



SUMMER – 13 EXAMINATION

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Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.



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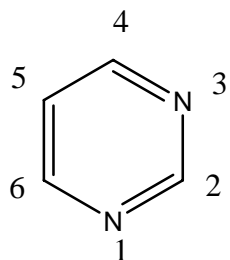
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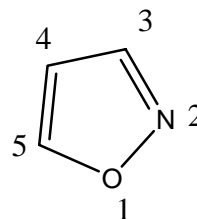
Q.1 Attempt any EIGHT of the following: (Each question will carry TWO marks) (16)

a) Structure and method of numbering of

i) Pyrimidine (1 Mark)

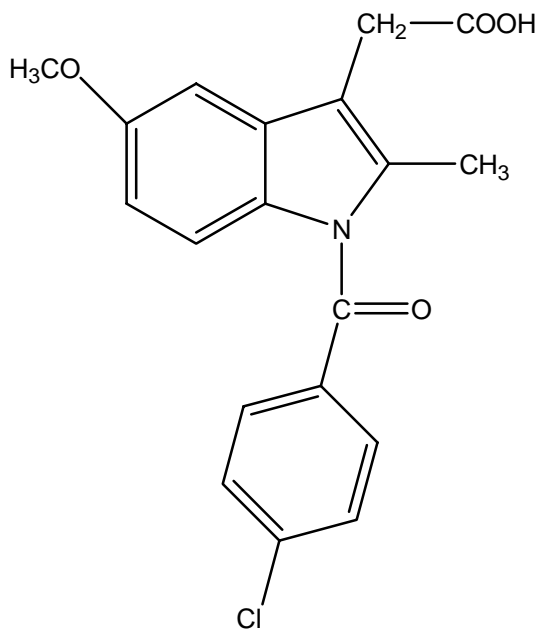


ii) Isoxazole (1 Mark)

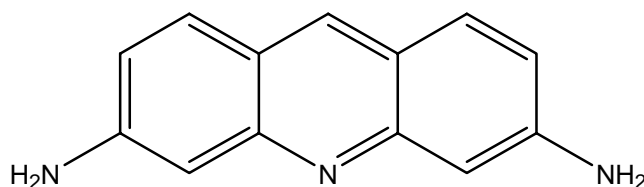


b) Name and structure of drug containing

i) Indole heterocycle- Indomethacin (1 Mark)



ii) Acridine- Proflavine (1 Mark)





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c) Dosage forms of

i) Tolnaftate- (1 Mark)

- 1) Tolnaftate Cream U.S.P.
- 2) Tolnaftate gel U.S.P.
- 3) Tolnaftate powder U.S.P.
- 4) Tolnaftate topical aerosol powder U.S.P.
- 5) Tolnaftate topical solution U.S.P.

ii) Insulin- (1 Mark)

- 1) Insulin Injection, I.P., B.P.
- 2) Insulin Injection Biphasic B.P.
- 3) Neutral Insulin Injection B.P.
- 4) Globin zinc Insulin Injection, I.P., B.P.
- 5) Isophane Insulin Injection I.P., E.P.
- 6) Protamin zinc Insulin Injection I.P., E.P.
- 7) Insulin zinc Suspension I.P., E.P.

d) Define

i) Tranquillizers- (1 Mark) Tranquillizers are CNS depressants which bring about a calming effect.

Tranquillizers include anxiolytic sedatives and neuroleptics. Anxiolytic sedatives are minor tranquillizers used to treat anxiety, agitation and tension while neuroleptics are major tranquillizers used in the treatment of psychoses, schizophrenia, mania and dementia.

ii) Antianginal drugs- (1 Mark) These drugs are used in the treatment of cardiac disease angina pectoris, characterized by acute chest pain due to adverse oxygen supply to heart muscles.



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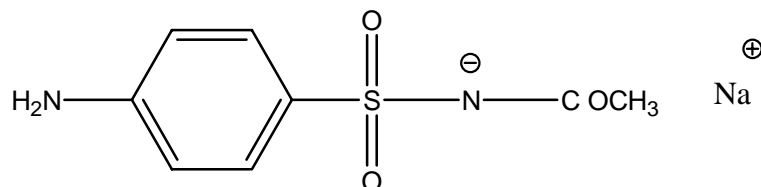
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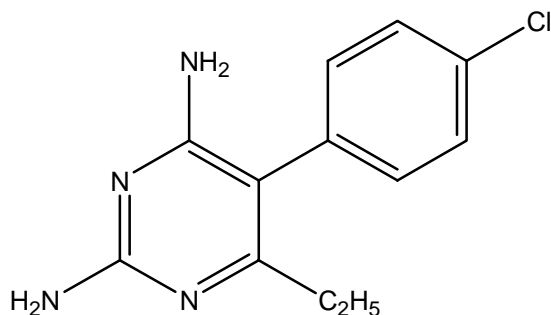
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e) Structure of

i) N¹-Acetylsulfanilamide sodium (1 Mark)



ii) 5-(4-Chlorophenyl)-6-ethylpyrimidine-2,4-diamine. (1 Mark)



f) Uses of

i) Promethazine (1 Mark)

1. It has antihistaminic properties
2. Used as an antiemetic drug
3. It also has tranquilizing action
4. It potentiates the action of other analgesic and sedative drugs
5. Used in allergic condition

ii) Thyroxine (1 Mark)

1. Treatment of metabolic insufficiency
2. Treatment of Hypothyroidism
3. Treatment of thyroid carcinoma



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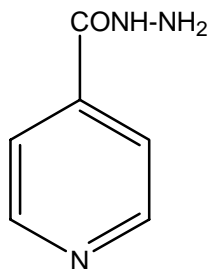
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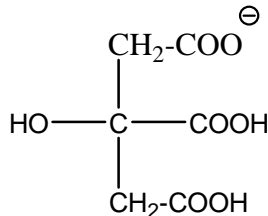
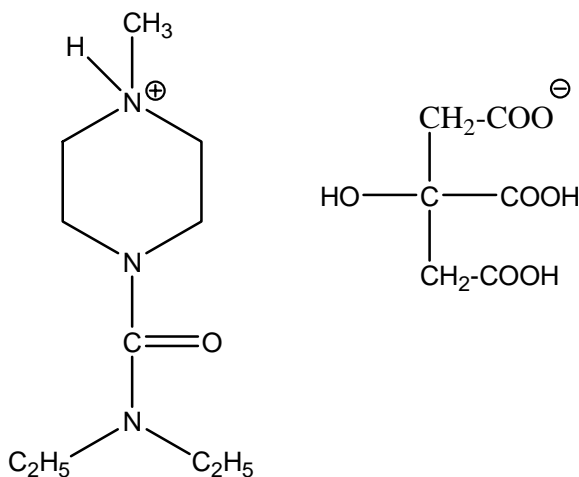
4. Treatment of obesity
5. It increases metabolism of carbohydrates, protein
6. Rarely used in the treatment of male infertility and some gynecological disorders
7. It decreases serum cholesterol level

g) Structure of (1 Mark)

i) Isoniazid



ii) D.E.C. (1 Mark)



h) Brand names of

i) Cotrimoxazole- (1 Mark. At least Two Brands are expected)

Ciplin, Trisulfase, Tprim forte, Bactrim, Sepmax, Oripim, Tabrol etc

ii) Diphenhydramine- (1 Mark. At least Two Brands are expected)

Benadryl Syrup, Bronolax Syrup, Abcof Syrup etc.



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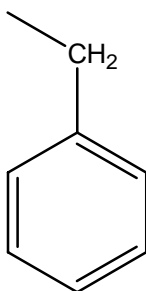
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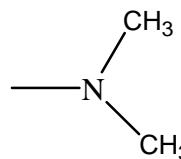
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i) Structure of

i) Benzyl (1 Mark)



ii) Dimethylamino (1 Mark)



j) Name of drug in

i) Campose- (1 Mark) Diazepam

ii) Styptocid- (1 Mark) Menadione

k) Cholinergic drugs Classification

• **Classification (2 Marks)**

1. Choline esters: Acetylcholine, Methacholine, Carbachol etc.

2. Cholinomimetic alkaloids: Muscarine, Pilocarpine, Arecholine

3. Cholinesterase inhibitors (Indirectly acting)

A) Reversible Inhibitors- Physostigmine, Neostigmine, Pyridostigmine etc.

B) Irreversible Inhibitors- Organophosphates (Parathion, Malathion), Insecticides.



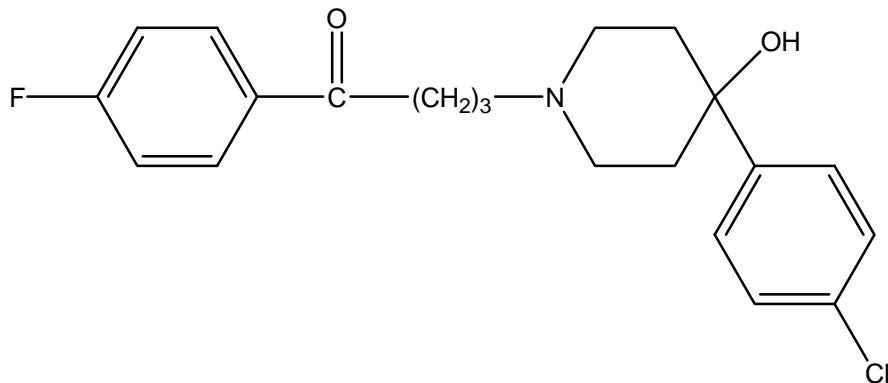
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1) Structure of Haloperidol (1 Mark)



Uses: (1 Mark)

1. Less sedative action
2. More effective in highly agitated and maniac patients
3. Treatment of schizophrenia
4. Treatment of psychosis and delirium

Q.2 Attempt any FOUR of the following: (Each question will carry THREE marks) (12)

a) Define and classify sulphonamides with examples

Sulphonamides- (1 Mark) These are also called as sulfa drugs. These are derivatives of sulphanilamide, synthetic antimicrobial agents contain sulphonamido (SO₂NH₂) functional group. They are useful in the treatment of gram positive and gram negative cocci, bacilli and protozoa.

Classification: (2 Marks)

1. Well absorbed, short and intermediate acting (Plasma t_{1/2}- less than 12 hrs.): Sulfadiazine, Sulfamethoxazole, sulfacetamide
2. Well absorbed, longer acting (Plasma t_{1/2}- more than 17 hrs.): Sulfadoxine, Sulfadimethoxine
3. Poorly absorbed sulfonamides for treatment of intestinal infection: Succinylsulfathiazole, phthalylsulfathiazole
4. Sulfonamides for ophthalmic infection: Sulfacetamide sodium, Sulfisoxazole diolamine



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5. Sulfonamides for burn therapy: Mafenide acetate, Silver Sulfadiazine.

OR

Chemical classification:

A) substituents on aromatic amino group.

e.g.-Prontosil.

B) Substituents on sulfonamido nitrogen.

e.g.- sulfadiazine, sulfamethoxazole.

C) Substituents on both amino & sulfonamido group.

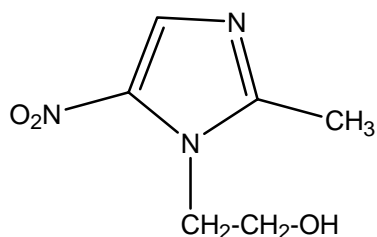
e.g.- succinylsulfathiazole, phthalylsulfathiazole.

D) Sulfas without aromatic amino group

e.g.- mafenide.

b) Draw structure, give chemical name and uses of Metronidazole.

Structure- (1 Mark)



Chemical Name- (1 Mark) 2-(2-Methyl-5-nitroimidazolyl)ethanol OR 1-(2'-hydroxy-ethyl)-2-methyl-5-nitro imidazole.



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Uses: (1 Mark)

1. It has antiprotozoal and antibacterial action
2. Used in the treatment of severe intestinal amoebiasis
3. It is active against anaerobic bacteria like streptococci and H-Pylori
4. It is a primary drug in the treatment of hepatic amoebiasis
5. Treatment of *Trichomonous vaginalis*, infection due to *entamoeba histolytica*, *giardia lamblia* etc

c) What are antifungal drugs? Write properties, storage condition and uses of Nystatin.

Antifungal drugs- (1 Mark) These drugs are used in the treatment of variety of fungal infection like candida, Epidermophyton, Microsporum, Trichophyton etc.

Properties of Nystatin: (1/2 Mark)

1. It is obtained from *Streptomyces noursei*.
2. It is a polyene antibiotic
3. Yellow to light brown hygroscopic powder
4. It has characteristic odour, very slightly soluble in water and alcohol

Storage condition: (1/2 Mark)

It should be stored below 5⁰C in air tight container, protected from light

Uses: (1 Mark)

1. It has wide range of activity against fungi and yeast
2. Treatment of candidal local infection of mucous membrane, skin, nails etc.
3. Pessaries are used in the treatment of vaginal candidiasis
4. Treatment of GIT candidiasis

d) Define Analeptics. Write properties and uses of caffeine

Analeptics: (1 Mark) Analeptics are central nervous system stimulants; it often stimulates respiratory centers and other vasomotor centers which maintain constriction of blood vessel wall. It also stimulate cardiac center. They are used in many forms of illness, both mental and physical, involve a depression of mood or mental activity.



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Properties: (1 Mark)

1. It occurs as white crystalline powder having bitter taste
2. It sublimes on heating
3. Sparingly soluble in water but very soluble in boiling water
4. It is a very weak base.

Uses: (1 Mark)

1. It stimulates CNS
2. It causes diuretic action
3. Vasodilation of peripheral muscles
4. Decreases drowsiness
5. Relieve mental fatigue and headache of certain kind like neuralgia, rheumatism, migraine etc.

e) Classify Adrenergic drugs. Draw structure of any one catecholamine.

Classification: (2 Mark)

1. Vasoconstrictors (Increases B. P.): Noradrenaline (Norepinephrine), Dopamine, Ephedrine
2. Cardiac stimulants: Dopamine, Adrenaline, Isoprenaline
3. CNS stimulants: Amphetamine
4. Smooth muscle relaxants: Adrenaline, Isoprenaline, Salbutamol etc.
5. Drugs used in allergic reactions: Ephedrine
6. Local vasoconstrictor/ nasal decongestants: Phenylephrine, Pseudoephedrine, Naphazoline
7. Anorectics (Decreases Appetite): Amphetamine, Phentermine.



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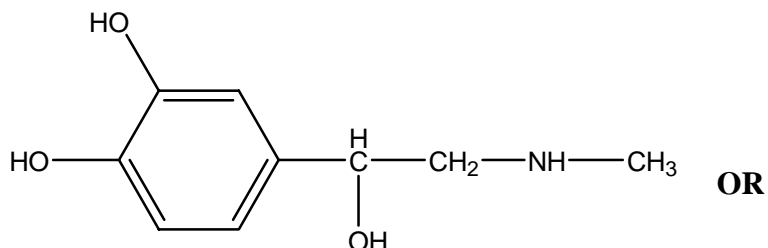
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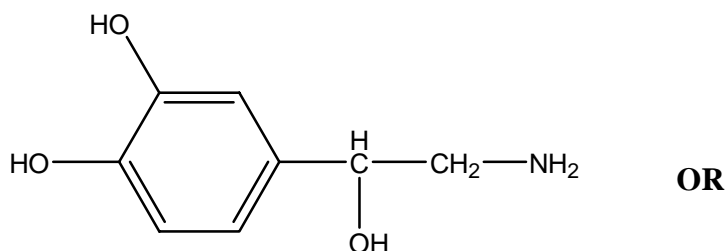
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Catecholamine: (Any one Structure will carry ONE mark)

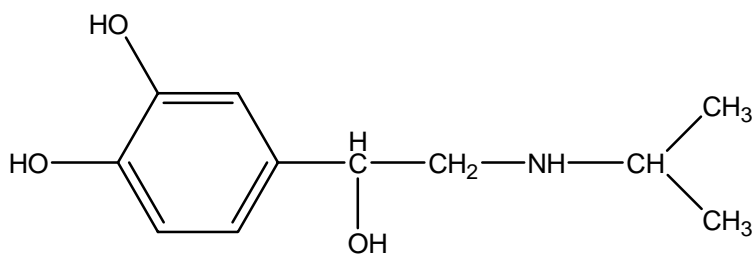
i) Adrenaline (1 Mark)



ii) Noradrenaline (1 Mark)



iii) Isoprenaline (1 Mark)



f) What are Narcotic analgesics? Give properties and therapeutic uses of Morphine.

Narcotic analgesics: (1 Mark) Narcotic analgesics are derivative of opium, psychoactive agents having potent analgesic activity and effective for the treatment of severe pain. Examples- Morphine, Codeine, Heroin etc.



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Properties: (1 Mark)

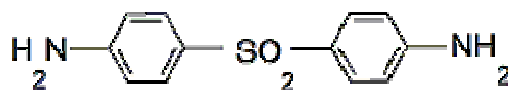
1. It is an important alkaloid of Opium
2. Opium contain 9-14% Morphine
3. It is obtained from Opium by various methods like extraction
4. It occurs as white needle shaped crystalline powder, having bitter taste
5. It is insoluble in water, ether and chloroform but soluble in alkali due to phenolic hydroxy.

Uses: (1 Mark)

1. Treatment of acute and chronic severe pain like fracture of longer bones, amputation of limbs in accident, labor pain etc.
2. It has sedative action so induces sleep in the presence of pain
3. Preanaesthetic medication in major surgery
4. Treatment of Diarrhoea
5. It suppress Whooping Cough
6. Treatment of acute left ventricular failure and pulmonary oedema.

Q3. Attempt any four (3 marks each)

a) Structure of Dapsone (1 mark)



Mechanism of action of Dapsone (1 mark)

- It acts as PABA antagonist due to its structural resemblance to PABA.
- It inhibits synthesis of folic acid in microbes resulting in the death of microbes.
- Thus Dapsone acts as competitive inhibitor of folic acid synthesis by blocking the uptake of PABA for folic acid synthesis.



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Uses of Dapsone (1 mark)

- Dapsone is used in combination with pyrimethamine in the treatment of malaria.
- Dapsone is the principal drug used in the treatment of all forms of leprosy.
- In addition to its use in leprosy, dapsone has been found of value in dermatitis herpetiformis and other dermatoses.

b) Uses of fat soluble Vitamins(1 mark each)

Vitamin A:-

- Vitamin A is used for treating vitamin A deficiency.
- Some people use vitamin A for improving vision and treating eye disorders including age-related macular degeneration (AMD), glaucoma and cataracts.
- It is also used to reduce complications of diseases such as malaria, HIV, measles, and diarrhea in children with vitamin A deficiency.
- Vitamin A is also used for skin conditions including acne, eczema, psoriasis, cold sores, wounds, burns, sunburn.

VitaminD:-

- Vitamin D is used for preventing and treating rickets, a disease that is caused by not having enough vitamin D (vitamin D deficiency).
- Vitamin D is also used for treating weak bones (osteoporosis), bone pain (osteomalacia), bone loss in people with a condition called hyperparathyroidism, and an inherited disease (osteogenesis imperfecta) in which the bones are especially brittle and easily broken.
- It is also used for preventing falls and fractures in people at risk for osteoporosis, and preventing low calcium and bone loss (renal osteodystrophy) in people with kidney failure.
- Vitamin D is used for conditions of the heart and blood vessels, including high blood pressure and high cholesterol.
- It is also used for diabetes, obesity, muscle weakness, multiple sclerosis, rheumatoid arthritis, chronic obstructive pulmonary disease (COPD), asthma, bronchitis, premenstrual syndrome (PMS), and tooth and gum disease.



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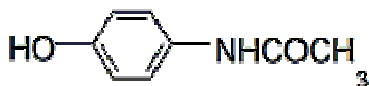
Vitamin K:-

- Vitamin K plays a key role in helping the blood clot, preventing excessive bleeding.
- Vitamin K is also used to counteract an overdose of the blood thinner Coumadin.
- While vitamin K deficiencies are rare in adults, they are very common in newborn infants. A single injection of vitamin K for newborns is standard.

Vitamin E:-

- Vitamin E is used for treating vitamin E deficiency, which is rare, but can occur in people with certain genetic disorders and in very low-weight premature infants.
- Some people use vitamin E for treating and preventing diseases of the heart and blood vessels including hardening of the arteries, heart attack, chest pain, leg pain due to blocked arteries, and high blood pressure.
- Vitamin E is also used for treating diabetes and its complications.
- It is used for preventing cancer, particularly lung and oral cancer in smokers; colorectal cancer and polyps; and gastric, prostate, and pancreatic cancer.
- Some people use vitamin E for diseases of the brain and nervous system including Alzheimer's disease and other dementias, Parkinson's disease, night cramps, restless leg syndrome, and for epilepsy, along with other medications.

c) Structure of Paracetamol (1 mark)



Properties of Paracetamol (1/2 mark)

- It occurs as white crystalline powder, odorless, less soluble in water, more soluble in boiling water, soluble in alcohol.
- Aqueous solutions are slightly acidic in nature.

Storage conditions of Paracetamol (1/2 mark)

- Reasonably stable to heat, light and moisture. Should be stored in well closed containers, protected from light.



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Uses of Paracetamol (1 mark)

- Paracetamol is used as a mild analgesic & antipyretic.
- It is commonly used for the relief of headaches and other minor aches and pains and is a major ingredient in numerous cold and flu remedies.
- In combination with opioid analgesics, paracetamol can also be used in the management of more severe pain such as post-surgical pain and providing palliative care in advanced cancer patients.

d) Definition of Tuberculosis (1 mark):- Tuberculosis (abbreviated as TB for *tubercle bacillus* or Tuberculosis) is a common and often deadly infectious disease caused by mycobacteria in humans mainly *Mycobacterium tuberculosis*.

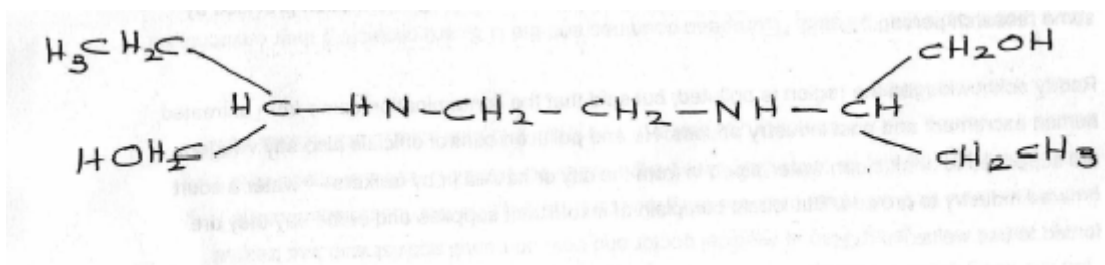
Tuberculosis usually attacks the lungs (as pulmonary TB) but can also affect the central nervous system, the lymphatic system, the circulatory system, the genitourinary system, the gastrointestinal system, bones, joints, and even the skin.(Extra pulmonary TB).

Drugs used in the treatment of tuberculosis (1 mark).

They are divided into two main classes.

- **“First-line”** agents, those with the greatest efficacy and acceptable degrees of toxicity used successfully in the great majority of cases; e.g. streptomycin, isoniazid, ethambutol, rifampin & pyrazinamide.
- **“Second-line”** drugs used in drug-resistant cases or those in which some other patient-related condition has compromised the effectiveness of primary therapy. e.g. ethionamide, aminosalicylic acid, kanamycin, cycloserine, capreomycin & viomycin. They have less efficacy & high toxicities.

Structure of Ethambutol (1 mark)





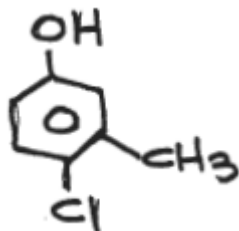
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d) Structure of Chlorocresol (1 mark)



Properties of Chlorocresol (1 mark)

- It is only slightly soluble in water.
- It is a colorless, white crystalline solid with phenolic odor.
- It is more soluble in alcohol.

Uses of Chlorocresol (1 mark)

- It is used as an antiseptic and preservative.
- For use as a disinfectant such as a hand wash, it is commonly dissolved in alcohol in combination with other phenols.
- It is a moderate allergen for sensitive skin.
- Used in 0.2% as bactericide in sterilization process.

f) Definition of cholinergic drugs (1 mark)

These are drugs that have the same effects as that of acetylcholine or produce these effects due to stimulation of parasympathetic nerves. Acetylcholinesterase inhibitors can also be included under this category.

Uses of Pilocarpine (1 mark)

- It stimulates the smooth muscles & gland cells that are innervated by cholinergic nerves.
- It is used as solution topically as miotic in glaucoma.
- Pilocarpine is often used as an antidote for scopolamine, atropine, and hyoscyamine poisoning.



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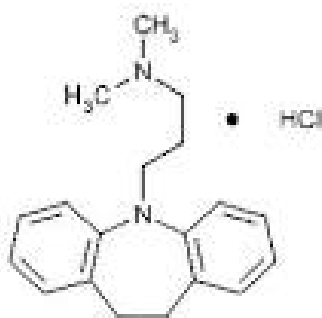
- Pilocarpine is also used to treat dry mouth (xerostomia) which can occur, for example, as a side effect of radiation therapy for head and neck cancers. Pilocarpine stimulates the secretion of large amounts of saliva and sweat.

Uses of Physostigmine (1 mark)

- Physostigmine is used to treat myasthenia gravis, glaucoma, Alzheimer's disease.
- It has a marked stimulatory action on the bowels, causes more secretion from the glands & more effect on blood pressure.
- A 0.1-1% solution is applied for glaucoma.
- Along with atropine, it is used to break adhesions between the iris & the lens.
- Sometimes, it is used for conditions of depressed intestinal motility.
- It is used in the form of solutions & injections.

Q4. Attempt any four (3 marks each)

a) Structure of imipramine (1 mark)



Uses of imipramine (1 mark)

- Imipramine is mainly used in the treatment of major depression and enuresis (inability to control urination).
- Imipramine is used in the treatment of depression, such as depression associated with agitation or anxiety.



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Brand names of imipramine (1 mark)

- ANTIDEP capsules.
- DEPSOL tablets.
- IMPRAMINE capsules.

b) Classification of antibiotics according to chemical structure:-

1) β -lactam antibiotics:- Examples- Penicillins, ampicillin, amoxicillin

Cephalosporins :- cephalothin, cephaloridine etc

2) Macrolides

Examples -Erythromycin, Azithromycin, Clarithromycin, Picromycin, Lincomycin.

3) Tetracyclines:

Examples-Tetracycline, Minocycline, Doxycycline, Lyme cycline

4) Aminoglycosides

Examples- Gentamicin, Amikacin, Streptomycin, Kanamycin, Neomycin, Paramomycin.

5) Polypeptide antibiotics

Examples include actinomycin, bacitracin, colistin, polymixinB.

6) Polyene antimycotics or polyene antifungal antibiotics

Amphotericin, nystatin and candicidin are examples of polyene antimycotics.

7) Ansamycins :-

The rifamycin group includes the "classic" rifamycin drugs as well as the rifamycin derivatives Rifampicin, rifabutin and Rifapentine.

8) Antibiotics derived from single aminoacid:-

Examples-Cycloserine & Choramphenicol



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9)Miscellaneous:-

Examples-fusidic acid, griseofulvin, novobiocin etc

Classification based on biogenesis

1) Derived from one aminoacid

e.g. chloramphenicol, cycloserine.

2) Derived from two aminoacids

e.g. penicillins, cephalosporins.

3) Derived from many aminoacids(polypeptides)

e.g. Bacitracin, colistin, polymyxin, capreomycin.

4) Derived from sugars

e.g. streptomycin, neomycins, kanamycins, tobramycin.

5) Derived from acetate or propionate units

e.g.tetracyclines, fusidic acid, erythromycin.

c) Definition of Antineoplastic drugs (1 mark)

These are chemotherapeutic agents used in treatment of malignant tumors or different types of neoplasms.

Uses of Cyclophosphamide (1 mark)

- The main use of cyclophosphamide is together with other chemotherapy agents in the treatment of lymphomas, some forms of leukemia and some solid tumors, also works by decreasing the immune system's response to various diseases.
- Its use is becoming more common in autoimmune diseases.



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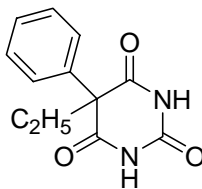
Uses of Methotrexate (1 mark)

- Methotrexate is the primary folate antagonist used as a chemotherapeutic agent.
- It may be used alone or in combination with other anticancer drugs.
- Methotrexate maintains its significant role as a treatment for breast cancer, osteogenic sarcoma, and leukemias.
- Administered orally or by i.v./ i.m. & intrathecal injection.

d) Hypnotics & Sedatives (1 mark)

- These are general CNS depressants.
- Hypnotics are drugs which induce sleep by depression of central nervous system function, while sedatives are the agents which reduce excitement & motor activity, & produce a calming effect without inducing sleep.
- Thus, small doses of hypnotics may act as a sedative, while large doses act as hypnotic agent.

Structure of Phenobarbitone (1 mark)



Chemical name (1 mark):- 5-ethyl, 5-phenyl barbituric acid

- e) Definition of General anaesthetics (1/2 mark):-**General anaesthetics are the agents which bring about loss of all modalities of sensation, particularly pain, along with a reversible loss of consciousness.



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General anaesthetics can be classified in to two types based on their route of administration

(2 marks):-

1) Inhalation anaesthetics:-, which include the liquids of volatile nature and gaseous substances used by inhalation to produce anaesthesia. These may be sub-classified as follows:

i) Volatile liquids:

(a) Halogenated hydrocarbons: e.g. Chloroform, Halothane, Trichloroethylene, Ethylchloride

(b) Ethers : e.g. Diethyl ether, Vinyl ether

ii) Gases: e.g. Cyclopropane, Nitrous oxide

2) Intravenous anaesthetics:-

i) Barbiturates: Ultra short acting barbiturates such as Methohexitone, Thiopentone sodium

ii) Non-barbiturates:

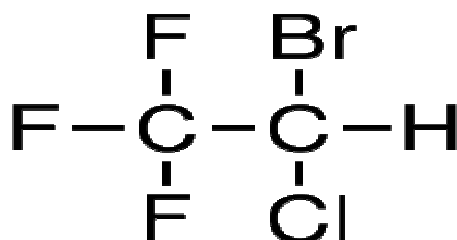
a) Eugenol derivatives. e.g. Propanidid

b) Phencyclidine derivatives. e.g Ketamine

c) Steroids. e.g. Althesin

d) Miscellaneous. such as Etomidate, Propofol

Structure of Halothane (1/2 mark):-





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e) Uses of Indigo carmine (1 mark)

- It is administered intravenously to test renal function (by estimating the rate of excretion in urine) & to locate the urethral orifices.
- In the lab it is used as coloring agents.

Uses of Evans Blue (1 mark)

- Evans Blue Dye (T-1824) is a di-azo compound and has been the principal method of determining blood volume in humans and animals for over eighty years.
- The dye combines firmly with plasma albumin when injected into the blood stream and leaves the circulation very slowly.

Uses of Congo Red (1 mark)

- Employed as a diagnostic aid in amyloidosis (In medicine, amyloidosis refers to a variety of conditions in which amyloid proteins are abnormally deposited in organs and/or tissues.)
- Also used as an indicator in lab.



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Q5) Attempt any Four of the following:

(12)

a) Define coagulants and anticoagulants. Enlist two coagulants and two anticoagulants

Ans:- Coagulants (01 Mark)

Coagulants are the agents which bring about coagulation of blood. They are employed in the treatment of hemorrhagic or threatened hemorrhagic conditions. Such hemorrhagic conditions are caused by many factors, such as platelet defects, plasma coagulation disorder, excessive use of anticoagulant therapy etc.

Anticoagulants :- (01 marks)

The drugs which are able to prolong coagulation time of blood are called anticoagulants. They are used prophylactically and therapeutically in treatment of thrombo-embolic occlusive vascular diseases like venous, thrombosis, pulmonary embolism, and cardiac infarction. They are also used to prevent thrombosis during and after surgical operation, during blood transfusion process & in preservation and storage of blood in blood banks.

Example of coagulant: (1\2 marks)

Dried thrombin

Thrombin

Human fibrinogen

Protamine sulphate

Menadione

Anticoagulants :- (1\2 Marks)

Heparin

Dicoumarol

Nicoumalone

Phenindione

Warfarine



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(b) Differentiate general anaesthesia and local anaesthesia. Write the advantages of lignocaine over procaine.

Ans. (02 marks for differentiation, 01 mark for advantages)

GENERAL ANASTHESIA	LOCAL ANAESTHESIA
1. General anesthesia is produced by depressing central nervous system to such an extent that all sensitivity to pain or feeling is lost with reversible loss of consciousness all over body.	In local anesthesia whole body is not affected but only a part of body is made insensitive to pain or feeling
2. General anesthesia is induced either by inhalation of volatile & gaseous anesthetics like diethyl ether, halothane or parenteral administration of intravenous anesthetics like thiopentone sodium.	Local anesthesia is induced by topical application of drugs to skin or mucous membrane (surface anesthesia) or by injection into area subjected to surgical operation (infiltration anaesthesia) or injection into dual membrane of spinal cord (spinal anesthesia)
3. General anaesthesia is produced before carrying out surgical operation or in obstetrics.	Local anaesthesia is produced in short surgical procedures & in dentistry.
4. Care of Vital organs essential	Care of Vital organs is not essential
5. E.g. halothane ,cycloprapane etc.	E.g. procaine, lignocaine, benzocaine

Advantages of lignocaine over procaine:- (1 Mark)

- 1) Lignocaine is extremely resistant to hydrolysis.
- 2) Lignocaine produces rapid onset of action as its penetration across cell membrane is good as compared to Procaine.
- 3) It has prolonged duration of action than those of procaine.

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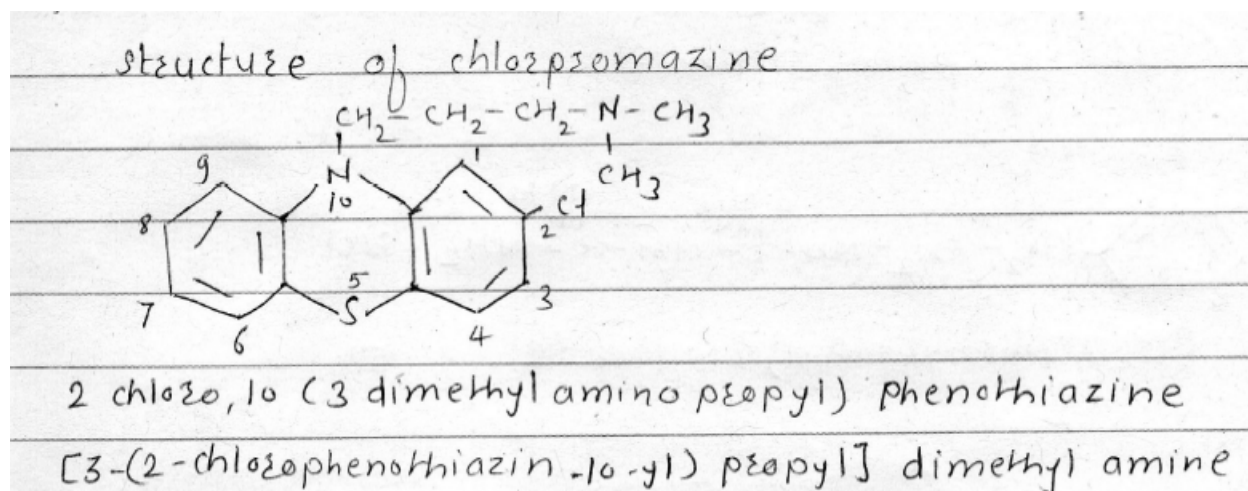
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C) Give the Structure, chemical name and uses of chlorpromazine hydrochloride.

Ans: - (each question bit carries 1 mark)

Structure of chlorpromazine (1 Mark)



Chemical Name: - 2 chloro, 10-(3dimethylamino-propyl) phenothiazine (1 Mark)

OR

(3 (2-chlorophenothiazine-10-yl) propyl) dimethylamine.

Uses of chlorpromazine:- (1 Mark)

Chlorpromazine is a prominent antipsychotic agent.

- 1) It is mainly used to control hyperkinetic states and aggression.
- 2) It is used in the treatment of anxiety, tension, agitation, emotional disturbances
- 3) It is also antiemetic and is therefore used to control nausea & vomiting of a variety of diseases.
- 4) It is also used in the alleviation of intractable hiccup.
- 5) It is generally given alone or in combination with pethidine and something promethazine as Premedication for surgical or diagnostic procedures.
- 6) It is also used as an adjunct in the treatment of tetanus and is given for controlling acute intermittent porphyria.



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D) What is epilepsy? Classify anti-convulsant drugs with examples.

Ans :- (definition 01 mark, classification 2 marks)

Epilepsy is a disease which arises due to the disorders of control nervous system. This disease is characterized by somewhat more or less frequent recurrence of seizures in which there occur convulsions or other abnormal body movements, which are accompanied by loss or disturbance in consciousness.

Anticonvulsants are the drugs which prevent or control convulsions.

These drugs are classified on chemical basis as

- 1) Barbiturates: - Barbitone sodium, Phenobarbitone, Methyl phenobarbitone.
- 2) Hydantoins :- Phenytoin, mephenytoin
- 3) Oxazolidinediones :- Troxidone (or timenthadione), Paramethadione
- 4) Succinimides :- Ethosuximide, Phensuximide
- 5) Miscellaneous :-
Primidone, Carbamazepine, Clonazepam, Sodium valproate, Sulthiame, Progabide.

e) Define anti-thyroid drugs. Give its classification and draw structure of any one drug.

Ans :- (Each question bit carries 01 marks)

Definition of Antithyroid drugs (01 mark):-

These are the drugs which are able to reduce the synthesis of thyroxine and liothyronine and therefore find use in the treatment of hyperthyroidism & thyrotoxicosis. Their action is probably due to interference with incorporation of iodide into thyroglobulin in thyroid gland, thereby reducing the synthesis of the hormones.

e.g:- propylthiouracil & carbimazole

Classification :- (01 mark)

- 1 Iodide ions :- Inorganic iodides
- 2 Thioamides :- Propylthiouracil, Methylthiouracil Carbimazole, Methimzole.
- 3 Aromatic amines & phenols - Sulphaguanidine, PAS
- 4 Lithium salts: - Lithium carbonate



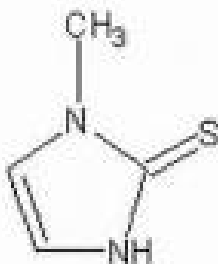
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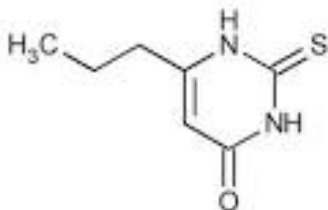
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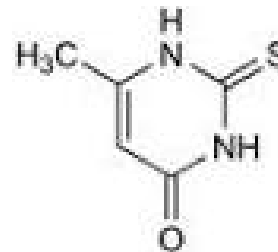
Structure of any one drug (01 mark)



Methimazole OR



Propyl Thiouracil OR



Methyl Thiouracil

F) Explain the role of sex hormones in body. Write the uses of testosterone.

Ans: - Role of sex hormones (02 marks)

- Sex hormones are the hormones which are produced mainly in gonads, ovaries or testes. They influence the development and directly or indirectly associated with reproduction. Three main types of sex hormones are

- 1 Androgenic or anabolic steroids
- 2 Oestrogens
- 3 Progestogens.

- The androgens are mainly able to maintain the development and maintenance of the secondary male sex characters, thereby increasing virility and libido

- The androgens are also able to increase nitrogen and water retention and stimulate skeletal growth.

- Oestrogens influence development and maintenance of secondary female sex characters. These are also able to control cyclic changes to which uterus and vagina are subjected during menstrual cycle. They are also essential for maintenance of pregnancy. They also exert anabolic effect on protein metabolism & water retention.

- Progestogens are necessary for various changes takes place in uterus & vagina during menstrual cycle, for developing mammary tissue and for maintain pregnancy.

Uses of testosterone (01 mark)

- 1) Used in male for replacement therapy in hypogondism, eunuchoidism and delayed puberty in adolescent males.
- 2) Used in treatment of gynaecomastia.



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- 3) Used in palliative treatment of disseminated breast cancer in postmenopausal women.

Q.6 Attempt any FOUR of following.

(a) Define & classify cardiovascular drugs.

Ans. (01 mark for definition, 03marks for classification)

Cardiovascular agents:- Cardiovascular agents represents a group of drugs which have direct action on heart or other parts of vascular system so that they modify the total output to the heart or the distribution of blood to certain parts of circulatory system. These drugs are used in the treatment of various cardiac diseases like hypertension, angina pectoris, arrhythmia, CHF, myocardial infarction etc.

Different kinds of drugs included in this category are:-

1) **Cardiotonic drugs :-**(Positive cardiac inotropic drugs which increase the force of muscle contraction without increasing oxygen consumption capacity of heart) e.g. cardiac glycosides obtained from Digitalis stropanthus like Digoxin, Digitoxin, Lanatoside etc.

2) **Antiarrhythmic agents:-**(used for modification of cardiac rate & rhythm)

e.g. a) Membrane stabilizing agent: - e.g. Quinidine, Procainamide, Diisopyramide, Phenytoin

b) Beta blockers: - e.g. Propranalol

c) Drugs that prolong the duration of action potential:- e.g.Amiodarone

d) Calcium channel blocker:-e.g. Verapamil

3) **Antianginal agents: -** (used in the treatment of angina pectoris, enabling the heart to meet its metabolic demands for oxygen)

a) Organic nitrates –Amyl nitrate, Isosorbidnitrate

b) Calcium channel blocker:-e.g. Verapamil

c) Beta blockers:- e.g. propranalol



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4) Antihypertensive drugs: - (which regulate blood pressure):-

- a) Centrally acting drugs:- e.g. alpha-methyl dopa, clonidine
- b) Ganglionic blockers e.g. Pentolinium, Mecamylamine
- c) Adrenergic neurone blockers e.g. Reserpine, Guanethidine
- d) Beta blockers: - e.g. Propranolol, Atenolol
- e) Alpha blockers: - Prazocin, Tolazoline
- f) Direct acting vasodilators e.g. Hydralazine, Minoxidil
- g) Calcium channel blocker:-e.g. Verapamil, Diltiazem, Nifedipine
- h) Angiotensin converting enzyme inhibitors:-Captopril, Enalapril

5) Antihyperlipidemic drugs:-e.g. Clofibrate, Nicotinic acid

6) Antithrombotic e.g. Urokinase

7) Anticoagulants:-Heparin

8) Antiplatelet agents:-Aspirin

9) Diuretics:-Frusemide, Thiazides

(b) What is DIABTES MELLITUS? Enlist various drugs used in its treatment. Give structure of Phenformin.

Ans. (Definition 01 mark, Classification 02 marks and Structure 01 mark)

Diabetes Mellitus: - Diabetes Mellitus is a condition characterized by hyperglycemia (excessive sugar in blood, than the threshold value) & glucoseuria (presence of sugar in urine).The disease is caused by deficiency of insulin, a protein hormone secreted by beta cells of islets of langerhans, responsible for proper carbohydrate metabolism.



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Classification:-

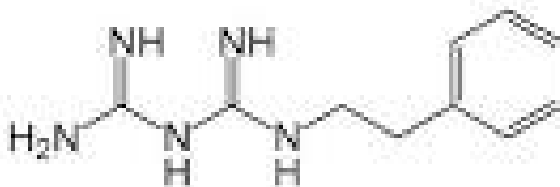
1) Parenteral Hypoglycemic (Insulins)

- a. Short acting Insulin- Neutral or plain insulin
- b. Intermediate acting insulins –Isophane Insulin, Lente Insulin
- c. Longer acting Insulin- Ultralente Insulin

2) Oral hypoglycemics:-

- a. Sulphonyl ureas:- Tolbutamide, Chlorpropamide etc
- b. Biguanides:- Phenformin, Metformin
- c. Thiazolidinediones: - Rosiglitazone, Pioglitazone
- d. Miscellaneous:- Acarbose, Miglitol

Structure of phenformin:-



(C) Define anti malarial drugs. Give the structure, chemical name & uses of chloroquine.

Ans:-Anti malarial drugs (01 mark):- The drugs which are used in the treatment of malaria caused due to Plasmodium Species like Plasmodium Vivax, P. falcifrum, P.malariae, P. ovale are called as Anti malarial drugs.e.g. Quinine, chloroquine, amodiaquine



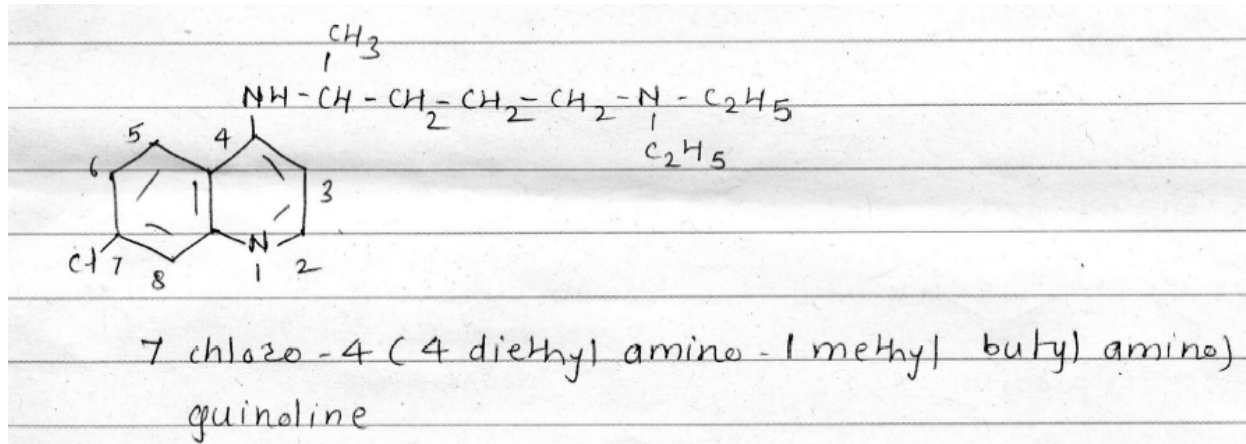
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Structure of chloroquine (01 mark):-



Chemical name (1 mark):-7chloro-4(4-diethylamino-1methyl butyl) amino quinoline

Uses :- (1 mark)

- 1) It has rapid schizonticidal effect so used to suppress & cure malaria
- 2) Used in treatment of amoebic hepatitis
- 3) In the treatment of discoid & systemic lupus erythomatosus & rheumatoid arthritis
- 4) In the treatment of giardiasis

(d) What are sympatholytics? Write structure & uses of any one beta-blocker. Why they are contradicated in bronchial asthma.

Ans: (Each question bit carries 01 mark)

Sympatholytics: (1 Mark) The drugs which block response to endogeneous or exogeneous circulating epinephrine or which block response to adrenergic nerve stimulation or which prevent release of adrenergic transmitter substance at sympathetic nerve endings are called as Sympatholytics or antiadrenergic drugs. Examples- Proparnalol, Practolol, Tolazoline, Phentolamine



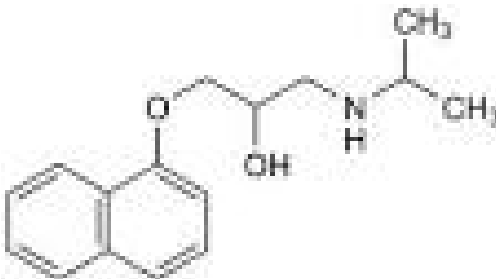
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Structure of Propranolol (Beta blocker):- (1 Mark)



Uses:- (1 Mark)

- 1) Cardiac arrhythmia
- 2) Arterial hypertension
- 3) Angina pectoris

Reason: (1 Mark)

Beta-1 receptors are present in heart while Beta-2 receptors are present in Bronchial muscles. Beta blockers can block beta-2 receptors in bronchi leading to broncho constriction; hence they are contraindicated in bronchial asthma.

(e) What are diuretics? Classify diuretics with examples. Draw structure of Frusemide.

Ans. (01 mark for definition, 02 marks for classification, 01 mark for structure)

Diuretics: (1 Mark)

Diuretics are the agents which promote excretion of water & electrolytes by the kidney.

Classification:- (2 Marks)

- 1) Water & Osmotic agents-
 - a) Electrolytes:-Sodium & Potassium salts
 - b) Non electrolytes:- Mannitol, Urea
- 2) Organic mercurials:- Mersalyl acid
- 3) Acidifying agents:-Ammonium chloride, Arginine hydrochloride
- 4) Alpha-beta unsaturated ketones:- Ethacrynic acid
- 5) Purinase & related compound: Caffeine



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- 6) Sulphonamides:-
 - a) Carbonic anhydrase inhibitors-e.g. Acetazolamide
 - b) Benzothiadiazines: - Chlorthiazide, Hydrochlorthiazide
 - c) Sulphamoyl benzoic acid derivatives e.g. Frusemide
- 7) Endocrine antagonists: (aldosterone antagonists) e.g. Spironolactone
- 8) Miscellaneous agents: - Trimaterene

OR

Diuretics can also be classified as

1) Weak diuretics –

- a) Osmotic diuretics:- Sodium & Potassium salts
- b) Xanthine deri.:- Aminophylline
- c) Carbonic anhydrase inhibitors-e.g. Acetazolamide

2) Moderately efficacious diuretics: -

- a) Osmotic diuretics: - Mannitol, Sucrose, Glycerol
- b) Benzothiadiazines deri.- Chlorthalidone, Chloroxozone

3) Very efficacious diuretics (High ceiling diuretics) e.g. Frusemide & Ethacrynic acid

4) Potassium sparing diuretics:

- a) Aldosterone antagonists: - Spironolactone
- b) Renal epithelial sodium channel inhibitors: - Trimaterene, Amiloride



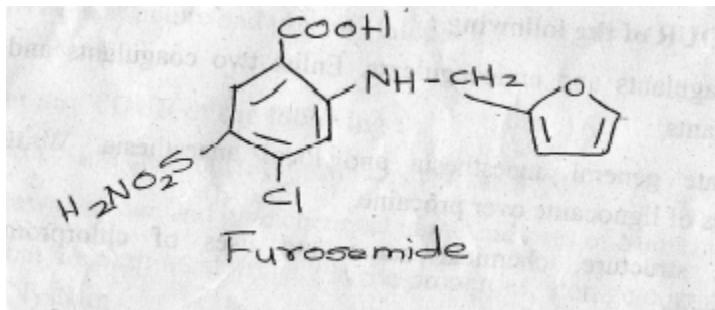
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Structure of frusemide:-



f) Define and classify anti-histaminic drugs. Draw the structure of chlorpheniramine.

Ans :- (01 marks for definition, 02 marks for classification, 01 marks for the structure)

Definition - Antihistamines: (1 Mark)

Antihistaminic drugs are the agents which diminish or prevent several actions of histamine in the body like allergic reaction, rhinitis, urticaria, mild asthma etc.

Classification:- (2 Marks)

1) **H1 receptor antagonist :-**

- a) Amine alkylethers : Diphenhydramine
- b) Ethylenediamines : Mepyramine , Tripeleennamine
- c) Alkyl amines: - Pheniramine, Chlorpheniramine, Bromopheniraimine, Triprolidine.
- d) Phenothiazine derivatives :- Promethazine, Trimeprazine
- e) Piperazine derivative :- Cyclizine, Chlorcyclizine, Meclizine, Buclizine,
- f) Miscellaneous: - Cyproheptadine, Diphenylpyraline, Phenindamine tartarate, Antazoline.

2) **H2 receptor antagonist: -** Cimetidine, Ranitidine, Burimamide, Metiamide.



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Structure of chlorpheniramine. (1 Mark)

