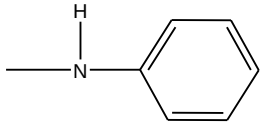
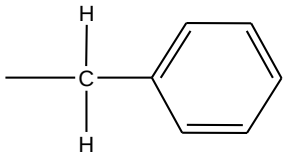
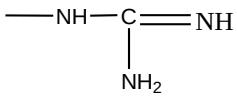
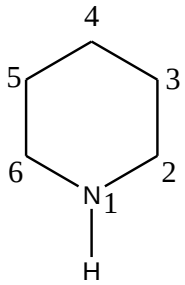
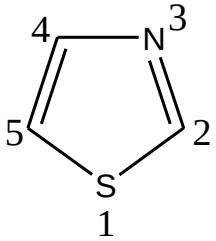
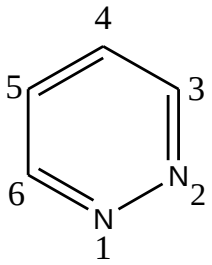
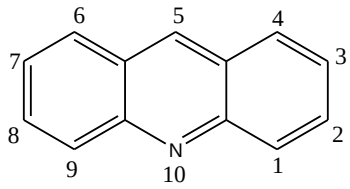
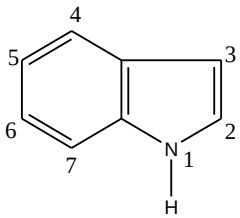
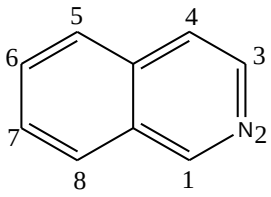
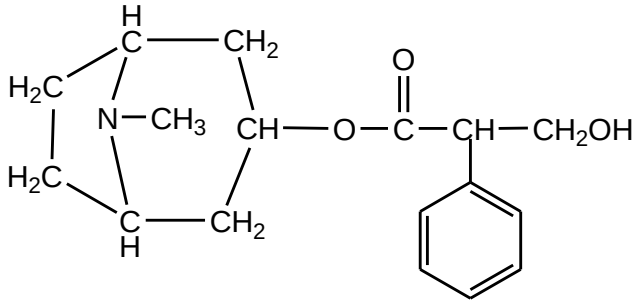
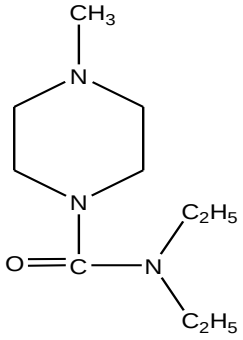
Important Instructions to examiners:

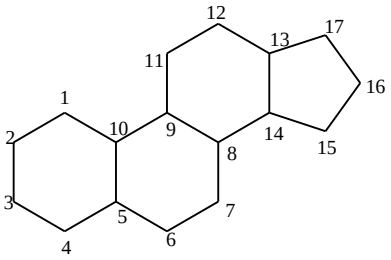
1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
3) The language errors such as grammatical, spelling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

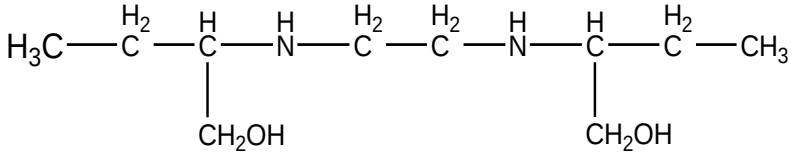
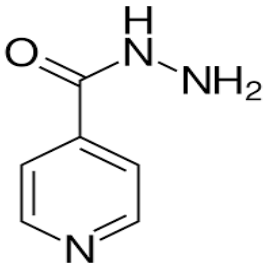
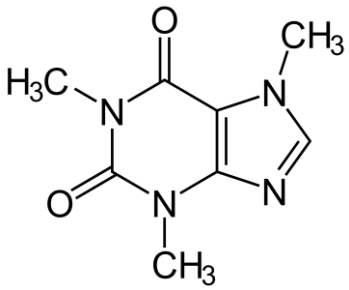
1		**ATTEMPT ANY <u>EIGHT</u> OF THE FOLLOWING.**	**16M (8X2M)**
1	**a)**	**Write the structure of following (any two):** (i) Anilino  (ii) Benzyl  (iii) Guanidinyl 	**1 M each**
	b)	**Write the structure with numbering of the following : (any two)** (i) Piperidine  (ii) Thiazole 	**1 M each**

		(iii) Pyridazine 	
	c)	**Write the structure with numbering of the following : (any two)** (i) Acridine  (ii) Indole  (iii) Isoquinoline 	**1 M each**
	d)	**Give uses of (any two) :** **(i) Glyceryl trinitrate :** It is used i) For prophylaxis and relief in angina pectoris.	**1 M each**

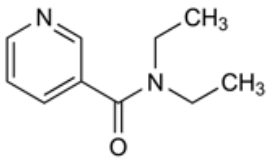
		ii) For relief of coronary artery spasm. iii) To treat congestive heart failure. iv) To treat myocardial infraction. **(ii) Nystatin** : It is antifungal drug and is used : i) For prophylaxis and treatment of candidiasis of skin and mucous membrane. ii) For treatment of intestinal and oesophageal candidiasis. iii) For candidiasis of mouth and vagina. **(iii) Pilocarpine** It is used : i) As miotic ii) To reduce intraocular pressure in glaucoma. iii) For diagnosis of Adie's (tonic) pupil. iv) To counteract anticholinergic side effects (eg. Dryness of mouth, constipation etc).	
	e)	**Define the following giving example.** i) **<u>Anthelmintic</u>** – 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. Eg. Piperazine citrate, Diethyl Carbamazine citrate (DEC), emetine. ii) **<u>Anticoagulant</u>**: - An anticoagulant is a substance that prevents coagulation; that is, it stops blood from clotting and anticoagulants are given to people to stop thrombosis (blood clotting in appropriately in the blood vessels). E.g. Heparin, warfarin, Dicoumarol, Nicoumalone, Phenindione	**1 M each**
	f)	**Give the dosage forms in which following drugs are given:** **i) Salbutamol** • Salbutamol injection • Salbutamol tablet • Salbutamol syrup	**1 M each**

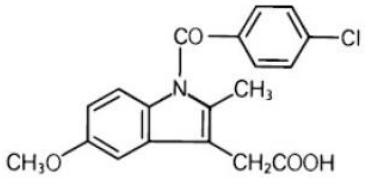
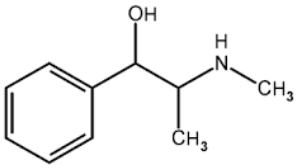
		• Salbutamol aerosol inhalation. ii) **Insulin** • Insulin injection • Neutral insulin injection • Biphasic insulin injection • Globin zinc insulin injection • Isophane insulin injection • Protamine zinc insulin injection	
	g)	**Write the structure of following drugs**: **(i) Structure of Atropine**  **(ii) Structure of DEC** 	**1 M each**
	h)	**Name the drug present in the following brand :** (i) **Valium:-** Diazepam drug is present in Valium. (ii) **Mebex** :- Mebendazole drug is present in Mebex.	**1 M each**
	i)	**Give use of Fluoresceine sodium** • It is used as 2% solution in ophthalmic practice to detect corneal lesions and foreign	**2 M**

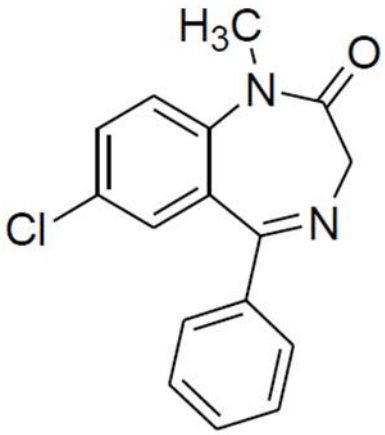
		bodies in the eye. • It is used intravenously (5 to 20% solution) for investigation of circulatory disorders.	
	j)	**Draw the structure of basic steroidal nucleus. Give two uses of Hydrocortisone.** **Basic steroidal nucleus**  **Uses of Hydrocortisone –** • For replacement therapy in adrenal insufficiency. • This medication is used to treat a variety of skin conditions (e.g., insect bites, eczema, dermatitis, allergies, rash, itching). • Hydrocortisone reduces the swelling (anti-inflammatory), itching, and redness that can occur in these types of conditions • To treat rheumatoid arthritis and neuro-muscular disorders.	**1 M each**
	k)	**Give stability storage conditions of the following :** (i) **Diethyl ether:** It is oxidized by atmospheric oxygen and is affected by light hence should be stored in well closed, light resistant container in a cool place. The label should bear • Very inflammable • Do not use near an open flame • Name and proportion of stabilizer added. • An antioxidant like propyl gallate or hydroquinone is added to prevent oxidation of ether to peroxides which are explosive and harmful. (ii) **Adrenaline:** It can be oxidized by air or oxygen to get pink or red colour complex. It darkens on exposure to light and air; hence it is stored in tightly closed light	**1 M each**

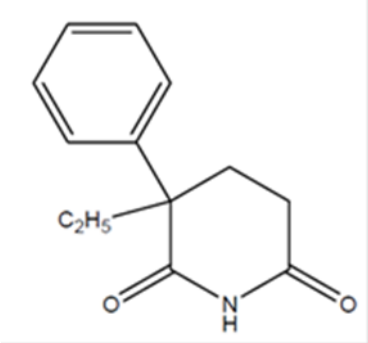
		resistant containers.	
	l)	**Give structure and chemical name of Ethambutol.** **Structure of Ethambutol**  **Chemical name** :- Bis-(1-hydroxy methyl propyl) ethylene diamine OR N,N'-Ethylene-Bis (2 -amino-butan-1-ol)	**1 M** **1 M**
2		**Attempt any FOUR of the following:**	**12M (4x3M)**
	a)	**Write structure and chemical name for :** **(i) Isoniazid** **Structure of Isoniazid**  **Chemical name** :-P**yridine-4-carbohydrazide OR Isonicotinic acid hydrazide** **(ii) Caffeine:-** **Structure of Caffeine** 	**1 ½ M each**

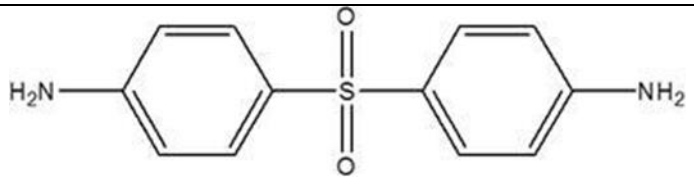
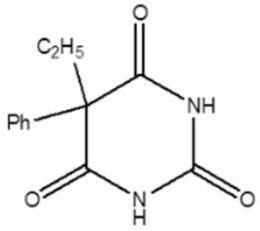
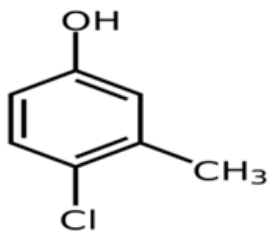
		Chemical name :- 1,3,7 trimethyl xanthine	
	b)	**Define and classify sedative-hypnotics with examples.** **Hypnotics** :- These are the drugs which depress C.N.S. and produce sleep resembling natural sleep in normal dose. They are used to overcome insomnia. **Sedatives** :- These are the drugs which depress C.N.S. but do not produce sleep in normal dose but calms the nerves. They reduce excitement of nerves and hence are used in relief of tension, anxiety and restlessness. **Classification** :- 1. Barbiturates – These drugs contains barbituric acid nucleus in the structure and depending upon duration of action sub classified as follows : a) Long acting barbiturates – (6 hrs or more) e.g. Barbitone, phenobarbitone b) Intermediate acting barbiturates – (3 to 6 hrs) e.g. Butobarbitone c) Short acting barbiturates- (less then 3 hrs) e.g. Cyclobarbitone d) Ultrashort acting (intravenous) barbiturates – (1/2 to 1 hr) E.g. Methohexitone sodium, thiopentone sodium 2. Non-barbitgurates – a) Benzo 1,4, diazepine derivative e.g. Diazepam, Nitrazepam b) Piperidin-2,6 dione deravitive e.g. Glutethimide, Methyprylone c) Quinazolinones e.g. Methaqulone d) Alcohol and their derivatives e.g. Triclofos sodium e) Aldehyde and its derivatives e.g. Paraldehyde	**1 M** **2 M Classification**

		f) Acyclic nitrogen containing compound e.g. Meprobamate g) Miscellaneous e.g. Diphenhydramine hydrochloride, promethazine	
	c)	**Give structure, chemical name, physical properties and uses of Nikethamide**. **Structure** of **Nikethamide**  **Chemical name** :- N,N- diethyl pyridine- 3 -carboxamide **Physical properties:-** • It is colourless or slightly yellow oily liquid or crystalline mass. • It has faint aromatic odour and slightly bitter taste. • It is miscible in water, alcohol and ether. **Uses**: - i) It is used as respiratory stimulant. ii) To overcome CNS depression and respiratory depression caused by CNS depressant drugs.	**1 M.** **½ M** **½ M** **1 M**
	d)	**Define 'Vitamins' and classify them giving examples.** Vitamins: - Vitamins are the constituents of diet other than carbohydrates, fats, proteins and inorganic salts which are essential for normal metabolic function of the body. They are not used as building units for the structure of organism but actually useful for transformation of energy and for regulation of metabolism. **Classification** : 1. Fat soluble vitamins e.g. Vitamin A (Retinol), Vitamin D (Calciferol), Vitamin E (Tocopherol), Vitamin K (Phytomenadione) 2. Water-soluble vitamins	**1 M** **2 M**

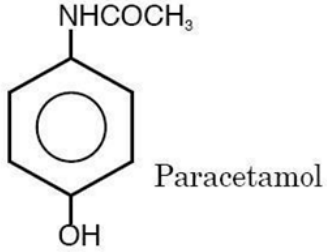
		e.g. Vitamin B1 (Thiamine), Vitamin B2 (Riboflavin / Lactoflavin), Vitamin B6 (Pyridoxine), Vitamin B12 (Cyanocobalamin), Folic acid, Nicotinic acid, Vitamin C (Ascorbic acid) 3. Fat- water insoluble vitamin: - e.g. Vitamin H (Biotin)	
	e)	**Give structure and chemical name of** **(i) Indomethacin** **Structure of Indomethacin**  **Chemical name :-** 1-(p-chlorobenzoyl)5-methoxy 2-methyl indol-3yl-acetic acid **(ii) Ephedrine.** **Structure of Ephedrine**  **Chemical name** :- 2-methylamino 1(phenyl) propan-1-ol	**1½ M each**
	f)	**Name the components of Co-trimoxazole. Write mechanism of antibacterial action and popular brand names.** **Components** : Co-trimoxazole mixture contains 5 parts of sulphamethoxazole and 1 part of trimethoprim. **Mechanism of action :** When Sulphamethoxazole is given alone resistance develops to susceptible bacteria and higher dose is needed and also produce toxic effects like crystaluria. Trimethoprim alone also develops resistance but when combination of these two drugs of similar pharmacokinetic properties is administered, the spectrum of	**1 M** **2M** **1M**

		antimicrobial activity increases. This is due to the synergistic effect arising from "sequential blockade" of both dihydropteroate synthatase and dihydrofolate reductase and thus prevents formation of tetra hydrofolic acid and acts as antibacterial activity. **Brand names** :- Bactrim, Septran, Ciplin	
3		**Attempt any FOUR of the following:**	**12M (4x3M)**
	a)	**Name a tranquilizer belonging to benzodiazepine class. Give its structure, chemical name and popular brand names.** Benzodiazepines: Diazepam, Alprazolam, Temazepam, Lorazepam, Nitrazepam **Structure of Diazepam**:  **Chemical name**: 7-chloro-1,3-dihydro-1-methyl-5-phenyl-2H-1,4-benzodiazepin- 2-one. **Diazepam brand names** :- Calmpose, Valium, Placidox, Anaxol, Quietal, Diazewok, Zepose	½ **M** **1M** ½ **M** **1M**
	b)	**What are Cardiotonics? Write about their hydrolysis products.** Cardiotonics: These are the drugs which have stimulating action on the cardiac muscles. They increase the force of muscle contraction without increasing oxygen consumption. Cardiac glycosides on hydrolysis yield corresponding sugar and aglycones.	**1M**

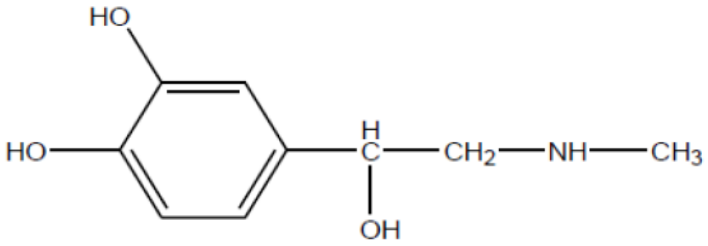
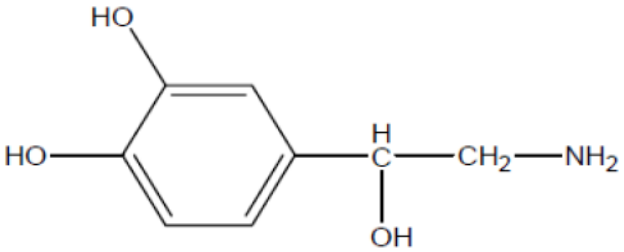
		<table><tr><th rowspan="2">Sr. No</th><th rowspan="2">Glycoside</th><th colspan="2">Products of Hydrolysis</th></tr><tr><th>Sugar</th><th>Aglycone</th></tr><tr><td>1</td><td>Digitoxin</td><td>3moleculesof digitoxose</td><td>Digitoxigenin</td></tr><tr><td>2</td><td>Digoxin</td><td>3 molecules of digitoxose</td><td>Digoxigenin</td></tr><tr><td>3</td><td>Lanatoside</td><td>2 molecules of digitoxose; 1 molecule of acetyl digitoxose and 1 molecule of glucose</td><td>Digoxigenin</td></tr></table>	**2M**
	c)	**Name a sedative- hypnotic containing piperidine ring in its structure. Give its structure and chemical name.** Sedative- hypnotic containing piperidine ring in its structure is **Glutethimide.** **Structure of Glutethimide**:  **Chemical name**: 3-Ethyl-3-phenyl-piperidine-2,6-dione **OR** 3-Ethyl-3-phenyl-glutarimide	**1 M each**
	d)	**Give structure and chemical name of:** **i) Dapsone** **Structure**	**Structure- 1M,** **Chemical name-**

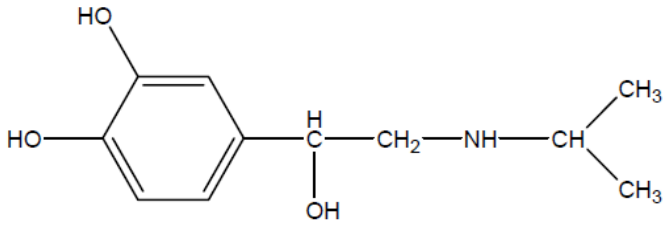
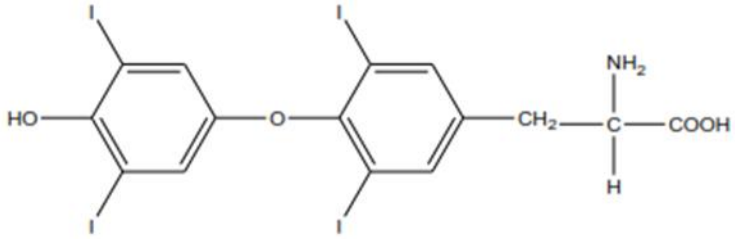
		 **Chemical name**: Bis (4-aminophenyl) sulphone OR 4,4' Diaminodiphenyl sulphone **ii) Phenobarbitone** **Structure**  **Chemical name:** 5-ethyl, 5-phenyl barbituric acid.	**½ M**
	e)	**Classify Antiseptics and disinfectants. Also write the structure of Chlorocresol.** **Classification:-** • Phenols & related compounds: Phenol, Chlorocresol. Chloroxylenol, Hexachlorophene • Alcohols & aldehydes: Alcohol, Formaldehyde • Halogen compounds: Chloramine t, Chorhexidine acetate, Dibromopropamidine • Organic mercurials: Merbromin (mercurochrome), Thiomersal • Dyes: Aminacrine hydrochloride, Brilliant green, Proflavine hemisulfate, Crystal Violet (gentian violet), Acriflavine • Cationic surface-active agents. e.g. Cetylpyridinium chloride, Benzalkonium chloride, Cetrimide • Miscellaneous agents. e.g. Dequalinium chloride, Nitrofurazone  	**2 M** **1 M**

	f)	**Define and classify 'Diuretics' with examples.** **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 **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	**1 M** **2 M**

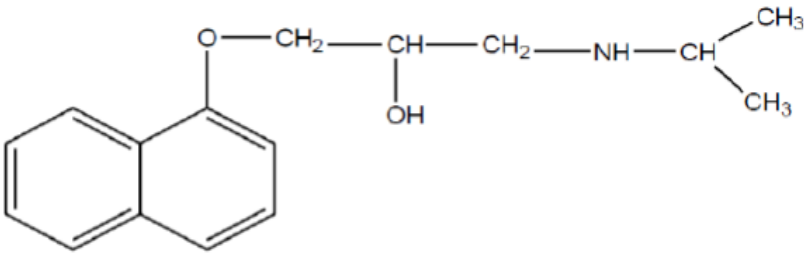
4		**Attempt any <u>FOUR</u> of the following**	**12M (4X3M)**
	a)	**Define and classify antipsychotics with examples.** Antipsychotics are also known as neuroleptics or major tranquilizers, are a class of medication primarily used to manage psychosis including delusions, hallucinations, paranoia or disordered thought, principally in schizophrenia and bipolar disorder. **Classification of antipsychotics:** a) Phenothiazines: Chlorpromazine, Prochlorperazine, Trifluoperazine b) Butyrophenones: Haloperidol, Droperidol, Trifluperidol c) Others: Thioxanthenes, Oxypertine, Thyothixene, Loxapine, Clozapine etc.	**1M** **2M**
	b)	**What is epilepsy? Classify the drugs used in the treatment of epilepsy with examples.** Epilepsy is a group of neurological disorders characterized by brief episodes of loss or disturbance of consciousness with or without body movement (convulsions). **Classification of antiepileptic drugs:** 1. Barbiturates: Phenobarbitone, Mephobarbitone, Metharbital 2. Hydantoin: Phenytoin, Mephenytoin 3. Oxazolidinediones: Trimethadione, Paramethadione 4. Succinimides: Ethosuximide, Phensuximide, Methsuximide 5. Benzodiazepines: Diazepam, Chlonazepam, Lorazepam, Nitrazepam 6. Miscellaneous: Carbamazepine, Valproic acid, Phenacemide, Pregabalin, Gabapentin.	**1M** **2M**
	c)	**Give structure, chemical name and uses of Paracetamol.** **<u>Structure :</u>**  Paracetamol	**1M each**

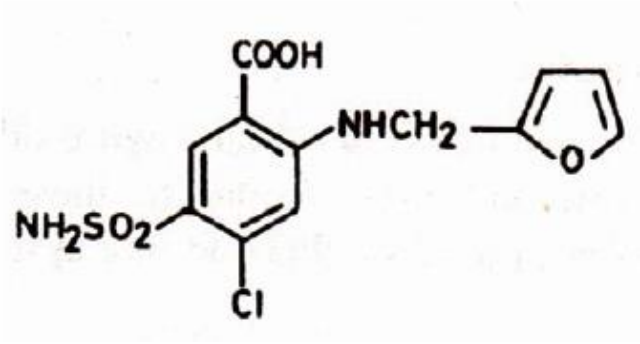
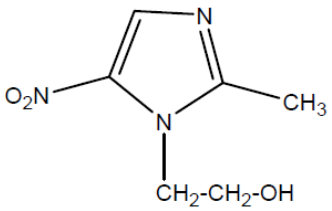
		Chemical name: p-hydroxy acetanilide OR 4-hydroxy acetanilide OR 4-Acetylamino phenol **Uses**: 1. Antipyretic 2. Analgesics for relief of pain such as headache, toothache, neuralgia, rheumatism.	
	d)	**Classify sulphonamides in at least two different ways.** **I) Chemical classification :-** • Substituents on aromatic amino group. e.g.-Prontosil. • Substituents on sulfonamido nitrogen. e.g.-sulfadiazine, sulfamethoxazole. • Substituents on both amino & sulfonamido group. e.g.-succinylsulfathiazole, phthalylsulfathiazole. • Sulfas without aromatic amino group. e.g.-Mafenide. • As antibacterials. e.g. Sulfadimidine, Sulfadiazine. **II) Antibacterials classification** • Sulphonamides used in eye infections. e.g. Sulfacetamide • Sulphonamides used in intestinal infections. e.g. sulfaguanidine,Phthalyl sulfathiazole,Succinyl ulfathiazole. • Sulphonamides used in systemic infections. e.g. Sulfadiazine, Sulfadimidine,sulfathiazole etc. • Sulphonamides used in burn infections. e.g. Silver Sulfadiazine • Sulphonamides used in urinary tract infections. e.g. Sulfafurazole, Sulfaphenazole, Sulfamethaxazole etc. **III) Classification based on duration of action and absorption** • Long acting: Sulfas having t/2 of about 24 hours. e.g. Sulfamethoxy-pyridazine, Sulfadiamethoxine. • Intermediate acting: Sulflas having t/2 between 10-24 hours. e.g. Sulfamethoxazole, Sulfasomizole. • Short acting: Sulfas having t/2 less than 10 hours.- e.g. Sulfathiazole,	**Any two** **1 ½ M Each**

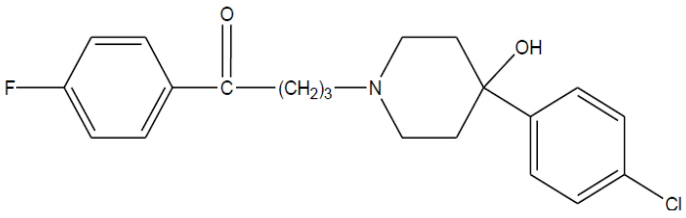
		Sulfisoxazole. • Poorly absorbable Sulphonamides- e.g. Sulfaguanidine, Phthalyl sulfathiazole, Succinyl sulfathiazole. **IV) Pharmacological basis of classification** • As oral hypoglycemics. e.g.-Tolbutamide. • As diuretics. e.g.-Furosemide, Chlorthalidone. • As antimalarials. e.g. Sulfadoxine. • As antidiarrhoeals.e.g.Phthalylsulfathiazole.	
	e)	**What are catecholamines? Write the structure of two catecholamines.** **Catecholamines** are class of aromatic amines which includes a number of neurotransmitters such as epinephrine, norepinephrine, and dopamine. They have catechol (benzene with two hydroxyl side groups at carbons 1 and 2) and a side-chain amine. **Structure of Adrenaline**:  **Structure of Nor adrenaline:** 	**1 M** **2M structures**

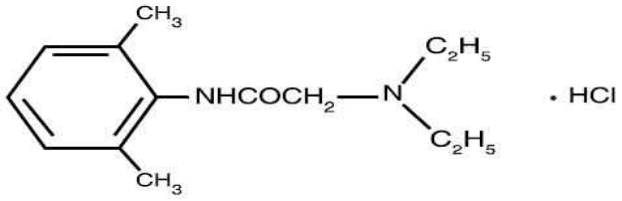
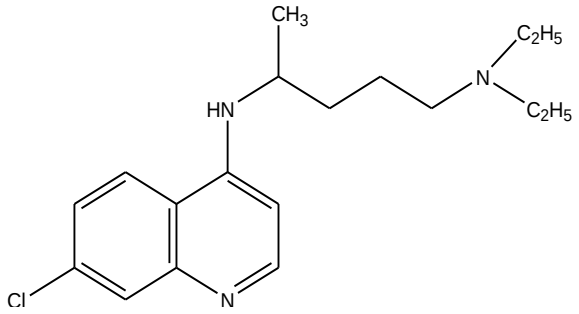
		Structure of Isoprenaline: 	
	f)	**Name the hormones secreted by thyroid gland. Write structure and chemical name of Thyroxine.** Hormones secreted by thyroid gland- 1. Thyroxine (T4) 2. Triiodothyronin (T3) 3. Calcitonin Structure and chemical name of Thyroxine.  **Chemical name:** 3,5,3'5'- Tetraiodo-thyronine	**1M each**
5		**Attempt any <u>FOUR</u> of the following**	**12M (4X3M)**
5	**a)**	**Give properties, uses, storage conditions for Aspirin.** **<u>Properties:</u>** • It is a colorless, odorless, crystalline powder. • It is soluble in water, alcohol, chloroform & ether. • It is stable in dry air, but gradually hydrolyses in contact with moisture to acetic	**1M each**

		acid & salicylic acid. • It also gets decomposed by alkali hydroxides & carbonates. **Uses:** • It is a salicylate drug, often used as an analgesic to relieve minor aches and pains. • It is used as an antipyretic to reduce fever. • It is used as an anti-inflammatory medication. • Aspirin also has an antiplatelet effect & so aspirin is used at low doses, to help prevent heart attacks, strokes, and blood clot formation in people at high risk for developing blood clots. **Storage conditions:** It should be stored in air tight containers, in a cool, dry place.	
5	**b)**	**Define and classify Antihistaminic agents with examples.** Definition- An antihistaminic is an agent that inhibits the release or action of histamine and can be used to describe any histamine antagonist, but it is usually reserved for the classical antihistamines that act upon the H1 histamine receptor and H2 receptor blockers are used in the treatment of stomach ulcer, gastric ulcer, heart burn etc. **Classification of Antihistaminics:** 1. H1 blockers or H1 antagonist: • Aminoalkylethers/Ethanolamines e.g. Diphenhydramine, Doxylamine • Ethylenediamine e.g.Mepyramine, Tripelennamine, Pyrilamine • Alkylamines/Propylamines e.g. Pheniramine, Chlorpheniramine, Triprolidine • Phenothiazine derivatives e.g. Promethazine, Trimeprazine • Piperazine derivatives. e.g Meclizine, Cyclizine, Chlorcyclizine • Dibenzocycloheptenes: Cyproheptadine, Azatadine • Second generation antihistaminics: e.g. Cetrizine, Levocetrizine, Fexofenadine, Terfenadine 2. H2 Blockers or H2 receptor antagonist e.g. Ranitidine, Cimetidine, Famotidine 3. An inhibitor of histamine release e.g. Sodium Cromoglycate	**1 M** **2 M**

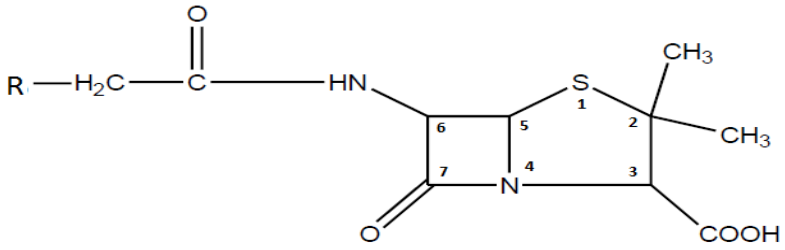
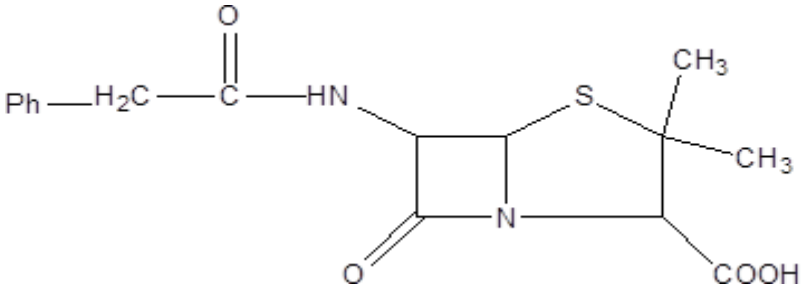
5	c)	**Give structure and important therapeutic uses of Propranolol.**  **Therapeutic uses of Propranolol:** 1. It is a typical beta adrenergic receptor blocker used in the treatment of cardiac diseases like • Angina pectoris • Cardiac arrhythmia • Hypertension • Congestive heart failure • Coronary atherosclerosis 2. Treatment of Pheochromocytoma 3. Treatment of tachycardia	**1.5 M each**
5	d)	**Define and classify Antitubercular agents.** **Definition**: The agents used in treatment of tuberculosis, a disease caused by *Mycobacterium* species (*M. Tuberculosis, M. bovis or M. africanum*) characterized by formation of nodular bodies or tubercles. **Classification of Antitubercular drugs:** 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 **OR**	**1 M** **2 M**

		i) First line drugs e.g. Isoniazid, Rifampin, Ethambutol, Pyrazinamide, Streptomycin, Thioacetazone etc. ii) Second line drugs e.g.Ethionamide, Kanamycin, capreomycin, Cycloserin, Para amino salicylic acid etc. iii) Third line drugs e.g.Clarithromycin, Thioacetazone **OR** i) Synthetic anti-tubercular drugs: E.g.Para Amino Salicylic acid (PAS), Isoniazide, Ethambutol, Pyrazinamide, Ethionamide ii) Antibiotics: E.g.Streptomycin, Cycloserine, Rifampin, Clarithromycin	
5	**e)**	**Name one drug each containing following heterocycle and draw the structure of the drug:** **(i) Furan** Name of the drug:- Furosemide  **(ii) Imidazole** Name of the drug:- Metronidazole  	**1.5 M each**

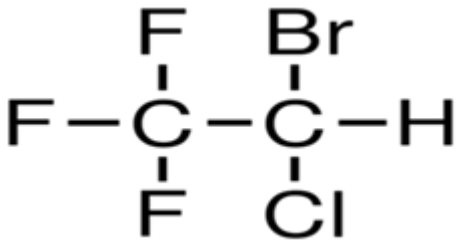
5	f)	**Define Hypoglycemic agents and classify them with examples.** **Definition**- Hypoglycemic agents are the drugs that decrease the level of glucose in the blood and are used in the treatment of diabetes mellitus characterized by hyperglycemia, glycosuria, polyuria, polydypsia etc. **Classification-** **1. Parenteral hypoglycemic** e.g. Insulin preparations A) Short acting- Neutral Insulin B) Intermediate acting- Isophane (NPH) Insulin, Lente Insulin C) Longer acting- Ultralente Insulin **2. Oral hypoglycemic** A) Sulphonylureas- Tolbutamide, Chlorpropamide, Glipizide, Glibenclamide B) Biguanides- Phenformin, Metformin C) Thiazolidinediones (TZDs)- Rosiglitazone, Pioglitazone D) Alpha glucosidase inhibitors- Acarbose, Miglitol, Voglibose	**1 M** **2 M**
6		**Attempt any FOUR of the following**	**16M (4X4M)**
6	a)	**Write the name of the drug with following chemical name and draw its structure:** **(i) 4-[4-(4-Chlorophenyl)-4-hydroxy piperidino]-4-fluoro butyrophenone** **Name of the drug:-** Haloperidol **Structure**  **ii)N- diethyl amino acetyl – 2,6- Xylidine** **Name of the drug:-** Lignocaine hydrochloride **Structure**	**2 M each**

			
6	**b)**	**Classify Antimalarial agents. Also give the structure of Chloroquine with 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	**2 M** **1 M** **1 M**
6	**c)**	**Define and classify cardiovascular agents.**	

		Definition- 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. **Classification:** **1) Cardiotonic drugs**: Cardiac glycosides obtained from Digitalis, stropanthus like Digoxin, Digitoxin, Gitoxin. **2) Antiarrhythmic agents:** a) Membrane stabilizing agent: - Quinidine, Procainamide, Diisopyramide, Phenytoin b) Beta blockers: Propranolol c) Drugs that prolong the duration of action potential:-Amiodarone d) Calcium channel blocker: Verapamil, Amlodipine, Diltiazem **3) Antianginal agents:** - a) Organic nitrates –Amyl nitrate, Glyceryl trinitrate, Isosorbid nitrate b) Calcium channel blocker:-Verapamil c) Beta blockers:-Propranolol **4) Antihypertensive drugs:** - a) Centrally acting drugs:- alpha-methyl Dopa, Clonidine b) Ganglionic blockers - Pentolinium, Mecamylamine c) Adrenergic neuron blockers -Reserpine, Guanethidine d) Beta blockers: - Propranolol, Atenolol e) Alpha blockers: - Prazocin, Tolazoline f) Direct acting vasodilators -Hydralazine ,Minoxidil g) Calcium channel blocker:-Verapamil, Diltiazem, Nifedipine h) Angiotensin converting enzyme inhibitors:-Captopril, Enalapril, Lisinopril **5) Antihyperlipidemic drugs:**-Clofibrate, Simvastatin, Atorvastatin **6) Anticoagulants:**-Heparin **7) Antiplatelet agents:**-Aspirin	**1 M** **3 M**

		8) Diuretics:-Frusemide, Thiazide	
6	**d)**	**Draw and explain the structure of basic nucleus of penicillins. Also give the structure of 'Penicillin G' with its chemical name.** Penicillin is the first antibiotic to be discovered. The various penicillins are obtained by fermentation using various strains of mold penicillium. The penicillins are strong monobasic acids. They readily form salts and esters. The penicillins are derivatives of 6-amino penicillanic acid. Penicillin contains β-lactum ring, a 4-membered cyclic amide, which is fused with thiazolidine ring. This bicyclic heterocyclic system is called penam. –COOH functional group is present at C_3 and amide group at C_6. **Basic structure of penicillin**  **Structure of Penicillin G(Benzyl penicillin)**  **Chemical name: 6-(2-phenylacetamido) penicillanic acid**	**1 M each**

	e)	**Define and classify Antineoplastic agents with examples. Give properties and uses of methotrexate.** **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, in other words, antineoplastic agents are used in the treatment of cancer. **Classification:** • Alkylating Agents. • Nitrogen mustard drugs: Mustine, Chormabucil, cyclophosphamide • Aziridines: Thiotepa • Alkyl sulphonate: Busulphan • Nitrosourea group compound: Lomustine • Antimetabolites: Methotrexate, Mercaptopurine, Azathioprine, Fluorouracil • Antibiotics: Actinomycin, Daunorubicin, Doxorubicin • Plant Products: Sulphates of vinblastin and vincristine. • Hormones and related drugs: Glucocorticoids, Tamoxifen • Miscellaneous agents: Hydroxyurea, cisplatin **Properties**- • It occurs as pale yellow to orange crystalline powder. • It is insoluble in water, soluble in dilute alkali & acid solutions. • When heated to decomposition it emits toxic fumes including /nitrogen oxides. **Uses**- • 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.	**0.5 M** **2 M** **0.5 M** **1 M**
6	**f)**	**Define and classify general anaesthetics. Give structure and chemical name of halothane.** **Definition**: General anaesthetics are the central nervous system depressant drugs which bring about loss of all modalities of sensations along with a reversible loss of consciousness.	**0.5 M**

		Classification: 1) Inhalation anaesthetics:-It includes 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) Intraveneous anaesthetics:- i) Barbiturates: Ultra short acting barbiturates such as Methohexitone, Thiopentone sodium ii) Non-barbituates: a) Eugenol derivatives. e.g. Propanidid b) Phencyclidine derivatives. e.g Ketamine c) Steroids. e.g. Althesin d) Miscellaneous. such as Etomidate, Propofol	**1.5 M** **1 M**
		Structure -  **Chemical name** – 2-bromo-2-chloro-1,1,1-trifluoro ethane.	**1 M**