6 oxygenated Purines or xanthine derivatives. eg. are Caffeine, Theobromine, & Theophylline.

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मई 2018  
शुक्रवार

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- They are strong diuretics which prevents the sodium reabsorption in Proximal tubules.
- Ascending loop of Henle by interacting with sulphhydryl enzyme hence causing increased urine output.
- However they have been replaced by much better drug due to their marked side effects.

Non-Mercurial Diuretics

- They have been classify on basis of structure & mode of action.
- THIAZIDES
- CARBONIC ANHYDRASE INHIBITORS
- HIGH CEILING DIURETICS
- OSMOTIC DIURETICS
- ALDOSTERONE INHIBITORS
- SULPHONAMIDE DIURETICS

शनिवार

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Thiazides

- These thiazides act as diuretics by reducing the reabsorption of electrolyte from renal tubules.
- Thus enhancing the secretion of sodium & chloride ions & consequently of water.

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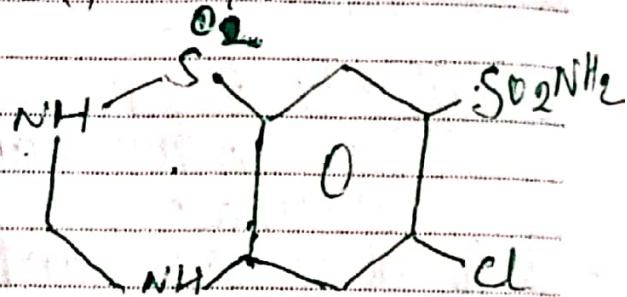
USE:- • It is mainly used by Intravenous Infusion as an osmotic diuretics to restore renal functions in acute renal failure.

- And to reduce raised Intracranial & Intra-ocular Pressure.

Drug

Structure:

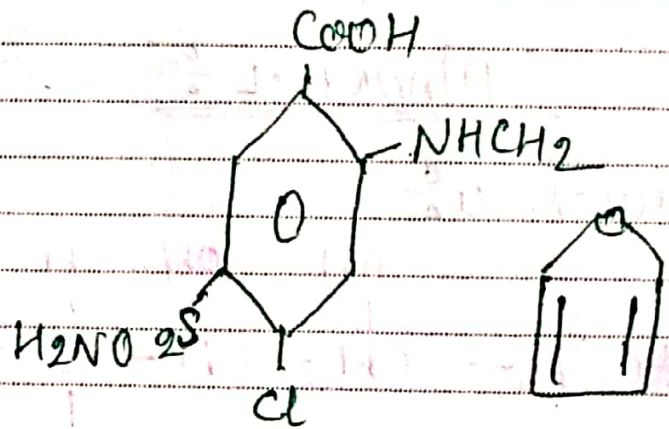
- Hydrochlorothiazide



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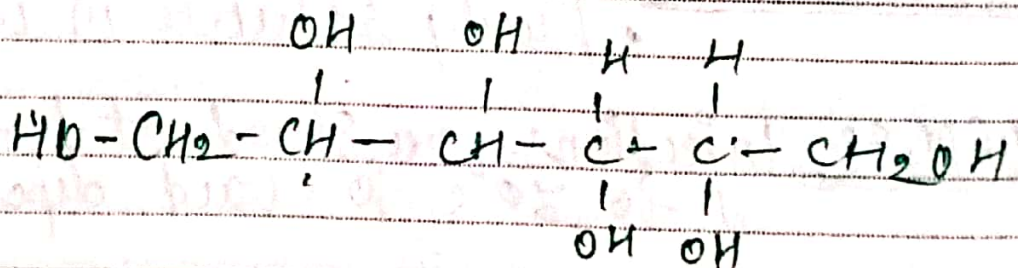
Furosemide



- Urea



- Mannitol:-



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2018 मई  
बुधवार

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| अप्रैल |        |         |        | 2018    |          |        |        |
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## DIURETICS

- Diuretics are the agents which increase the output of urine by the kidneys.
- The major use of diuretics is for the purpose of increasing sodium & chloride excretion.
- These agents are generally employed for the treatment of all types of oedema (abnormal retention of salt & water).
- The main disease associated with oedema are Congestive Heart Failure, renal hepatic or Pulmonary disease.

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गुरुवार

- Diuretics are also used either alone or in combination with other antihypertensive agents in the treatment of increased blood pressure.

### CLASSIFICATION:

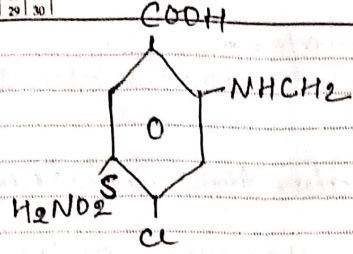
- Diuretics are classified on chemical basis as:-
- Mercurial diuretics
  - Non-mercurial diuretics.

### MERCURIAL DIURETICS

e.g.:- MERSALYL.

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- Properties:-
- white crystalline powder
  - unstable light but stable in air
  - practically insoluble in water
  - freely soluble in dilute alkali hydroxide solution

STORAGE It should be stored in light resistant containers.

USES:- It is a Potent diuretic. रविवार 20

- It is chemically related to sulphonamide diuretics
- It is used
- ① In the treatment of oedema, due to CHF, Cirrhosis of liver or renal disease.
- ② It is also used orally in the management of mild to moderate hypertension.

ETHACRYNIC ACID

Brand name Edexin

- Properties:-
- white crystalline powder
  - Odourless
  - Better taste
  - Non-hygroscopic



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(12)

- Slightly soluble in water.
- It forms soluble compounds with alkali hydroxide & ammonia.

STORAGE: Stored in air-tight containers.

USES: ① It is used in treatment of Hypertension & oedema.

② Hypokalaemia is major side effects so the patients are kept on Potassium supplements.

### ◌ Osmotic Diuretic ◌

- These compounds are freely filtered at Glomerulus & are not reabsorbed from the tubules.

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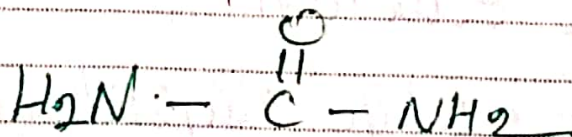
मंगलवार

- Large Intake of any of these substances causes Increase in its Conc<sup>n</sup> in the Body fluids.
- The subs. finally appears in urine with an Increase in the excreted electrolytes & water.

### ◌ UREA ◌

Brand name: Ureaphil.

Structure:



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2018 मई  
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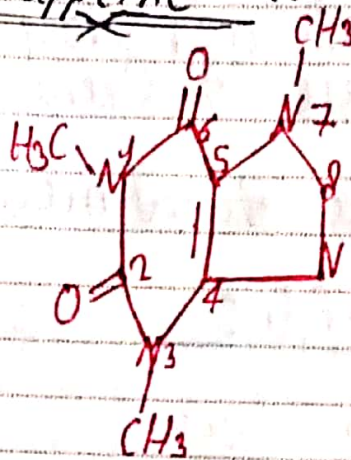
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STORAGE:- Stored in well closed light resistant containers.

USE:- It is used to overcome CNS depression, respiratory depression caused by central depressant drugs.

Caffeine :-

Structure :-

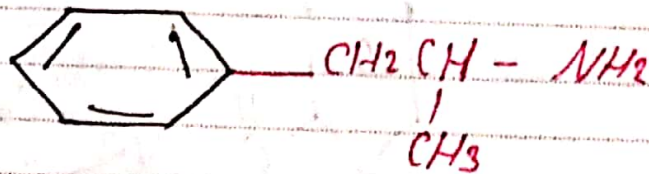


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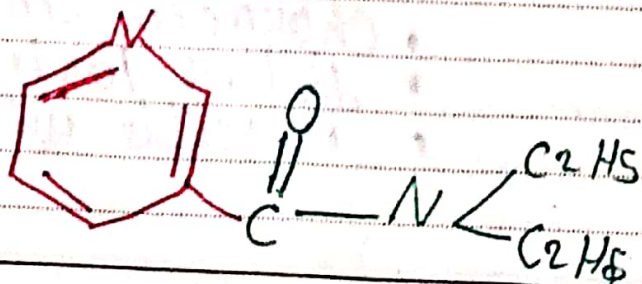
Dexamphetamine :-

Structure :-



Nitrobenzamide :-

Structure :-



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गुरुवार

Properties:

- white Crystalline Powders
- Bitter taste
- Soluble in water.
- Dexamphetamine Sulphate is freely soluble in water.

Uses: (1) It has Powerful stimulant activity.

- It cause in mental activity thus leading to lessening of fatigue & cerebral feeling of well being.
- It is used in the treatment of narcolepsy.

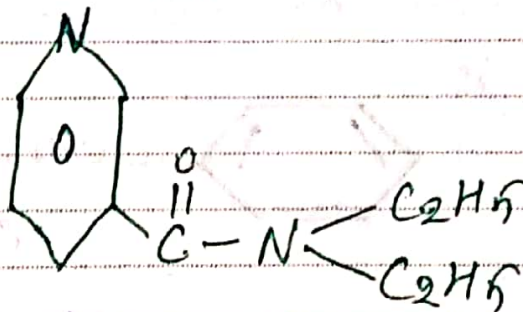
Nikethamide

Brand name: Caramin.

शुक्रवार

4

Structure:



Properties:

- Slightly yellow oily liquid.
- Calorless.
- Characteristic odour
- Bitter taste
- miscible with water

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2018 मई  
रविवार

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- The compounds of this group are diuretics  
1,2,4, Benzothiazine - 1,1, dioxide.
- eg:- Chlorothiazide, Hydrochlorothiazide, Benzthiazide

### CHLOROTHIAZIDE

Brand name:- Saluric

Properties:- White Crystalline Powder.

- Odourless
- Bitter in taste.
- very slightly soluble in water.
- Dissolve dilute solutions alkali Hydroxides.

14 सोमवार STORAGE:- It should be stored in well closed containers.

USES:- It is used in the treatment of Oedema & Hypertension.

- If it is used orally while, It sodium salt is given Intravenously.

### HYDROCHLOROTHIAZIDE

Brand name:- Hydride.

Properties:- White Crystalline powder.

- odourless.

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Properties :- Colourless, transparent prismatic crystals.

- white crystalline powder.
- slightly hygroscopic.
- slightly odourless decomposes ammonia.
- freely soluble in water.

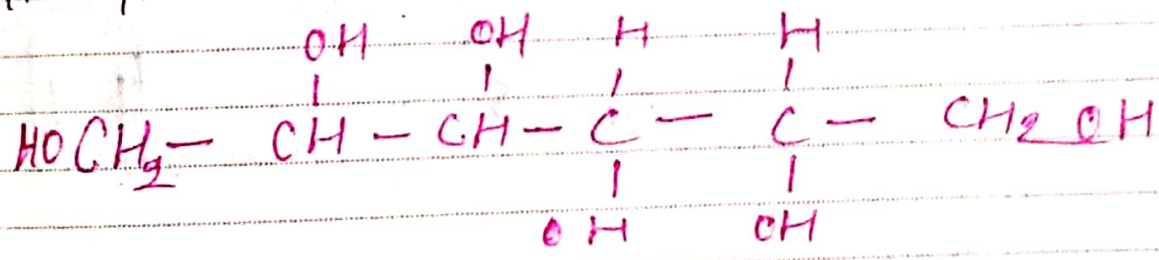
STORAGE :- Vena is stored in well closed container.

USES :- It is used in the treatment of acute increase in Intraocular pressure due to Corneal edema.

• to decrease Intraocular pressure in acute Glaucoma.

MANNITOL

Structure :-



Brand name :- Osmitol.

Properties :- • white crystalline powder.  
• freely soluble in water

STORAGE :- Injections are stored at temperature of 20° to 30°C to avoid deposition of crystals.

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मंगलवार

- Bitter taste

- It is very soluble in water.
- It dissolves in dilute solution of alkali hydroxides.

STORAGE:- Stored in air-tight containers.

USES:- ① It is used in treatment of oedema & hypertension. But ten times more potent than chlorothiazides.

### BENZTHIAZIDE

- Prop. Names:-
- White Crystalline powder.
  - Characteristic powder.
  - Bitter taste.
  - Practically Insoluble in water बुधवार

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Brand name:- **Fovani**

STORAGE:- It should be stored in air-tight containers.

USES:- It is also used in treatment of oedema & hypertension.

- Approximately 85% as active as Hydrochlorothiazides.

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2018 मई  
मंगलवार

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THEOPHYLLINE

Brand name:- Hephyllin, Phylbid.

IUPAC Name:- 1,3-Dimethylxanthine.

- Properties:-
- white crystalline powder
  - odourless
  - Bitter taste
  - Theophylline & Theophylline hydrate are sparingly soluble in water
  - Theophylline + ethylene-diamine = aminophylline

Uses:- (1) It is widely used in the treatment of bronchials asthma & disease of Cardiovascular system

2

बुधवार

Cardiac dyspnoea:- Difficult in breathing due to Heart disease

Synthetic Compound

The synthetic drugs such as *heptazol*, *nikethamide*, *cloramphetamine* are used as CNS stimulants.

DEXAMPHETAMINE

Structure

