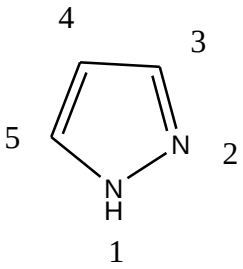
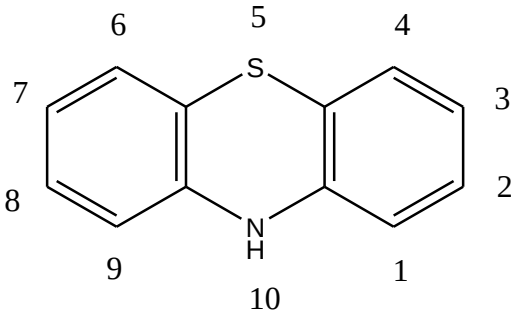
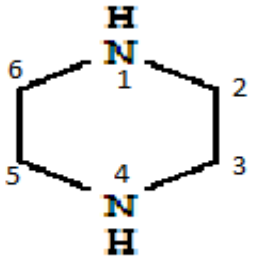
MODEL ANSWER

SUMMER– 18 EXAMINATION

Subject Title:PHARMACEUTICAL CHEMISTRY-ll **Subject Code:** 0812

Important Instructions to examiners:

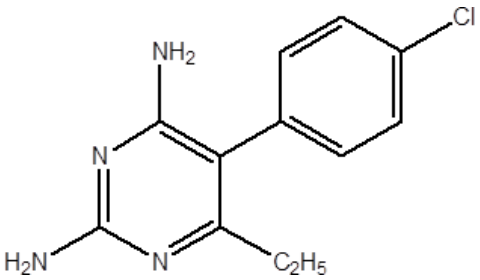
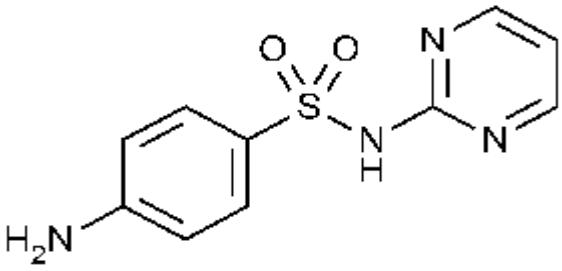
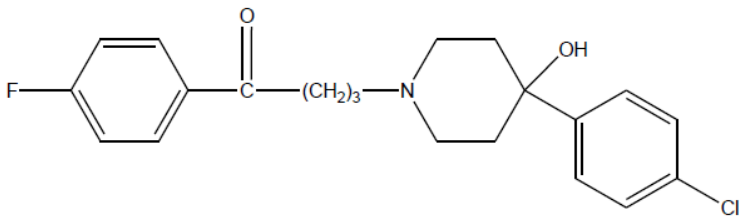
1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
3) The language errors such as grammatical, spelling 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 anyequivalent 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.

1		**ATTEMPT ANY <u>EIGHT</u> OF THE FOLLOWING.**	**16M (8X2M)**
1	**a)**	**Draw structure with numbering (any two)** (i) Pyrazole  (ii) Phenothiazine  (iii) Piperazine 	**1 M each**
1	**b)**	**Write structure of the following organic groups (any two)** **(i) Allyloxy** $CH_2=CHCH_2O-$	**1 M each**

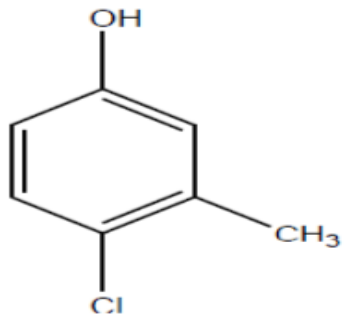
		(ii) Acetyl $-COCH_3$ **(iii) Amido** $-CONH_2$	
1	**c)**	**Name the drug present in the following brands (any two)** (i) Ecosprin- Aspirin (ii) Stemetil- Prochlorperazine maleate (iii) Valium – Diazepam	**1 M each**
1	**d)**	**Classify local anaesthetics with examples.** Classification of Local anesthetics 1. Natural Products- Cocaine,Tropocaine. 2. Synthetic Compounds a) Benzoic acid ester derivatives- Hexylcaine, Isobucaine b) Para-amino benzoic acid ester derivatives- Benzocaine, Procaine, Tetracaine hydrochloride (amethocaine hydrochloride), Butacaine sulphate c) Amides- Lignocaine, Prilocaine, Bupivacaine,Dibucaine. d) Miscellaneous- Phenacine, Clove Oil, Phenol, Orthoform etc.	
1	**e)**	**Give two brand names for each of the following drugs** (i) Paracetamol-Tylenol, Calpol, panadol, crocin, metacin, valadol, paldesic, Dolo (ii) Metformin- Dideta SR, Formin, Metchek, Forminal (iii) Metronidazole- Aristogyl, Flagyl, Metrogyl, Aldezol, Unimezol	**1 M each**

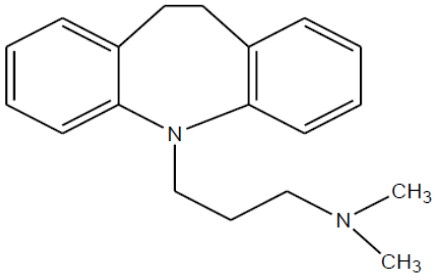
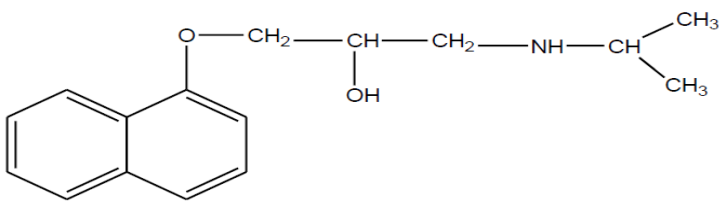
1	f)	**In what dosage form the following the following drugs are administered?** **i) Tolnaftate-** • Tolnaftate Cream • Tolnaftate gel • Tolnaftate powder • Tolnaftate topical aerosol powder • Tolnaftate topical solution **(ii) Insulin** • Insulin Injection • Insulin Injection Biphasic • Neutral Insulin Injection • Globin zinc Insulin Injection • Isophane Insulin Injection • Protamin zinc Insulin Injection • Insulin zinc suspension	**1 M each**
1	g)	**Write names of four fat soluble vitamins.** Fat soluble vitamins: Vitamin A (Retinol),Vitamin D (Calciferol), Vitamin E (Tocopherol), Vitamin K (Menadione)	**½ M each**
1	h)	**Write uses of following: (any two)** **(i) Evans blue** • Evans Blue is a di-azo compound used to determine blood volume in humans and animals. • The dye combines firmly with plasma albumin when injected into the blood stream and leaves the circulation very slowly. **(ii) Iopanoic acid** • Given orally & gets well absorbed through the gastrointestinal tract. • Mainly excreted in the faeces.	**1 M each**

		• Used in cholecystography. **(iii) Fluorescein sodium** • Fluorescein sodium is a diagnostic agent. • It is used to detect diseased or damaged areas of cornea. • It is used to detect foreign bodies in the eye. • As an aid in the fitting of hard contact lenses • For diagnosing Dry eye syndrome • Given by mouth/injection into a vein, it may be used to help evaluate the blood vessels in the back of the eye, during Fluorescein angiography	
1	**i)**	**Define coagulants and anticoagulants.** **Coagulants** 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** 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.	**2 M**

1	j)	**Draw two structures of drug containing pyrimidine ring.**  **Pyrimethamine**  **Sulphadiazine**	**1 M each**
1	k)	**Give structure and uses of haloperidol.** **Haloperidol structure:-**  **Haloperidol uses:-** 1. It is major tranquilizer and used to treat • Acute schizophrenia • Mania and hypomania • Behavioral disturbances • Sever anxiety • Childhood development disorders.	**1 M each**

		2. It is used to control nausea and vomiting. 3. It potentiates the actions of CNS depressant like analgesics, barbiturates, and anesthetics. 4. It is used to treat intractable hiccupps.	
1	**l)**	**Name the drug used for (any two)** **(i) Glaucoma**- Pilocarpine, Carbachol, Acetazolamide, Physostigmine, Timolol **(ii) Asthama**–Salbutamol, Terbutaline, Isoprenaline, Pseudoephedrine, Aminophylline. **(iii) Amoebiasis**-Clioquinol, Diiodohydroxyquinoline, Metronidazole, Tinidazole, Diloxanidefuroate, Antibiotics like paramomycin.	**1 M each**
2		**Attempt any FOUR of the following:**	**12M (4x3M)**
2	**a)**	**Classify Antiseptics and Disinfectants. Draw structure of chlorocresol.** **Classification:-** 1) Phenols & related compounds: Phenol, Chlorocresol. Chloroxylenol, Hexachlorophene 2) Alcohols & aldehydes : Alcohol, Formaldehyde 3) Halogen compounds : Chloramine t, Chorhexidine acetate, Dibromopropamidine 4) Organic mercurials: Merbromin (mercurochrome), Thiomersal 5) Dyes: Aminacrine hydrochloride, Brilliant green, Proflavinehemisulfate, Crystal Violet (gentian violet), Acriflavine. 6) Cationic surface-active agents. e.g. Cetylpyridinium chloride, Benzalkonium chloride, Cetrimide 7) Miscellaneous agents. e.g. Dequalinium chloride, Nitrofurazone	**1 ½ M each**

		Structure: Chlorocresol 	
2	**b)**	**Define and classify Anti-depressants with examples. Draw structure of Imipramine.** Antidepressants are drugs which counteract or overcome mental depression.These drugs are therapeutically useful in a variety of cases pertaining to mentally ill patients.Mental depression is a phenomenon which may arise in normal individuals or in mentally ill persons. **<u>Antidepressants drugs may be classified as follows below:-</u>** 1. Betaphenylethylamine analogue, which act as monoamino oxidase inhibitors. eg. Phenelzinesulphate, Isocarboxid, Tranylcypromine. 2. Tricyclic antidepressants: a. Dibenzazepine class eg. Imipramine b. Dibenzcycloheptene class eg. Amitriptyline, Nortriptyline 3. Selective serotonin reuptake inhibitors (SSRIs): Citalopream, Fluoxetine 4. Serotonin and Norepinephrine reuptake inhibitors (SNRIs): eg. Venlafaxine, Desvenlafaxine 5. Atypical Antidepressants: Mitrazapine, Trazodone	**1 M each**

		Imipramine: 	
2	**c)**	**What are cardiotonic agents? Name any two cardiac glycosides and give their hydrolysis products.** These are the drugs which have stimulating action on the cardiac muscles. They increase the force of muscle contraction without increasing oxygen demand of the heart. Cardiac glycosides on hydrolysis yield corresponding sugar and aglycone moieties.	**1 M each**
2	**d)**	**Give structure and use of propranolol and Pethidine.** **Structure of Propranolol:** 	**1½ M each**

Sr. No.	**Glycoside**	**Products of Hydrolysis**	
		Sugar	**Aglycone**
1	Digitoxin	3moleculesof digitoxose	Digitoxigenin
2	Digoxin	3 molecules of digitoxose	Digoxigenin
3	Lanatoside	2 molecules of digitoxose; 1 molecule of acetyl digitoxose and 1 molecule of glucose	Digoxigenin

Uses of Propranolol:

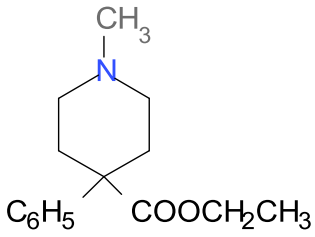
1. It is a typical beta adrenergic receptor blocker, falling under the category of 'Life saving drug' being used in the treatment of cardiac diseases and emergencies like

- Angina pectoris
- Cardiac arrhythmia
- Hypertension
- Congestive heart failure
- Myocardial infarction (MI), where it may be useful in preventing re-infarction and also in preventing sudden ventricular fibrillation in subsequent attacks of MI
- Coronary atherosclerosis

2.Treatment of Pheochromocytoma

3. In small doses, Propranolol may be used to reduce symptoms of anxiety such as sweating, tachycardia and diarrhoea, particularly in susceptible individuals prior to public speaking engagements or meetings etc

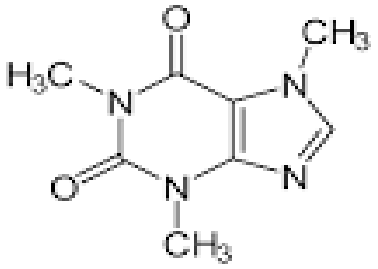
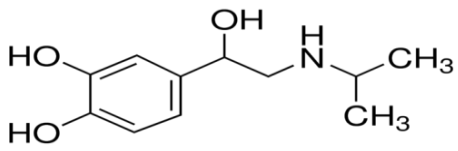
Structure of Pethidine

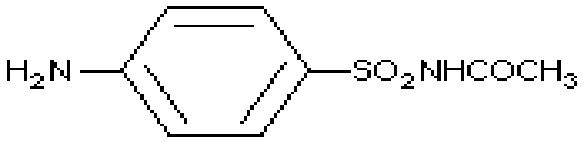
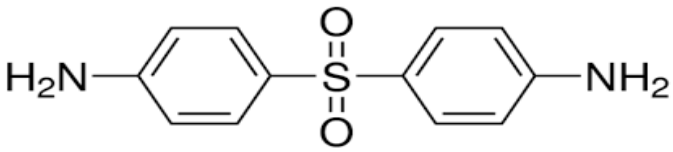


Uses of Pethidine-

- Used as a substitute for morphine for the relief of most types of moderate to severe pains.
- Also exerts a mild sedative & antispasmodic action.
- Shorter duration of analgesic action than morphine.
- Used in combination with chlorpromazine & promethazine to produce narcosis.
- It also produces mild euphoria.
- Used orally & parenterally.

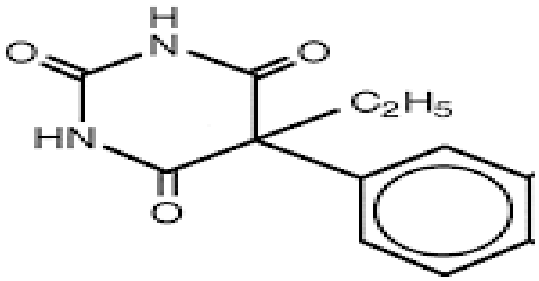
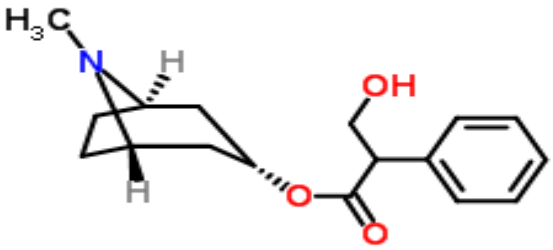
2	e)	**Give properties, uses and official preparations of Clofibrate**. Properties- It is a stable, clear, colorless to pale yellow liquid with a characteristic faintly acrid odor. It is very slightly soluble in water; miscible with alcohol, chloroform & ether. Uses- It is used as in treatment of hyperlipoproteinemia and severe hypertriglyceridemia & for the prophylaxis of ischaemic heart disease. Official preparations- Capsules.	**1M each**
2	f)	**Define and classify NSAIDS with examples.** The drugs which do not have the steroidal nucleus & are used to diminish or reduce inflammation & give relief from pain in arthritis & rheumatic diseases are called as non-steroidal anti-inflammatory agents [NSAID]. **Classification of non-steroidal antiinflammatory drugs** A. Nonselective COX inhibitors (conventional NSAIDs) i. Salicylates: Aspirin, Diflunisal ii. Pyrazolone derivatives: Phenylbutazone, Oxyphenbutazone iii. Indole derivatives: Indomethacin, Sulindac iv. Propionic acid derivatives: Ibuprofen, Naproxen, Ketoprofen, Flurbiprofen v. Anthranilic acid derivatives: Mefenamic acid vi. Aryl-acetic acid derivatives: Diclofenac vii. Oxicam derivatives: Piroxicam viii.Pyrrolo-pyrrole derivative: Ketorolac B. Preferential COX-2 inhibitors E.g. Nimesulide, Meloxicam, Nabumetone C. Selective COX-2 inhibitors E.g.Celecoxib, Rofecoxib, Valdecoxib	**1 M** **2M**

3		**Attempt any <u>FOUR</u> of the following**	**12M (4x3M)**
3	**a)**	**Define Analeptic. Give structure and chemical name of caffeine.** **Definition:** The drug which increases the activity of various parts of central nervous system (brain and spinal cord) is called an analeptic. **Chemical structure**  **Chemical name** : 1,3,7 Trimethyl Xanthine	**1M each**
3	**b)**	**Classify Adrenergic drugs. Draw structure of Isoprenaline** **Classification** : 1)Catecholamines : e.g.: adrenaline, noradrenaline, Isoprenaline, Phenylephrine 2)Non-Catecholamines : a) Containing phenylethylamine skeleton i)with phenolic group: e.g.Salbutamol, Phenylephrine ii)without phenolic hydroxy group :e.g:ephedrine. b) Aliphatic amines : e.g:cyclopentamine c) Imidazolidine derivatives : eg:naphazoline **Structure Of Isoprenaline**: 	**2M classify** **1M struct.**

3	**c)**	**Give name, structure and properties of Sulphonamide used for the treatment of eye infection.** **Name :** The sulphonamide used for treatment of eye infection is Sulphacetamide. **Structure:**  **Properties:** 1) It occurs as a white crystalline powder. 2) It is soluble in water & alcohol, very soluble in hot water & solutions of alkali hydroxides & mineral acids. 3) Its aqueous solutions are acidic to litmus.	**1 M each**
3	**d)**	**What is Leprosy? Give structure and uses of Dapsone.** • Leprosy is chronic, contagious disease caused by slow growing bacteria, Mycobacterium Leprae. • It was first identified by Hansen in 1871 and also called as Hansen's disease. • It affects the skin, mucous membranes and nerves causing discoloration and lumps on skin and, in severe cases disfigurement and deformities. **Structure** : 	**1M each**

		Uses : 1) Dapsone is a drug of choice to treat leprosy in combination with rifampicin. 2) Dapsone has a suppressive action on malarial parasite. 3) It is also used in the treatment of dermatitis herpetiformis and relapsing polychondritis. 4) In combination with pyrimethamine in the treatment of malaria. 5) It is the principal drug used in the treatment of all forms of leprosy.	
3	**e)**	**Classify Antibiotics according to chemical structure with examples** **Classification:** I. β-Lactam antibiotics: e.g. Benzyl Penicillin, Phenoxymethyl penicillin, Cephaloridine, cephalothin II. Non-β-Lactam antibiotics: 1. Tetracyclines: e.g chlortetracycline, oxytetracycline. 2. Aminoglycoside antibiotics : e.g: Streptomycin, neomycin, gentamicin 3. Macrolide antibiotics : e.g : Erythromicin 4. Ansamycins : e.g: Rifamycin 5. Polyene macrolide antibiotics: e.g: Nystatin, Hamycin 6. Anthracycline antibiotics : e.g :actinomycin, daunorubicin 7. Peptide antibiotics: e.g: Bacitracin. 8. Steroidal antibiotics : e.g : Fusidic acid 9. Nucleoside anitibiotics: e.g : Puromycin 10. Non- classifiable antibiotics : e.g : Chloramphenicol	**3 M**
3	**f)**	**What is epilepsy? Classify Anti convulsant drugs with examples.** It is defined as paroxysmal (sudden), self-sustaining and self-limiting cerebral dysrhythmia. It is characterized by an abnormal and excessive neuronal discharge and by disturbance of consciousness.	**1M**

		It is proposed that seizures were caused by sudden, occasional, rapid, excessive, local electrical (nervous) discharges which originate in grey matter &spread to other parts of CNS. Epilepsy may or may not be associated with body movements or hyperactivity of ANS. Convulsive states have been observed in systems where concentration of GABA (Gamma Amino Butyric Acid) in brain is below certain level or the effect of GABA is blocked. **Classification:** 1) Barbiturates: eg :Phenobarbitone, Mephobarbitone. 2) Hydantoin Derivatives: eg : Phenytoin ,Methoin , Ethotoin 3) Succinimides : eg : Ethosuccimide, Phensuccimide 4) Oxazolidine 2, 4 diones eg: Trimethadione ,Paramethadione. 5) Glutarimides eg : Amino glutethimide 6) Acyl ureides/acylureas eg: Phenacemide. 7) Benzodiazepine derivatives eg : Diazepam, Clonazepam, Nitrazepam 8) Dibenzazepines eg: carbamazepine 9) Hexahydrapyrimide 4,6 dione eg: Primidone 10) Carboxylic acids eg: Sodium Valproate 11) Sulphonamides eg: Acetazolamide	**2 M**
4		**Attempt any <u>FOUR</u> of the following**	**12M (4X3M)**
4	**a)**	**Classify Hypnotics and sedatives. Draw structure of Phenobarbitone.** **Classification:** BARBITURATES : Depending upon duration of action ▪ Long acting barbiturates (6 hrs or more). eg: Barbitone, Phenobarbitone. ▪ Intermediate acting barbiturate(3-6 hrs).eg: Butobarbitone. ▪ Short acting Barbiturate(less than 3 hrs) eg: Cyclobarbitone. ▪ Ultra short acting (IV) Barbiturates (1/2 to 1 hr).eg: Methohexitone Sodium	**2M**

		,Thiopentone Sodium. NON BARBITURATES : ▪ Benzodiazepines eg: Diazepam, Nitrazepam ▪ Other cyclic nitrogen containing compounds eg: amides eg: glutethimide, methyprylone. ▪ Acyclic nitrogen containing compounds eg: meprobamate,ethinamate. ▪ Alcohols &derivatives eg: triclofos Na, ethchlorvynol. ▪ Aldehydes & derivatives eg: Paraldehyde ▪ Misc: Eg: bromides, diphenhydramine , promethazine **Structure of Phenobarbitone :** 	**1M**
4	**b)**	**Give structure, properties and uses of Atropine.** **Structure** 	**1M each**

Properties:

- It occurs as colourless crystals or white crystalline powder.
- It is odourless and has bitter taste.
- It is sparingly soluble in water and freely soluble in chloroform.
- It is official as sulphated salt which contains one molecule of water of crystallization and is very soluble in water.
- When it is treated with fuming nitric acid and mixture is evaporated to dryness on water bath, it leaves yellow residue.
- In acidic or alkaline medium, it is hydrolysed to give tropine and tropic acid

Uses:

A) Action on CNS

- It is used to treat Parkinsonism (paralysis agitans) to reduce muscular rigidity and salivation.
- In small dose, it is CNS stimulant

B) Anti-muscarinic activity:

- As a mydriatic in ophthalmologic practice.
- As an antispasmodic (to treat renal and biliary colic, and bronchial asthma)
- For anaesthetical premedication (to inhibit excessive salivary and bronchial secretion and to prevent bronchospasm)
- To treat sialorrhoea (secretion of saliva), acute coryza, rhinitis, hay fever etc. due to its antisecretory activity.
- To treat poisoning by organophosphurus compounds(insecticidal)
- As an adjunct to treat gastric and duodenal ulcers
- With morphine to lessen the respiratory depression
- In small doses, to prevent excessive peristalsis and colicky pain produced by irritant purgative

4	c)	**What are Antihypertensive drugs? Classify them with examples.** The drugs which are used to treat hypertension are called as antihypertensive drugs. **Classification:** 1. **Drugs affecting the sympathetic tone:** • Drugs that alter central sympathetic activity Clonidine , Methyl Dopa • Adrenergic neuron blockers : Guanethidine, reserpine • α- adrenoceptor blocking agents : Prazosin, phentolamine • β – adrenoceptor blocking agents : Propranolol, atenolol **2. Vasodilators** : • Direct Vasodilators : Hydralazine, Minoxidil • Calcium channel blockers: Nifedipine, Verapamil **3. Agents acting on renin-angiotensin system:** • Renin inhibitors, Angiotensin antgonists eg: Saralasin • Angiotension converting enzyme inhibitor : Captopril, Enalapril **4. Diuretics :** • Thiazides : Hydrochlorthiazide • Loop diuretics : Furosemide • Potassium Sparing Diuretics : Traiamterene	**1M** **2M**
4	d)	**What are vitamins? Name four water soluble vitamins with their deficiency symptoms** **Vitamins**: Vitamins may be defined as potent organic substances which are essential for normal growth and maintenance of life of animals, which they are not able to synthesize in adequate quantity and their deficiency may cause various diseases.	**1M**

Water soluble vitamins with deficiency symptoms: — **2M**

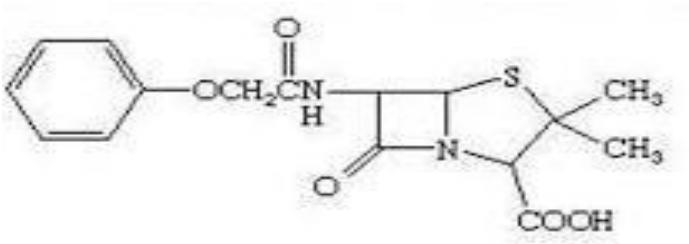
Name of vitamin	Deficiency symptom
Thiamine/Vit.B1	Beriberi
Riboflavin/Vit.B2	Skin lesion, glossitis, stomatitis
Nicotinic acid/Vit.B3	Pellagra
Pyridoxine/Vit.B6	Dermatitis
Folic acid	Macrocytic anemia
Cynocobalamine/Vit.B12	Pernicious anemia
Vitamin C	Scurvy

4 e) What do you know about adrenocorticoid hormones? Give uses and official preparations of Hydrocortisone. — **1 M each**

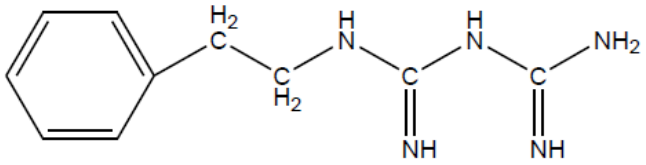
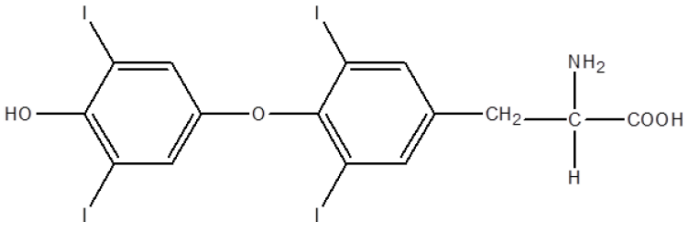
- These are the steroidal hormones secreted by cortex of adrenal gland. There are two types of adrenocorticoids , Glucocorticoids and mineralocorticoids
- The glucocorticoids are necessary to regulate carbohydrate, lipid and protein metabolism. Eg: Cortisone, Hydrocortisone.
- Mineralocorticoids are necessary to regulate salt and water metabolism. They maintain electrolyte balance. Eg: Aldosterone.

Uses:

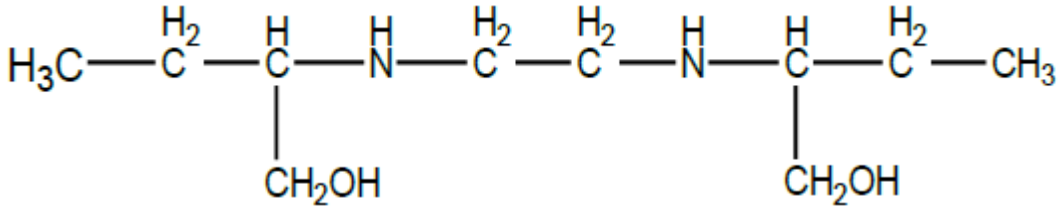
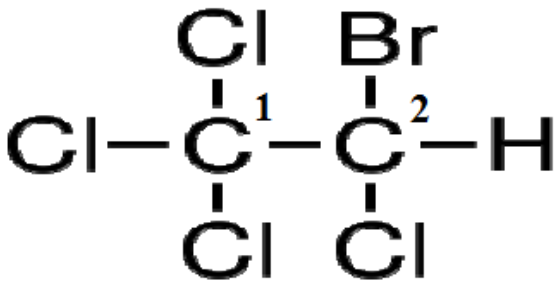
- For the replacement therapy in adrenocortical failure or hypopituitarism (low production of hydrocortisone or aldosterone)
- To treat asthma or other respiratory tract diseases.
- To treat allergic &anaphylactic reactions
- To treat diseases of connective tissue eg: rheumatic diseases , rheumatoid arthritis ,osteoarthritis,

		• To treat collagens disease(Lupus erythmatosus) • To treat dermatological disease • To treat Addison's disease • To treat chronic lymphatic leukemia • To prevent hyperkalemia **Official preparations:** • Hydrocortisone Acetate Injection I.P • Hydrocortisone Acetate Ointment I.P • Hydrocortisone Acetate & Neomycin Eye drops I.P • Hydrocortisone Acetate &Clioquinol ointment I.P • Hydrocortisone Acetate &Neomycin Eye ointment I.P • Hydrocortisone Acetate Cream • Hydrocortisone Acetate Tablets I.P	
4	**f)**	**Write structure , chemical name and uses of Penicillin V.** **Structure**:  **Chemical name**: (6R)-6-(2-phenoxy acetamido) penicillanic acid. **Uses:** It is used in the treatment of following diseases: 1) Respiratory tract infection 2) Urinary tract infection 3) Gonorrhea	**1M each**

		4) Meningitis 5) Enteric infection 6) Septicemia	
5		**Attempt any <u>FOUR</u> of the following**	**12M (4X3M)**
5	**a)**	**Define and classify Antineoplastic with examples.** **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. **Classification:** 1. Alkylating Agents. a) Nitrogen mustard drugs: Mustine, Chormabucil, cyclophosphamide b) Aziridines: Thiotepa c) Alkyl sulphonate: Busulphan d) Nitrosourea group compound: Lomustine 2) Antimetabolites: Methotrexate, Mercaptopurine, Azathioprine, Fluorouracil 3) Antibiotics: Actinomycin, Daunorubicin, Doxorubicin 4) Plant Products: Sulphates of vinblastin and vincristine. 5) Hormones and related drugs: Glucocorticoids, Tamoxifen 6) Miscellaneous agents: Hydroxyurea, cisplatin	**1 M** **2M**
5	**b)**	**Classify hypoglycemic agent with example. Give structure of Phenformin.** Classification :- 1. Insulin and its preparation. • Insulin Injection • Insulin Injection Biphasic • Neutral Insulin Injection • Globin zinc Insulin Injection • Isophane Insulin Injection	**1.5 M each**

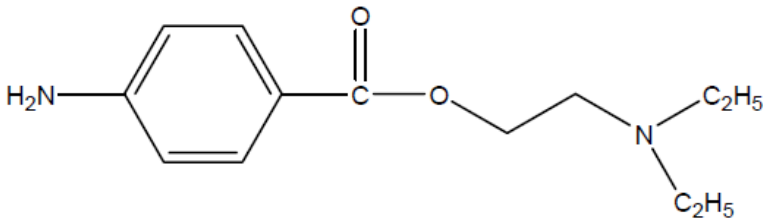
		• Protamin zinc Insulin Injection • Insulin zinc suspension 2. Oral hypoglycemic agent • Sulphonylurea derivatives ➢ First generation compounds eg. Tolbutamide, Chlorpropamide ➢ Second generation compounds eg. Glibenclamide, Glipizide etc • Biguanide derivatives e.g. Phenformin, Metformin • Meglitidine/Phenyl alanine derivatives eg. Repaglidine • Thiazolidine derivatives eg.Rosiglitazone, Pioglitazone • Alpha glucosidase inhibitors eg. Meglitol, Acarbose Structure :- 	
5	**c)**	**Give structure, chemical name and uses of Thyroxin.** **Structure of Thyroxine.**  **Chemical name:** 3,5,3'5'- Tetraiodo-thyronine OR O^4-(4-hydroxy-3,5-diiodophenyl)-3,5-diiodo tyrosine **Uses:-** 1. To treat Hypothyroidism.	**1 M each**

		2. To suppress Goiter. 3. To treat cretinism 4. To treat thyrotoxicosis. 5. It is also used in chronic constipation, menstrual disorders and sterility etc, associated with low metabolic rate	
5	**d)**	**What is co-trimoxazole? Give uses and brand names of co-trimoxazole.** Co-trimoxazole mixture contains 5 parts of sulphamethoxazole and 1 part of trimethoprim. These two drugs produce overtly similar effects; will sometimes produce increased effects when used concurrently. **Uses:-** it is mainly used in treatment of 1. Urinary tract infection 2. Upper and Lower respiratory infection (URTI and LRTI) 3. Skin and wound infections 4. Septicemias 5. In systemic infection. **Popular Brand Names:** Bactrim, Bactrimel, Co-trimoxazole, Cotrim, Septra, Sulfatrim, Biseptol, Trisul, Bactrom, Septram, Vactrim, Bibactin etc.	**1 M each**
5	**e)**	**Give medicinal uses of** **(i) Isoniazid** ➢ Treatment of Tuberculosis ➢ Treatment of meningitis, genitourinary infection **(ii) DEC** ➢ This drug is categorised as an anthelmintic, particularly antifilarial agent. ➢ It is used to treat filariasis particularly when due to *W.bancrofti or Loa loa.* ➢ It has also been used in the treatment of tropical eosinophilia. ➢ It is usually administered by mouth as tablets. **(iii) Quinine sulphate** ➢ Quinine sulphate is an antimalarial drug indicated only for treatment of uncomplicated *Plasmodium falciparum* malaria.	**1. M each**

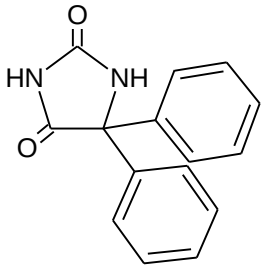
		➢ Quinine sulphate is effective in geographical regions where resistance to chloroquine has been documented.	
5	f)	**Give structure, chemical name and uses of Ethambutol.** **Structure of Ethambutol**  **Chemical name** :- Bis-(1-hydroxy methyl propyl) ethylene diamine OR N,N'-Ethylenebis (2-aminobutan-1-ol) **Uses:-** • It has a bacteriostatic action against mycobacteria • Used in combination with other anti-tubercular drugs like Pyrazinamide, Isoniazide and Rifampin.	**1 M each**
6		**Attempt any <u>FOUR</u> of the following**	**16M (4X4M)**
6	a)	**Draw structure of given chemical name:** **(i) 2-bromo-2-chloro-1,1,1 trichloro ethane**  ***Note : (Assessor should give the appropriate marks to students for attempting this**	**1 M each**

question)

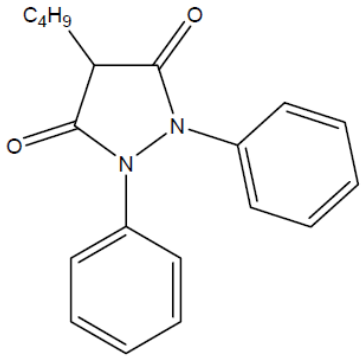
(ii) 2-diethyl aminoethyl-4-amino benzoate.



(iii) 5,5 diphenyl imidazolidine 2, 4-dione.



(iv) 4-butyl-1, 2-diphenyl pyrazolidine 2, 4-dione.

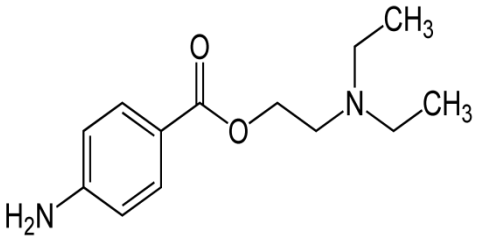


6 b) Differentiate between general and local anesthetics. **3M (Any 3 diff.)**

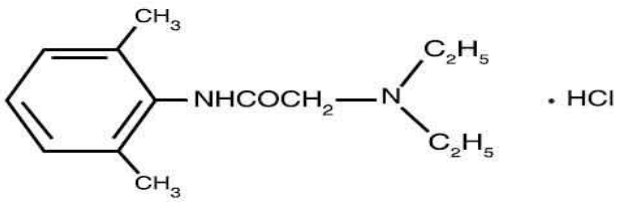
Sr No		General anesthetics	Local anesthetics
1	Site of action	Central Nervous System (CNS)	Peripheral nerves
2	Area of body involved	Whole body	Restricted area
3	Consciousness	Lost	Not lost
4	Poor health patient	Risky	Safer
5	Use in non-cooperative patient	Possible	Not Possible
6	Major surgery	preferred	Not preferred
7	Minor surgery	Not preferred	preferred
8	Care of vital organs	Essential	Usually not needed
9	Examples	Chloroform, diethylether, Thiopental sodium etc.	Benzocaine, Procaine, Lignocaine etc.

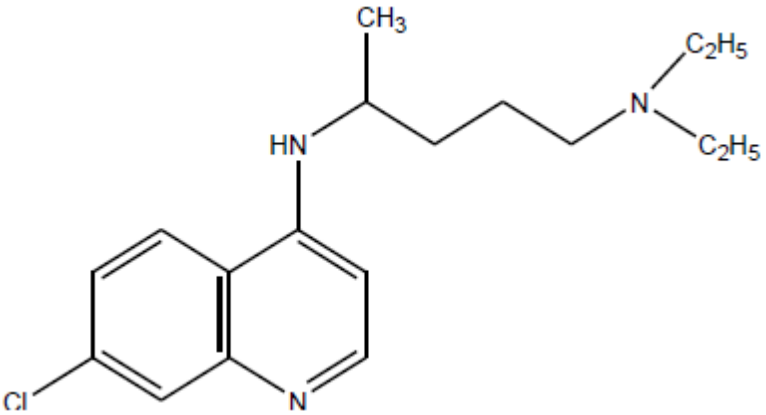
1 M struct.

Procaine structure

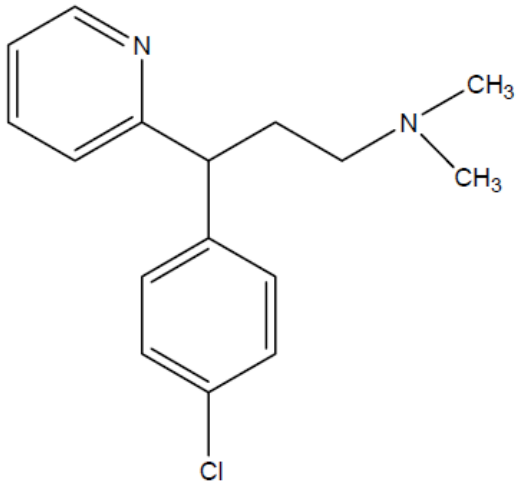


Structure of Lignocaine

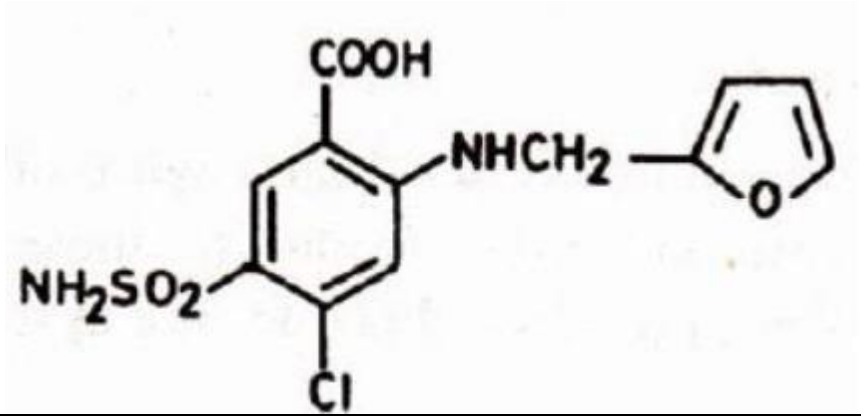


6	c)	**Classify the antimalarial with examples. Draw the structure of Cloroquine with its chemical name.** **Classification-** • Quinine salts e.g. Quinine sulphate, Quinine phosphate, Quinine dihydrochloride. • 8-Aminoquinolines e.g. Pentaquine, Isopentaquine, Pamaquine, Primaquine. • 4-Aminoquinolines e.g. Chloroquine ,Amodiaquine. • 9-Aminoacridines e.g. Quinacrine, Mepacrine. • Biguanides e.g. Proguanil, Cycloguanil • Diaminopyrimidines. e.g. pyrimethamine. • Artemisinin & its derivatives. • Miscellaneous: - They are further classified as mentioned below a) Sulfones &sulfonamides. b) Antibiotics **Structure of Chloroquine**  **Chemical name:** 7-Chloro-4-[4'-(diethylamino)-1-methyl butyl] amino quinoline	**3 M** **classify** **1M** **1M**

6	**d)**	**What is histamine? Define and classify antihistamines with example. Draw structure of chlorpheniramine.** **Histamine:-**Histamine is a potent biogenic amine, stored in mast cells in inactive form. Effect of Histamine release in the body varies from simple skin rash to anaphylactic shock. **Definition – Antihistaminic agents:** 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:** **1) H1 receptor antagonist :-** a) Amino alkylethers : Diphenhydramine b) Ethylenediamines : Mepyramine , Tripelennamine c) Alkyl amines: Pheniramine, Chlorpheniramine, Bromopheniraime, Triprolidine. d) Phenothiazine derivatives : Promethazine, Trimeprazine e) Piperazine derivative : Cyclizine, Chlorcyclizine, Meclizine, Buclizine, f) Miscellaneous: Cyproheptadine, Diphenylpyraline, Phenindaminetartarate, Antazoline. **2) H2 receptor antagonist**: - Cimetidine, Ranitidine, Burimamide, Metiamide. **Structure of Chlorpheniramine:**	**1 M Each**

			
6	**e)**	**What are sex hormones? Give properties, uses and official preparations of testosterone.** Sex hormones are the hormones which are produced mainly in gonads, ovaries or testes. They influence the development and maintenance of the structures directly and indirectly associated with reproduction. Three main types of sex hormones are 1. Androgenic or anabolic steroids 2. Oestrogens 3. Progestogens. **Properties of Testosterone:** • It occurs as white crystalline powder • It is practically insoluble in water • Soluble in fixed oils • It is incompatible with oxidising agents • It should be protected from light **Uses of testosterone** • 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. • It is useful in certain anemias, osteoporosis and to stimulate growth in undergrown boys.	**1 M each**

		• It is used to increase athletic performance and maintain muscle tone. • Used in palliative treatment of disseminated breast cancer in postmenopausal women. • Used in treatment of gynaecomastia. **Official Preparations:-** • Testosterone B.P. • Testosterone Implants B.P. • Testosterone Propionate B.P. IP • Testosterone Propionate Injection B.P. IP • Testosterone Phenyl Propionate B.P. • Testosterone Phenyl Propionate Injection B.P. • TestosteroneDecanoate B.P. • TestosteroneEnanthate B.P. • TestosteroneIsocaproate B.P.	
6	**f)**	**Define diuretics. Classify them with examples. Give the structure of furosemide** **Definition**: - Diuretics are the drugs which increase the rate of formation & excretion of urine through kidneys. They increase the excretion of sodium ion and other ions along with water by decreasing its reabsorption. **Classification - I:** • Water& Osmotic diuretic. E.g. mannitol and urea • Carbonic anhydrase inhibitors (sulfonamides). E.g. Acetazolamide, Methazolamide • Acidifying drugs. E.g. Ammonium chloride. • Mercurial agents. E.g.Mercaptomerin • Thiazides diuretics. E.g .Chlorothiazide, Chlorothalidone, Hydrochlorothiazide • Miscellaneous i. Potassium sparing diuretics- e.g.Triamterene, amiloride ii. Aldosterone antagonist- e.g. Spironolactone iii. High ceiling diuretics/ Loop diuretics E.g. Furosemide, Ethacrynic acid	**1 M** **2 M**

		OR **Classification- II:** • Weak diuretics a) Osmotic diuretics- Urea, sodium and potassium salts b) Non electrolytes- Mannitol, Glucose c) Carbonic Anhydrase Inhibitors - Acetazolamide, Methazolamide, d) Xanthine derivatives- Caffeine, Theophylline, Theobromine • Moderately potent diuretics: Chlorothiazides, Hydrochlorothiazide, Benzothiazides • Very potent/ loop/ high ceiling diuretics: Frusemide, Ethacrynic acid • Potassium sparing diuretics: Triamterene, Amiloride, aldosterone blocking agents- Spironolactone • Antidiuretic hormone: Lithium salts • Miscellaneous: Ammonium chloride, Calcium chloride **Structure of furosemide** 	**1 M**