



WINTER- 14 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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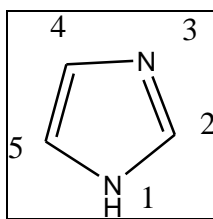
Q.1 Attempt any five of the following (5X4)

(20)

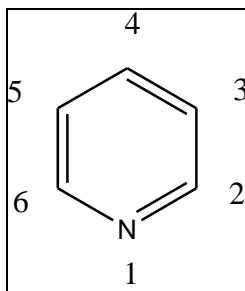
A) Write the structure and numbering of (any four)

(One mark to each structure with numbering)

a) Imidazole



b) Pyridine



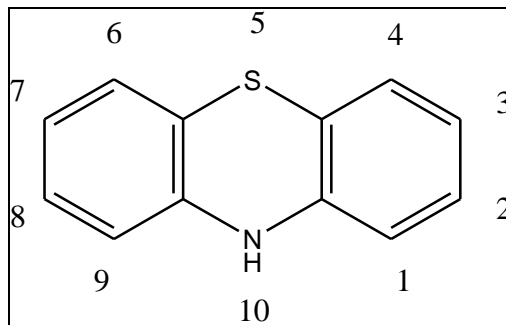
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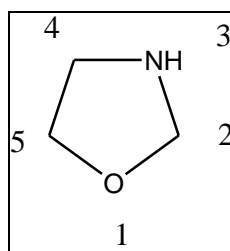
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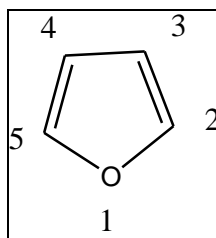
c) Phenothiazine



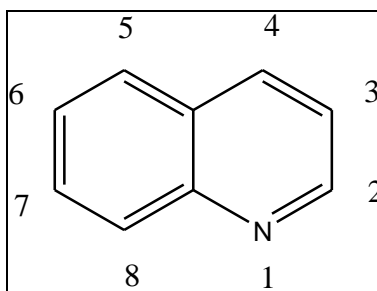
d) Oxazolidine



e) Furan



f) Quinoline





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B) Write the name of drugs containing following heterocyclic rings (any four)

(One mark to each drug)

a) **Acridine**- Proflavine

b) **Indole**- Indomethacin

c) **Barbituric acid**-Phenobarbitone

d) **β -lactum**- Penicillins (e.g.-Penicillin G, Penicillin V, Ampicillin etc.), Cephalosporins

e) **Pyrazine**- Pyrazinamide

f) **Benzodiazepine**- Diazepam, Oxazepam, Nitrazepam etc.

C) Define the following terms (any four)

(One mark for each definition)

a) **Analgesics:** Analgesics are the drug which reduces or eliminates pain. OR

The term analgesics refer to altered behavioral response to pain with decreased ability to perceive pain without loss of consciousness.

b) **Antihypertensive:** The drugs which are used to regulate the blood pressure by decreasing the elevated blood pressure or hypertension are called as antihypertensive.

c) **Antibiotics:** Antibiotics are chemical substances produced by certain species of microorganisms and having the property of inhibiting the growth of or destroying other microorganisms in high dilutions or low concentration.

d) **Disinfectants:** Disinfectants are agents which are applied on inanimate objects & kill the microbes outright.

e) **Sympathomimetics:** Drugs that mimic the responses obtained as a result of stimulation of the sympathetic or adrenergic nerves are called as Sympathomimetic agents or adrenergic agents.



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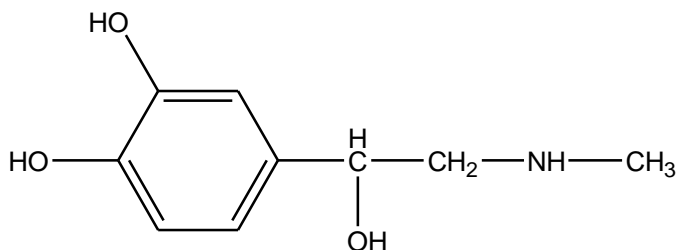
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f) **Hypnotics:** Hypnotics are drugs which induce sleep by depression of central nervous system function.

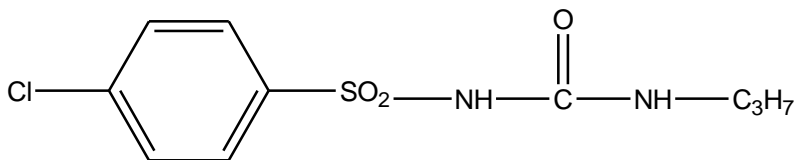
D) Give structures of (any four)

(One mark for one structure)

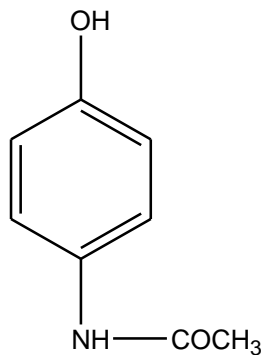
a) Adrenaline



b) Chlorpropamide



c) Paracetamol





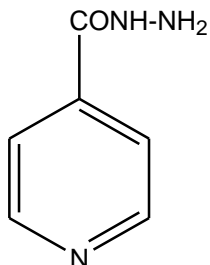
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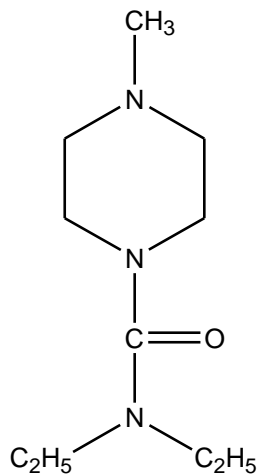
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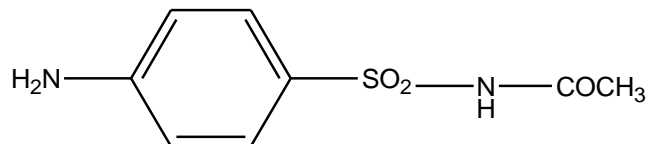
d) Isoniazid



e) DEC



f) Sulfacetamide





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E) Give uses of (any four)

(One mark to any two uses of each drug)

a) Testosterone

1. It has both androgenic and anabolic activity. Its primary use is as androgen replacement therapy in men at maturity age in case of testosterone deficiency.
2. It is useful in certain anemia, osteoporosis and to stimulate growth in undergrown boys.
3. It is used to increase athletic performance and maintain muscle tone.
4. It is used in palliative treatment of disseminated breast cancer in postmenopausal women.
5. It is useful in the treatment of gynecomastia.

b) Warfarin

1. Warfarin is categorized as an anti-coagulant.
2. It prolongs the coagulation time of blood and prevents coagulation.
3. It is useful in a no. of clinical conditions such as venous thrombosis, pulmonary embolism and myocardial infarction.
4. Useful as prophylactic to prevent thrombosis during and after surgical operations.

c) Nystatin

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) Chlorocresol

1. It is used as an antiseptic and preservative.
2. It is also used as disinfectant. It is commonly dissolved in alcohol in combination with other phenols.



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e) Procaine

1. It is used in dentistry as a local anesthetic.
2. It is used primarily to reduce the pain of intramuscular injection of penicillin.
3. It is also used therapeutically as an anti-inflammatory drug.

f) Caffeine

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

F) Give brand names of (any four)

(One mark to any one brand of each drug)

a) Phenytoin: Dilantin, Epilan, Eptoin etc.

b) Thyroxin: Eltroxin, Roxin, Thyrox etc.

c) Frusemide: Lasix, Fru, Frusenex, Tebemid etc.

d) Phenformin: DBI, Azucap, Diabis, Retardo, Dibotin etc.

e) Ibuprofen: Ibugesic, Brufen, Ibuspan SR, Ibuflamar etc.

f) Chlorpheniramine : Febrex plus, Fendyl, Cadinstin, Polaramine, etc.



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G) Name any two drugs used in following diseases (any four)

(One mark to any two drugs of each disease)

- a) **Malaria:** Chloroquine, Primaquine, Pentaquine, Pyrimethamine, Trimethoprim, etc.
- b) **Glaucoma:** Pilocarpin, Timolol, etc.
- c) **Thrombosis:** Heparin, Dicumarol, Warfarin etc.
- d) **Allergy:** Diphenhydramine, Pheniramine, Chlorpheniramine, Promethazine, Cetirizine etc.
- e) **Asthma:** Isoprenaline, Salbutamol, Terbutaline etc.
- f) **Amoebiasis:** Emetin, Metronidazole, Tinidazole, Ornidazole, Diloxanide furoate, Iodochlorhydroxyquin etc.

Q.2 Attempt any three of the following (3X4)

(12)

A) Classify antihypertensive drugs with suitable examples.

(Four marks to classification)

1. Drugs acting centrally- Alpha methyl dopa, clonidine
2. Ganglionic blockers- hexamethonium chloride, Mecamylamine
3. Drugs acting on post ganglionic sympathetic nerve ending
 - a) Adrenergic neuron blockers- Guanethidine
 - b) Catecholamine depletors- Reserpine
4. Adrenergic blockers
 - a) Alpha blockers- Prazocine, Phentolamine, Phenoxybenzamine



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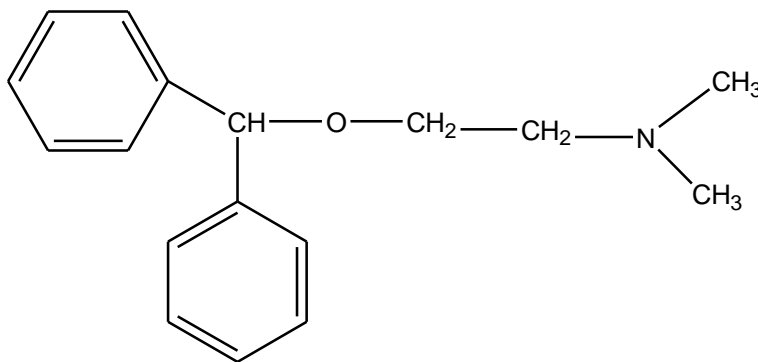
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- b) Beta blockers- Propranolol, Atenolol, Metaprolol, Timolol
- c) Alpha+ Beta blockers- Labetolol
5. Vascular smooth muscle dilators- Sodium Nitropruside, Hydralazine
6. Calcium channel blockers- Verapamil, Nifedipine, Diltiazem, Amlodipine etc
7. ACE Inhibitors- Captopril, Enalapril, Lisinopril etc.
8. Diuretics- Chlorthiazides, Frusemide etc.

B) Write structure, chemical name, uses and brand names of Diphenhydramine.

(One mark to each sub question)



Chemical name: 2-(Diphenylmethoxy)-N,N-dimethylethanamine.

Uses: 1. Diphenhydramine is an antihistaminic agent.

2. It is used in various allergic conditions.
3. Orally and intravenously it is useful in the treatment of urticaria, hay fever, bronchial asthma.
4. Treatment of common cold and it is a constituent of cough mixtures.



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5. It has pronounced sedative properties, antiemetic action.
6. It is also used to control parkinsonian symptoms.

Brands: Benadryl, Bronolex, Abcof, Allergin, Amidryl etc.

C) Define and classify antineoplastic drugs with suitable examples.

(One mark to definition and three marks to classification)

Definition: Antineoplastic agents, also known as cytotoxic agents are used in the treatment of malignant diseases when surgery or radiotherapy is not possible or has proved ineffective. It is also employed as an adjunct to surgery or radiotherapy. In short, antineoplastic drugs are used in the treatment of various types of cancers.

Classification:

- i) Alkylating agents- eg. Chlorambuil, Busulphan, Cyclophosphamide etc.
- ii) Antimetabolites- eg. Azathioprine, Fluorouracil, Methotrexate, Mercaptopurine
- iii) Antitumor antibiotics- eg. Actinomycin-D, Mitomycin-C, Daunorubion
- iv) Hormones and related compounds- eg. Adrenocorticosteroids. Androgens, Estrogens etc.
- v) Plant products (Vinca alkaloids)- eg. Vinblastine, Vincristine
- vi) Radioactive isotopes- eg. Radioiodine, Radiophosphorous
- vii) Miscellaneous- eg. Hydroxyurea, Procarbazine, Cisplatin etc.



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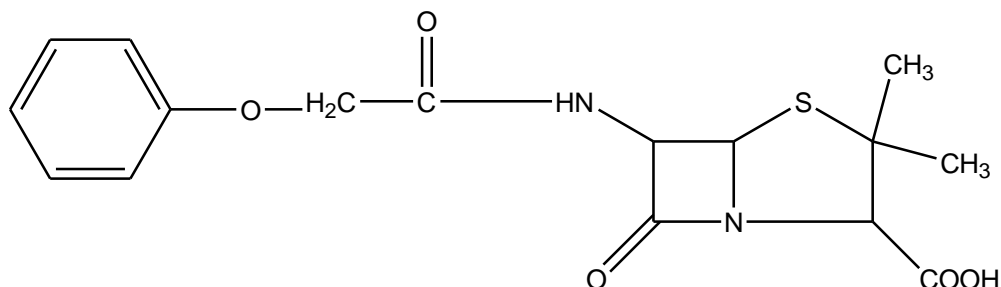
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D) Write structure, chemical name, uses and brand name of Penicillin V

((One mark to each sub question))



Chemical name: (6R)-6-(2-Phenoxyacetamido) penicillanic acid

OR Phenoxy methyl Penicillin

Uses: 1. It is used as an antibiotic for several infections.

2. It is useful in infection caused by Streptococcus pneumonia, Streptococcus pyogenes, Species of Neisseria, Actinomyces and Clostridium etc.

3. It is also used to treat infections caused by anaerobes, in meningococcal infection, in gonococcal infections and in syphilis.

4. It is used prophylactically in the infection caused by gonorrhoea.

5. Treatment of Pharyngitis, skin infection etc.

Brands: Kaypen, Apopen, Fenacillin, V-Cil, Vebecillin etc.



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E) What do you mean by hypoglycemic agents? Give source, stability, storage, uses and pharmaceutical formulations of Insulin.

(One mark to definition, uses and formulations. Half mark each to source and stability)

Hypoglycemic agents are the drugs that decrease the level of glucose in the blood and are used in the treatment of diabetes mellitus characterized by hyperglycemia, glycosuria, polyuria, polydypsia etc.

Source: Traditionally insulin has been obtained from bovine and porcine pancreas. Insulin for human use is obtained by chemical conversion of porcine insulin. Recently, human insulin has been biotechnologically processed through cultures of E. coli bacteria and is known as Humalin.

Stability: Insulin is soluble in water but undergoes molecular aggregation at extreme pH 3.2 and 10. In presence of zinc aggregation is further encouraged as it brings about crystallization of insulin. It is relatively insoluble at pH 4 to 7. It can combine with zinc, which helps preservation of its activity and prolongation of its duration of action.

Although manufacturers recommend storing insulin in the refrigerator, injecting cold insulin can sometimes make the injection more painful. To avoid this, many providers suggest storing the bottle of insulin you are using at room temperature. Insulin kept at room temperature will last approximately 1 month.

Uses: 1. Insulin cannot be given orally and is effective only through injection. Insulin has many effects on metabolic processes. Insulin affects skeletal and heart muscle, adipose tissues, the liver, lens of the eyes and leukocytes.

2. The main use of insulin is treatment of diabetes mellitus caused due to pancreatic disease.

3. It is also useful in hyperkalemia and in schizophrenia.



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Pharmaceutical formulations:

- 1) Insulin injection
- 2) Insulin injection biphasic
- 3) Neutral insulin injection
- 4) Globin zinc insulin injection
- 5) Isophane insulin injection
- 6) Protamine zinc insulin injection

Q.No. 3. Attempt any three of the following (3X4)

A) Give storage conditions for

- a) **Cyclopropane**
- b) **Diethyl Ether**
- c) **Glyceryl Nitrate**
- d) **Thrombin**

Ans:-[One mark for each compound. Total 1X4 = 4 marks]

- a) Cyclopropane: - It is stored in metal cylinder designed to hold compressed gases and kept in a cool room free from inflammable material. The whole cylinder is painted orange.
- b) Diethyl Ether: - It is oxidized by atmospheric oxygen and is affected by light. Hence it is stored in tightly closed, light resistant containers in a cool place. If cork is used as a closer than it should be protected with metal foil. An antioxidant like hydroquinone or propyl gallate in suitable proportion should be added.
- c) Glyceryl Nitrate: - It should be stored in tightly closed container, protected from light in a cool, dry place.



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d) Thrombin: - It is affected by air, heat and light. Hence it is stored in the atmosphere of nitrogen, in glass containers which are sealed so as to exclude microorganisms and moisture. The containers are kept at a temperature between 2° and 8° C and are protected from light. It may contain suitable bactericide.

B) Classify diuretics and give structure and two brand names of hydrochlorothiazide.

Ans: - [02 marks for Classification, 01 mark each for structure and two brand names]

Chemical Classification of Diuretics- Method I

1. Cyclic polynitrogen compounds:
 - a) Xanthine derivatives – e.g. Aminophylline, Theophylline
 - b) Pteridine derivatives--e.g. Triamterene
 - c) Pyrazine derivatives – e.g. Amiloride
2. Organomercurials – e.g. Mersalyl , Mercaptomerin.
3. Sulphonamides :
 - a) 1, 3, 4-thiadiazole derivatives – e.g. Acetazolamide
 - b) Sulphamyl benzoic acid derivatives – e.g. Frusemide,
 - c) Thiazides and hydrothiazides - e.g. Hydrochorthiazide
4. Steroidal aldosterone antagonists or endocrine antagonist – e.g. Spironolactone
5. Phenoxyacetic acid derivative or α or β – unsaturated ketones. – e.g. Ethacrynic acid
6. Miscellaneous diuretics –e. g. Mannitol, Urea, Ammonium chloride, arbutin



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OR Method -II

1. Weak diuretics
 - a. Osmotic diuretics- Urea, sodium and potassium salts
 - b. Non electrolytes- Mannitol
 - c. Carbonic Anhydrase Inhibitors (CAI)- Acetazolamide, Methazolamide etc.
 - d. Xanthine derivatives- Caffeine
2. Moderatly potent diuretics: Chlorothiazides, Hydrochlorothiazides, Benzothiazides etc,
3. Very potent/ loop/ high ceiling diuretics: Frusemide, Ethacrynic acid
4. Potassium sparing diuretics: Triamterene, Amiloride
5. Aldosterone blocking agents- Spironolactone,
6. Antidiuretic hormone: Lithium salts
7. Other: Ammonium chloride, calcium chloride etc.

OR Method- III

- 1] Water & Osmotic diuretics: Mannitol and Urea
- 2] Carbonic anhydrase inhibitors (sulfonamides): Acetazolamide, Methazolamide
- 3] Acidifying drugs: Ammonium chloride.
- 4] Mercurial agents: Mercaptomerin
- 5] Thiazides diuretics: Chlorothiazide, Chlorothalidone, Hydrochlorothiazide



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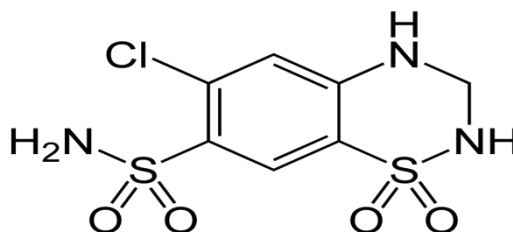
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6] Miscellaneous

- K- sparing diuretics- e.g. Triamterene, amiloride
- Aldosterone antagonist- e.g. Spironolactone
- High ceiling diuretics/ Loop diuretics
- E.g. Furosemide, Ethacrynic acid

Structure of Hydrochlorthiazide :



Brand Names of Hydrochlorthiazide :- Aquazide, Hydride, Biduret, Esidrex, Cidrex, Direma, Diuril, Fluvin , Hydril, Nefrix, Oretic, Panurin, Vetidrex, etc.

C) Define and Classify antitubercular drugs. Write structure and Chemical name of PAS.

Ans: [One mark for each sub question]

Definition: An agents which are used for treatment of Tuberculosis caused by Mycobacterium tuberculosis, are called antitubercular agents.

Classification of Antitubercular agents:

1. Synthetic drugs:

Para Amino Salicylic acid (PAS), Isoniazid, Ethambutol, Pyrazinamide, Ethionamide etc.



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2. Antibiotics:

Streptomycin, Cycloserine, Rifampin etc.

OR

1. First line drugs: Rifampin, Isoniazid, Streptomycin, Pyrazinamide, Ethambutol.

2. Second line drugs: Para Amino Salicylic acid (PAS), Ethionamide, Cycloserine

3. Third line drugs: Clarithromycin, Thiacetazone etc.

OR

i) p-amino salicylic acid derivative – e.g. PAS

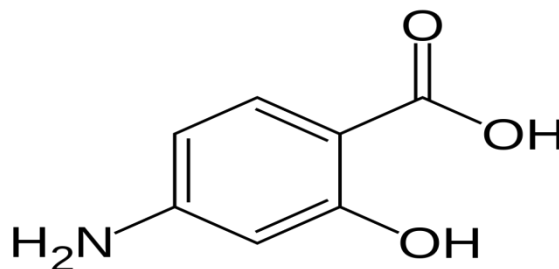
ii) Pyridine derivatives – e.g. Isoniazid, Ethionamide

iii) Pyrazine derivatives- e.g. Pyrazinamide

iv) Ethylene diamine derivatives – e.g. Ethambutol

v) Antibiotics – e.g. Cycloserine, Streptomycin, Rifampicin

Structure of PAS :



Chemical name of PAS: 4-amino-2-hydroxy-benzoic acid OR

4-amino salicylic acid.



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D) Explain the 'Combination Cotrimoxazole'. Give its uses and two brand names.

Ans:[Two marks for Explanation, one mark each for uses and two brand names]

Explanation of Combination Cotrimoxazole:

When Sulphamethoxazole is given alone, resistance develops to susceptible bacteria and hence higher dose is needed but it produces adverse effect like crystaluria. Trimethoprim also develops resistance when given alone.

Cotrimoxazole is the combination of two drugs i.e. Sulphamethoxazole and Trimethoprim

It is a mixture of 5 parts of Sulphamethoxazole and 1 part of Trimethoprim. Sulphonamides block the biosynthesis of folic acid from p-amino benzoic acid. Trimethoprim inhibits the enzyme folate reductase and blocks the conversion of folic acid to tetrahydrofolic acid (THF). THF is the form required for coenzyme synthesis. Combination of Sulphamethoxazole and Trimethoprim by synergism produces bactericidal effect.

Uses of Cotrimoxazole: This is used in the treatment of

- i) Genito-urinary tract infection.
- ii) Respiratory tract infections like bronchitis and pneumonia.
- iii) Meningitis
- iv) Enteric fever like Typhoid and paratyphoid.
- v) Species of Klebsiella, Proteus, Salmonella, Shigella are sensitive to Cotrimoxazole.

Brand names: Bactrim, Septran, Ciplin, Uritrim, Trimforte, Eusaprim, Omsat, Sulfotrim, Suprim, Microtrim.



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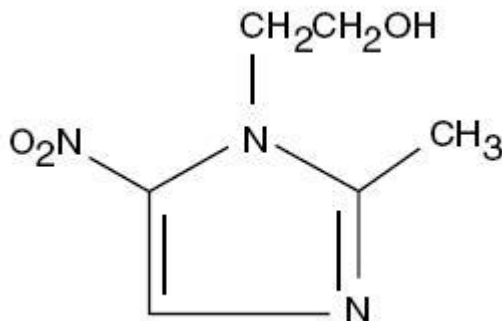
E) Give chemical classification of antiamoebic drugs and draw structure of Metronidazole.

Ans: [Three marks for classification and one mark for structure]

Chemical classification of Antiamoebic drugs:

- i) Alkaloids – e.g. Emetine, dihydro-emetine
- ii) Antibiotics – e.g. Paromomycin
- iii) Quinoline derivative
 - a) Halogenated hydroxyl quinolines –e.g. Di-iodohydroxy quinoline,
Iodochlorhydroxy quinoline
 - b) Amino quinolines – e.g. Chloroquine, Amodiaquine
- iv) Heterocyclic compounds:
 - a) Furan derivatives –e.g. Diloxanide furoate
 - b) Imidazole derivatives – e.g. Metronidazole

Structure of Metronidazole:





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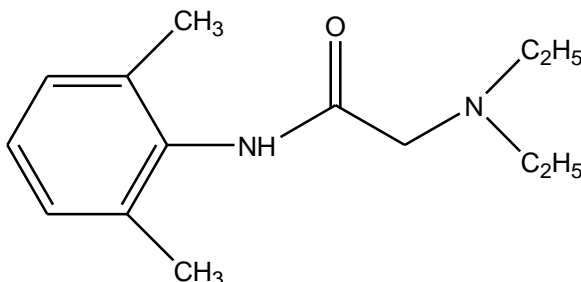
Que. 4. Attempt any three of the following (3x4)

A) Define 'Local Anaesthetics'. Write structure, chemical name and dosage form of Lignocaine.

Ans: [One mark for each sub question)

Definition of Local Anesthetic: Local anaesthetics are the drugs which produce reversible loss of sensation in limited area without loss of consciousness. They act by blocking the conduction of sensory nerve impulses near the site of their application or injuries.

Structure of Lignocaine:



Chemical name of Lignocaine:

2-diethylamino, N-(2, 6-dimethyl phenyl)-acetamide.

OR

N-diethylamino acetyl 2, 6-xylidine



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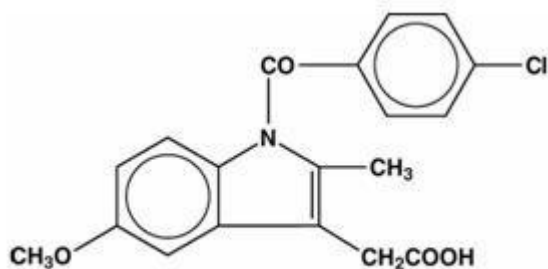
Dosage form of Lignocaine:

1. Lignocaine hydrochloride Injection
2. Lignocaine hydrochloride Gel
3. Lignocaine and Adrenaline Injection
4. Lignocaine hydrochloride Eye drop
5. Lignocaine Topical Aerosol
6. Lignocaine Ointment.

B) Write structure, chemical name, uses, dosage form and brand names of Indomethacin.

Ans: [One mark each for structure, chemical name, uses and one half mark each for dosage forms and brand names)

Structure of Indomethacin:



Chemical name of Indomethacin :

1-(4-Chlorobenzoyl)-5-methoxy-2-methylindol-3-yl-acetic acid.

OR

1-(4-Chlorobenzoyl)-5-methoxy-2-methyl-1-H-indole-3-acetic acid.



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Uses of Indomethacin:

It is used as Analgesic, Anti-inflammatory and Antipyretics for the treatment of –

1. Rheumatoid arthritis
2. Acute gout
3. Spondylitis
4. Dysmenorrhea
5. Acute musculo-skeletal disorder
6. Pain in malignant disease

Dosage form of Indomethacin:

1. Indomethacin Capsule
2. Indomethacin Suppositories
3. Indomethacin mixture

Brand names of Indomethacin :

Indoflam, Artacin, Confortid, Indomethine, Ciplacid, Indocap, Indometh, Indocid,
Indocin, Inflazon, Lausit, Mezolin Mobilan, Tanmex



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C) Define and Classify Anthelmintics. Give uses and brand names of Mebendazole.

Ans: [One mark for each sub question]

Definition: Anthelmintics are the drugs which are used to combat or oppose any type of helminthiasis or helminthic infection. OR The anthelmintics are the drugs used to kill or remove the parasitic worms.

Classification of Anthelmintics :

1. Halogenated hydrocarbons – e.g. Tetrachloroethylene
2. Halogenated Phenols and biphenols – e.g. Bithinol
3. Dyes – e.g. Gentian violet.
4. Piperazine and related compounds – e.g. Piperazine citrate, DEC
5. Other heterocyclic ring containing compounds- e.g. Mebendazole

Uses of Mebendazole : It is broad spectrum anthelmintics. It is used to treat-

- i) Whipworm infestation (Trichuriasis)
- ii) Round worms infestation (Ascariasis)
- iii) Tape worms infestation (Taeniasis)
- iv) Thread worm infestation
- v) Hook worm infestation
- vi) Guinea worm infestation
- vii) Capillaria infection.

Brand names of Mebendazole : Mebex, Wormin, Wormokil, Pantelmin, Telmin, Vermirax, vermox etc.



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D) What are anticholinergic? Classify them with suitable examples. Give Structure of any one acetyl cholinesterase inhibitor drug.

Ans: [One mark for definition, two marks for Classification, one mark for Structure of any one acetyl cholinesterase inhibitor drug]

Anticholinergic: The drugs which inhibit the pharmacological effects of acetylcholine liberated from parasympathetic postganglionic nerve ending are known as anticholinergics. The anticholinergic drugs which inhibit muscarinic action of acetylcholine are called as antimuscarinic drugs. The examples are Atropine, Hyoscine, Biperidin, Propantheline etc.

Classification of Anticholinergic drugs:

1. Amino alcohol esters- e.g. Atropine, Hyoscine, Propantheline
2. Amino alcohol ethers – e.g. Benzotropine
3. Amino alcohols – e.g. Biperiden
4. Amino amides – e.g. Tropicamide
5. Miscellaneous – e.g. Pirenzepine, Ethopropazine

Structure of any one acetyl cholinesterase inhibitor drug : The acetyl cholinesterase inhibitor drugs are Neostigmine and Physostigmine



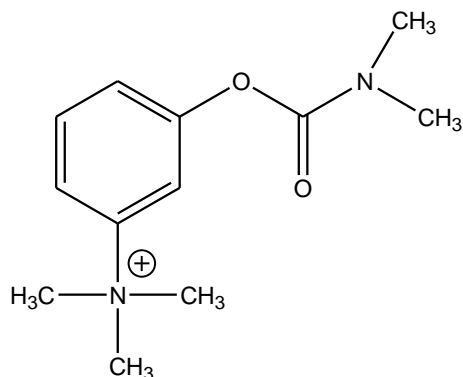
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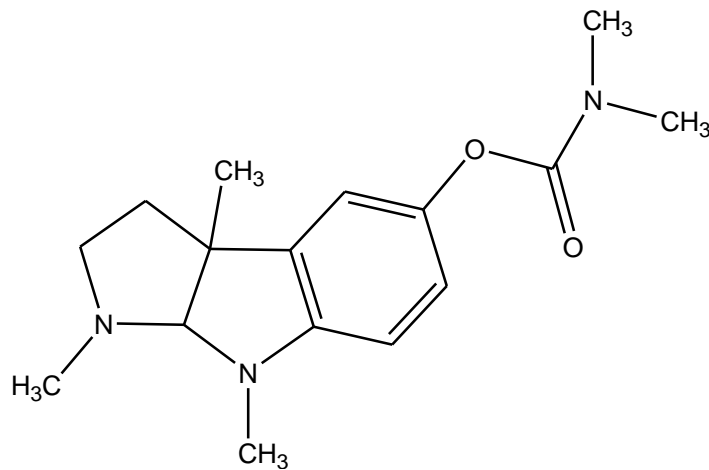
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Neostigmine :-



OR

Physostigmine :-



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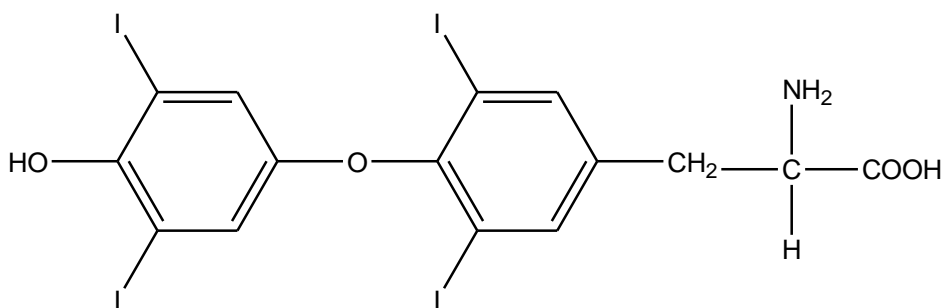
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E) Write structure, chemical name, uses and dosage form of Thyroxine.

Ans: [One mark for each sub question]

Structure of Thyroxine :



Chemical Name: O-(4-hydroxy-3,5-diiodophenyl)-3,5-diiodo-tyrosine **OR**
3,5,3',5' - Tetraiodothyronine

Uses of Thyroxine :

1. To treat Hypothyroidism.
2. To suppress Goiter.
3. To treat cretinism
4. To treat thyrotoxicosis.

Dosage form of Thyroxine :-

1. Thyroxine Tablet



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Q.No.5. Attempt any three of the following (04 marks for each)

A) Explain the term “Diagnostic Agents” (01 mark). Classify them (01 mark) & give uses of (01 mark each).

- **Diagnostic Agents:-**These are the agents or chemicals used to detect abnormalities in tissues & organs or to test an organ function.
- These are thus useful for the clinical diagnosis of the diseases.
- These agents do not usually have any medicinal values or pharmacological effect.
- They are usually introduced in the body or the specific organ.

The diagnostic agents can be classified in to two types:-

1) Radiopaque substances.

Radiopaque substances can be divided in to two types:-

- Water soluble compounds. E.g. diatrizoic acid, iothalamic acid etc
- Water insoluble compounds. E.g. ipanoic acid, propyliodone etc.

2) Compounds used to test organ function. E.g. indigocarmine, phenolsulphophthalein, sulphobromophthalein sodium etc.

i) Sulphobromophthalein Uses: Given in the ratio of 5mg per kg body weight intravenously to test hepato-biliary function. A water-soluble triphenylmethane derivative bound by plasma proteins and excreted by the liver, used in liver function tests.

ii) Fluorescein sodium Uses: Fluorescein eye stain

- This is a test that uses orange dye (fluorescein) and a blue light to detect foreign bodies in the eye.
- This test can also detect damage to the cornea, the outer surface of the eye.
- The damaged or diseased areas of the cornea like corneal ulcers get stained green.
- The fluorescein sodium injection is also employed for determination of circulation time.



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B) Write uses of: (01 mark each)

a) Cyanocobalamine:

1. Cyanocobalamine is usually prescribed after surgical removal of part or all of the stomach or intestine to ensure adequate levels of vitamin B₁₂ in the bloodstream.
2. It also is used to treat pernicious anemia, vitamin B₁₂ deficiency (due to low intake from food), thyrotoxicosis, hemorrhage, malignancy, liver disease and kidney disease. Cyanocobalamin injections are often prescribed to gastric bypass patients having had part of their small intestine bypassed, making it difficult for B₁₂ to be absorbed via food or vitamins.

b) Niacin:

1. Niacin and niacinamide are forms of Vitamin B₃. Niacin and niacinamide are also found in many vitamin B complex supplements with other B vitamins.
2. Niacin is used for high cholesterol. It is also used along with other treatments for circulation problems, migraine headache, dizziness, and to reduce the diarrhea associated with cholera.
3. Prevention and treatment of Pellagra
4. Niacin is also used for preventing positive urine drug screens in people who take illegal drugs.

c) Pyridoxine:

1. Pyridoxine is used for preventing and treating low levels of pyridoxine (pyridoxine deficiency).
2. Women use pyridoxine for premenstrual syndrome (PMS) and other menstruation problems, "morning sickness" (nausea and vomiting) in early pregnancy, depression related to pregnancy or using birth control pills, and symptoms of menopause.
3. Pyridoxine is also used for Alzheimer's disease, attention deficit-hyperactivity disorder (ADHD), Down syndrome, autism, diabetes and related nerve pain, sickle cell anemia, migraine headaches, asthma, , night leg cramps, muscle cramps, arthritis, allergies, acne and various other skin conditions. Some people use pyridoxine for boosting the immune system, eye infections, bladder infections, and preventing cancer and kidney stones.



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4. Pyridoxine is also used to overcome certain harmful side effects related to radiation treatment and treatment with medications such as mitomycin, procarbazine, cycloserine, fluorouracil, hydrazine, isoniazid, penicillamine, and vincristine.
5. Pyridoxine is frequently used in combination with other B vitamins in vitamin B complex products.

d)Ascorbic acid:

1. In general this drug is used for the prevention and treatment of scurvy. This condition is caused by a lack of vitamin C often due to a lack of fresh fruit and vegetables. Symptoms of scurvy include a general feeling of being unwell, tiredness, muscle and joint pain, bleeding into the skin, around bones, into joints and from the gums, and loose teeth.
2. Benefits of being on this drug can include relief from the symptoms of scurvy which include a general feeling of being unwell, tiredness, muscle and joint pain, bleeding into the skin, around bones, into joints and from the gums, and loose teeth. Other conditions requiring vitamin C supplementation.

C) Classify antibiotics on the basis of biosynthesis & chemical nature with examples.

(03 marks for chemical classification & 01 mark for biosynthesis classification)

1) β -LACTAM ANTIBIOTICS:-

They have a four membered cyclic amide ring. They inhibit bacterial cell wall synthesis
Examples Penicillins :-ampicillin, amoxycillin etc.

Cephalosporins :-cephalothin,cephaloridine etc.

2) MACROLIDES

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

3)TETRACYCLINES



Examples-Tetracycline, Minocycline, Doxycycline, Lymecycline

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4) AMINOGLYCOSIDES

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

5) POLYPEPTIDES ANTIBIOTICS

Examples include actinomycin, bacitracin, colistin, polymixinB.

6) POLYENE ANTIMYCOTICS OR 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 FROM SINGLE AMINOACID:-

Examples-Cycloserine & Choramphenicol

9) FLUOROQUINOLONES

Examples- Norfloxacin Ciprofloxacin Enoxacin Ofloxacin

10) 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.



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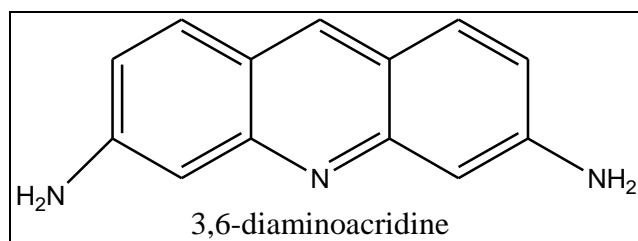
5) Derived from acetate or propionate units: e.g.tetracyclines, fusidic acid, erythromycin.

D) Classify Antiseptics & Disinfectants. (03 marks). Draw structure of Proflavine.(01 mark)

Classification:

- 1) Alcohols & aldehydes e.g. Alcohol, Formaldehyde
- 2) Halogen compounds e.g.Chloramine t, Chorhexidine acetate, Dibromopropamide isothionate
- 3) Phenols & related compounds.e.g. Phenol, Chlorocresol. Chloroxylenol, Hexachlorophene
- 4) Organic mercurials e.g. Merbromin(mercurochrome), Thiomersal
- 5) Dyes e.g.Aminacrine hydrochloride, Brilliant green, Proflavine hemisulfate, Crystal violet(gentian violet), Acriflavine.
- 6) Cationic surface-active agents. e.g. Cetylpyridinium chloride, Benzalkonium chloride, Cetrimide
- 7) Miscellaneous agents.e.g. Dequalinum chloride, Nitrofurazone

Structure of Proflavine



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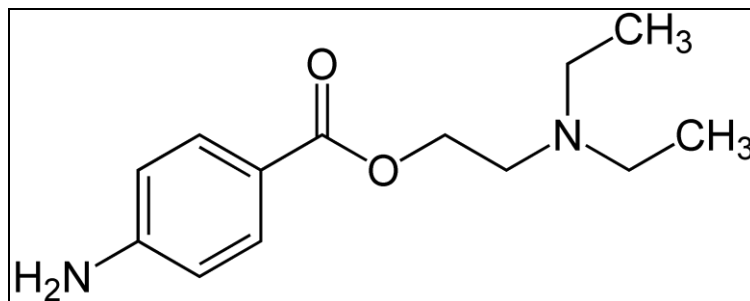
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F) Draw structure & chemical name of

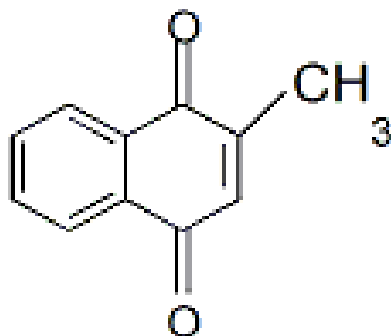
(One mark each for structure and chemical name)

a) Procaine



Chemical Name: 4-amino-N (2-diethyl amino ethyl) benzoate

b) Menadione



Chemical Name: 2- Methyl 1,4-Naphthaquinone



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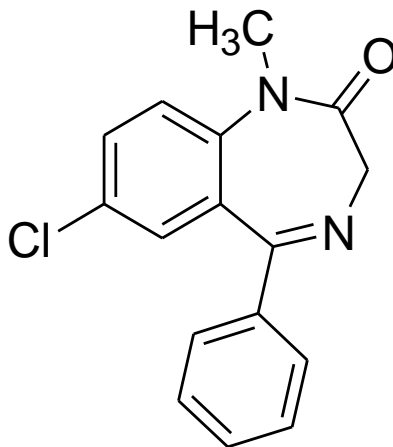
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Q.No.6. Attempt any three of the following (04 marks for each)

A) Classify anticonvulsants. Draw structure of Diazepam. (Three marks for classification and One mark for Structure)

1. Barbiturates- Phenobarital, Mephobarbital, Metharbital
2. Hydantoins- Phenytoin, Mephenytoin
3. Oxazolidinedions- Trimetadione, Paramethadione
4. Succinimides- Phensuximide, Methsuximide
5. Benzodiazepines- Diazepam, Clonazepam
6. Miscellaneous- Carbamazepin, Valproic acid, Phenacemide etc.

Diazepam structure:





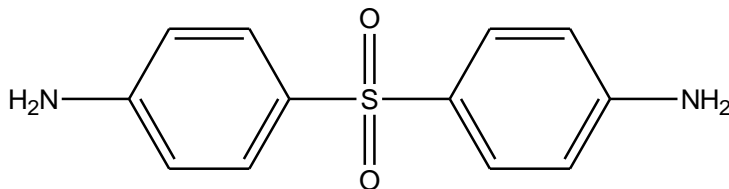
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B) Write structure, uses, chemical name, and brand name of DDS. (01 mark for each)



Dapsone: Chemical name- 4,4' Diaminodiphenylsulphone or Bis (4-aminophenyl) sulphone

Uses of Dapsone

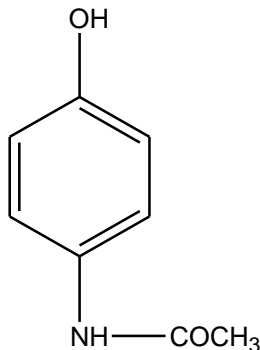
- Dapsone is used in combination with pyrimethamine in the treatment of malaria.
- Dapsone is the principal drug used in the treatment of all forms of leprosy.
- In addition to its use in leprosy, dapsone has been found of value in dermatitis herpetiformis and other dermatoses.

Brand names of Dapsone –DADPS; DDS; Dumitone; Novophone, Diphone, etc.

C) Classify analgesics & antipyretics. (02 marks). Give structure of paracetamol. (02 marks)

- Para amino phenol derivatives: Paracetamol (Acetaminophen), Aspirin.
- Pyrazolone derivatives: Metamizol (Dipyrone), Propiphenazone
- Benzoxazocine derivatives: Nefopam

Structure:





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D) Give properties, uses, dosage forms, brand names of hydrocortisone.

(01 mark for each sub question)

Properties: It is a white crystalline powder, odorless, bitter in taste, insoluble in alcohol & sparingly soluble in chloroform. It is sensitive to light & should be protected from it during storage. M.P. is 217-220°

Uses: It is a glucocorticoid used in the treatment of all conditions of corticosteroid therapy.

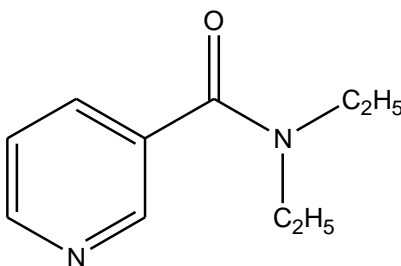
This medication is used to treat a variety of skin conditions (e.g., insect bites, eczema, dermatitis, allergies, rash, itching). Hydrocortisone reduces the swelling, itching, and redness that can occur in these types of conditions. This medication is a mild corticosteroid.

Dosage forms: Available as creams, ointments, lotions & tablets.

Brand names: Cremesone; Cobadex; Cort-Dome; Cortef; etc.

E) Write structures of the following: (01 mark for each)

i) N, N-diethyl pyridine-3-carboxamide.(Nikethamide)



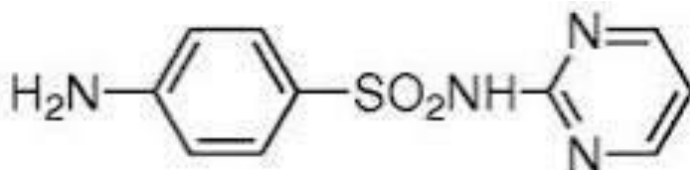
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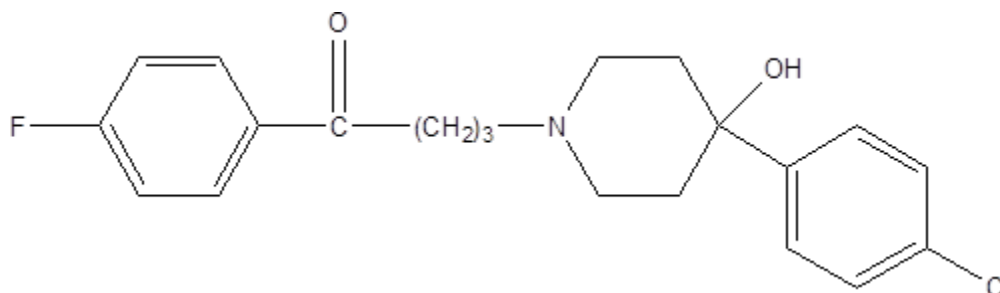
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ii) N'- (2-pyrimidinyl) sulfanilamide. (Sulfaguandine)



iii) 4-[4-(p-chlorophenyl),4-hydroxy piperidine] 4' fluorobutyrophenone. (Haloperidol)



iv) N,N'-Ethylene-Bis (2 -amino-butan-1-ol) (Ethambutol)

