MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION
(Autonomous)
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MODEL ANSWER
SUMMER 2019 EXAMINATION
Subject Title: Pharmacology & Toxicology Subject Code: 0813

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.

Q. No	Sub Q. N.	Answer	Marking Scheme
1		**Define any EIGHT of the following terms with two examples of each.**	**16M**
1	**a)**	**Chemotherapy:** It is defined as the use of chemical compounds in the treatment of infectious disease so as to destroy the microorganisms without damaging the host tissues. Ex. Peniciliins, Cephalosporins, Tetracyclines, Streptomycin, Amoxycillin, etc.	**1M def. Any two correct examples 1M.**
	b)	**Antiemetic:-** These are the agents used in treatment of vomiting. Eg: Phenothiazine, Hyoscine, Meclizine, Promethazine, Domperidone, Ondansetron ,Chlorpromazine etc.	**1M def. Any two correct examples 1M.**
	c)	**Haemostatic:-** These are the pharmacological agents which when administered stop or arrest bleeding from capillary vessels. E.g. Gelatin sponge, Oxidized cellulose, Fibrinogen, Thrombin, Thromboplastin, Vitamin,K ,Ethamsylate	**1M def. Any two correct examples 1M.**
	d)	**Antiarrhythmic agents:-** These are the agents used to correct cardiac arrhythmia i.e. disturbance in cardiac rhythm. Eg: Quinidine, Procainamide, Propranolol, Lignocaine, Phenytoin, etc.	**1M def. Any two correct examples 1M.**
	e)	**Vermicidal:-** These are the agents which kill parasitic worms. Ex. Piperazine, Mebendazole, Pyrantel pamoate, Tetramisole Albendazole etc.	**1M def. Any two correct examples 1M.**
	f)	**Autocoids:-**	**1M def.**

		Autocoids are local hormones with high biological activity and naturally found in body as active or inactive forms. Ex. Histamine, Serotonin, 5 hydroxytryptamine, Bradykinin, Angiotensin, Prostaglandins etc.	**Any two correct examples 1M.**
	g)	**Miotics:-** These are the agents which produce miosis i.e. constriction of pupil. Eg. Parasympathomimetics like Physostigmine, Pilocarpine,Carbachol etc.	**1M def. Any two correct examples 1M.**
	h)	**Fibrinolytics:-** The drugs which activate blood plasminogen to cause lysis / breakdown of thrombus are called fibrinolytics. Ex. Urokinase, Streptokinase etc.	**1M def. Any two correct examples 1M.**
	i)	**Analeptics:-** These drugs stimulate central nervous system and stimulate the respiratory centre improving respiration. Examples: Caffeine, Amphetamine, Nikethamide, Doxapram, Bemigride etc.	**1M def. Any two correct examples 1M.**
	j)	**Expectorants:-** These are the drugs which increase the secretion of the respiratory tract, thereby reducing the viscosity of the mucus and help in its removal from the respiratory tract. Eg: Ammonium chloride, Potassium iodide, Ammonium bicarbonate, Ipecac etc.	**1M def. Any two correct examples 1M.**
	k)	**Diuretics:-** These are the pharmacological agents which when administered, increase rate of formation of urine as well as excretion of urine. Examples: Mannitol, Theophylline, Acetazolamide, Furosemide, Spironolactone, Chlorothiazide etc.	**1M def. Any two correct examples 1M.**

	l)	**Disinfectants:-** These are the pharmacological agents having bactericidal properties that can be directly applied on inanimate objects for making them free from microorganisms. Examples: Phenols, Formaldehyde, Cresol, Chlorocresol, etc.	**1M def. Any two correct examples 1M.**
2		**Attempt any FOUR of the followings**	**12M**
2	**a)**	**Define Pharmacodynamics. Explain different mechanisms of drug action.** **Pharmacodynamics**: It includes the study of mechanism of action and pharmacological effects of drug on biological system. It is what drug does to the body. **Different mechanisms of drug action**:- 1) Physical action: physical property of drugs like adsorptive property or osmotic or radio-opacity, Radioactivity. Ex. Bulk laxative ispaghula 2) Chemical Action: Drugs act by chemical reaction Ex. Antacids directly neutralizes gastric acid. 3) Enzyme inhibition or ion channel blocking: All biological reactions are carried out by enzymes; if particular enzyme is inhibited there is loss of particular function. Ex. ACE inhibitors: Enalapril, Captopril. 4) Receptors: Various drugs act by either stimulating or inhibiting receptors in the body. Ex. Salbutamol stimulates beta adrenergic receptor and produce bronchodilation and help in bronchial asthma. 5) By altering metabolic processes: drugs like antimicrobial alter metabolic pathway in microorganisms. Ex. Sulphonamide interfere with bacterial folic acid synthesis. **OR** 1) Stimulation: Certain drugs produce their action by increasing the activity of specialized cells.eg Caffeine stimulates brain cells, cardiac stimulants like Digoxin stimulate cardiac cells	**1M def. Mecha. 2M.**

		2) Depression: Certain drugs produce their action by decreasing the activity of specialized cells. E.g. CNS depressants like Diazepam, Phenobarbitone etc. 3) Replacement: Drugs can be used as replacement when production of endogenous substance is reduced. E.g. Use of Insulin in Diabetes mellitus, also Hormone replacement treatment 4) Inhibition of Microorganisms: e.g. antibiotics, antifungals etc. 5) Irritation: certain drugs produce changes in cellular structure and affect growth of cells. G I irritants like Senna glycosides 6) Physical Action: Drugs like kaolin act in mechanical way because of its adsorption property. 7) Chemical Reaction: Drugs show their effect due to chemical reaction. E.g. Antacids neutralize gastric acidity.	
2	**b)**	**Explain plasma protein binding of drugs and give its significance.** This is the phenomenon seen when the drug gets distributed in the blood plasma. Some drugs have affinity to get bound to plasma proteins depending upon their physicochemical Properties. So drugs may exist as Free drug (i.e. Unbound) & bound Drugs. Some drugs are highly protein bound: e.g. Sulpha drugs, Aspirin, warfarin, diazepam etc. **Significance:** 1) Increase in duration of action of drugs: To maintain dynamic equilibrium between free and bound drug, there would be release of drug from protein bound fraction. Hence highly protein bound drug would have longer duration of action and its dose & dosing frequency should be decided accordingly. 2) Possibility of drug interactions: drug interactions can occur when 2 or more drugs having high protein binding affinity for the same plasma protein are given simultaneously. This may result in displacement of one drug by the other & may result in toxicity.	**Explain 1.5M Significance 1.5M**
2	**c)**	**Define antagonism. Differentiate between competitive and non-competitive antagonism.**	**1M Def. 2M for**

		Define: The opposite action of two drugs on the same physiological system is called as Antagonism.	**any four correct points**

Competitive antagonism (Reversible)	**Non-competitive antagonism (Non-reversible)**
1) Competitive antagonists bind to same receptor as agonist.	1) Non-competitive antagonist binds to another site over the receptor other than agonist.
2) Competitive antagonist chemically resembles with agonist.	2) Non-competitive antagonist does not resemble with agonist.
3) Same maximal response can be attained by increasing dose of agonist.	3) Maximal response cannot be attained by increasing dose of agonist.
4) It reduces affinity	4) Non-competitive antagonist reduces efficacy.
5) Response depends upon concentration of both agonist and antagonist.	5) Response depends only on concentration of antagonist.
6) Examples:Atropine,Propranolol etc.	7) Examples Verapamil , Isoprenaline , Phenoxybenzamine etc

2	**d)**	**Classify oral hypoglycemic with examples. Give Mechanism of action of metformin.** **Classification:-** 1) Sulfonylureas a) First generation:- Ex. Tolbutamide, Chlorpropamide b) Second generation:-Ex. Glibenclamide, Glipizide, Gliclazide 2) Biaguanides: Metformin, Phenformin 3) Thiazolidinediones: Pioglitazone 4) Meglitinides: Repaglinides	**2M Classification 1M for MOA.**

		5) Alpha Glucosidase inhibitors: Acarbose 6) Newer agents: Sitagliptin, Extenaide, Canagliflozin etc. **OR** A. Enhance insulin secretion 1. Sulfonylureas i) First generation:- Ex. Tolbutamide ii) Second generation:-Ex. Glibenclamide, glipizide, gliclazide. 2. Meglitinides Ex. Repaglinide, Nateglinide 3. Glucagon like peptide-1 receptor agonists Ex. Exenatide, Liraglutide 4. Dipeptidyl peptidase-4 inhibtors Ex. Sitagliptin, vildagliptin, Sexagliptin B. Overcome insulin resistance I) Biguanide: Ex. Metformin II) Thaizolidinediones: Ex. Pioglitazone C) Miscellaneous antidiabetic drugs a) alpha glucosidase inhibitors: Ex. Acarbose, miglitol b) Sodium glucose cotransport-2:- Dapagliflozin **Mechanism of action**:- **Metformin** decreases hepatic glucose production, decreases intestinal absorption of glucose, and improves insulin sensitivity by increasing peripheral glucose uptake and utilization.	
2	**e)**	**Define drug metabolism. Explain first pass effect.** It is the alteration of drugs within living organism so as to modify its activity or nature. It is the chemical transformation of drug from one form to another within the body to	**1M def.** **2M Expl.**

		make it easier for excretion. **First pass effect:-** A **first-pass effect** is defined as the rapid uptake and metabolism of an agent into inactive compounds by the liver, immediately after enteric absorption and before it reaches the systemic circulation.	
2	**f)**	**Give advantages and disadvantages of intramuscular route of drug administration.** **Advantages:-** 1) Mild irritants, suspensions, colloids and injections with insoluble oily bases can be administered in this route. 2) This route also ensures uniform and slow absorption of drugs which includes drugs with low solubility as well as repository penicillin preparations. **Disadvantages:-** 1) If proper care is not taken there is possibility of injury to the nerves. 2) Injected drug may produce local pain and abscess formation. 3) Total volume of drug injected is restricted up to 10 ml. 4) Certain intramuscular injections need more time for absorption as compared to oral administration.	**1.5M. For any two correct points each**
3		**Attempt any FOUR of the followings**	**12M**
3	**a)**	**Name the drug producing following effect:** **i)** **Osteoporosis:** Corticosteroids like Beclomethazone, cortisone; Antacids like Cimetidine,ranitidine; Anticovulsants like Carbamazepine,phenobarbiotne,phenytoin; Tricyclic Antidepressants ;Anticancer drugs like Methotrexate;Heparin **ii)** **G6PD deficiency**: Quinine, Pamaquine ,Primaquine, Quinidine, Aspirin,	**0.5 EACH**

		Sulphonamides, Antibiotics such as Quinolones, Nitrofurantoin **iii) Hypoglycemia:** Insulin, Sulphonylureas, Pioglitazone **iv) Hyperplasia of gums**:- Phenobarbital, Phenytoin **v) Extrapyramidal effect**: Haloperidol and Fluphenazine,Chlorpromazine; Metoclopramide **vi) Systemic alkalosis**: Sodium Bicarbonate, thiazide diuretics etc	
3	**b)**	**Mention the drug of choice in following condition:** i) **Rheumatoid arthritis**: NSAIDs, Prednisone, Hydroxychloroquine, Sulphasalazine, Methotrexate, ii) **Candidiasis:** Clotrimazole, Nystatin, fluconazole, Amphotericin B iii) **Atherosclerosis**: Atorvastatin, Lovastatin, Gemfibrozil, Fenofibrate , Nicotinic acid, Ezetimibe etc. iv) **Skeletal muscle spasm**: Chlorzoxazone, NSAIDs, Methocarbamol v) **Leprosy**: Dapsone,Rifampicin,Clofazimine vi) **Depression:** Amitriptyline, Imipramine, Phenelzine ,Fluoxetin	**0.5 EACH**
3	**c)**	**Mention the drug contraindicated in following condition:** i) **Gastric bleeding**: Aspirin, Clopidogrel, Heparin,Warfarin, Prednisone ii) **Hypokalemia:** Diuretics, Chlorthiazide, Digitalis, Theophylline iii) **Edema**: NSAIDs like ,Ibuprofen, Prednisone, Corticosteroids, iv) **Mysthenia Gravis:** Streptomycin, Kanamycin v) **Lactation**: Anticancer drugs, Cyclosporine, Radiopharmaceuticals vi) **Congestive cardiac failure**: Calcium channel blockers, Verapamil and Diltiazem, Quinidine	**0.5 EACH**
3	**d)**	**Give dose of following drugs:** i) **Omeprazole:** 20-40mg/day ii) **Albendazole:** 400 mg orally , Less than 60 kg: 15 mg/kg/day orally iii) **Diazepam**: 2 to 10 mg orally 2 to 4 times a day orally	**0.5 EACH**

		iv) **Diclofenac:** 50 mg orally 3 times a day v) **Metoprolol**: 25 mg or 50 mg orally twice a day vi) **Pioglitazone**: 15 mg or 30 mg orally once a day.	
3	**e)**	**Give adverse drug reaction of following drug:** i) **Rifampicin:** Orange-red coloured urine, Hepatotoxiciy, Nephritis ii) **Nitroglycerin**: Headache, Dizziness, light headedness, postural hypotension, flushing iii) **Ibuprofen**: Gastritis, allergic reaction, precipitation of bronchial asthma, nephrotoxicity iv) **Digitalis:** Hypokalemia, Cardiac arrhythmia ,Anorexia v) **Insulin:** Hypoglycemia, Allergic reaction vi) **Kanamycin**: Ototoxicity, Nephrotoxicity, teratogenicity	**0.5 EACH**
3	**f)**	**Give therapeutic use of following drugs:** i) **Acyclovir:** As antiviral agent in Chicken pox, Herpes ii) **Noscapine:** As antitussive agent ,used in cough iii) **Indapamide:** Diuretic, Antihypertensive iv) **Cetrizine:** As antihistaminic, antiallergic, v) **Loperamide:** As antidiarrheal agent vi) **Bisacodyl:** As laxative, in treatment of constipation.	**0.5 EACH**
4		**Attempt any FOUR of the followings**	**12M**
4	**a)**	**Classify antiasthmatic agents with examples.** **a)Bronchodilators :** i) Sympathomimetic: Salbutamol, Terbutaline, Adrenaline, Isoprenaline, Ephedrine ii) Xanthines: Theophylline, Aminophylline iii) Anticholinergics: Atropine **b)Anti-inflammatory agents:** i) Systemic: Hydrocortisone, Prednisolone	**3M**

		ii) Inhalational: Beclomethasone,Triamcinolone **c) Mast cell stabilizers**: Disodium chromoglycate, Ketotifen **d) Other agents**: Montelukast	
4	**b)**	**Give the pharmacological profile of adrenaline.** 1. On Heart: - Adrenaline with its action on B-receptors of heart increases heart rate, force of contraction and cardiac activity. 2. On Blood vessels and blood pressure: - The blood vessels of skin and mucous membrane are constricted. Adrenaline dilates blood vessels of skeletal muscles by acting on B-receptors. The net result is thus decrease in peripheral resistance. It show biphasic response in moderate dose 3. On Smooth muscles:-It causes relaxation of smooth muscles of bronchi, GIT, uterus etc. It is a powerful bronchodilator 4.Central Nervous system:- Therapeutic doses of adrenaline may give rise to tremors, restlessness, palpitation and apprehension 5. Metabolism:- It produces hyperglycemia by accelerating glycogenolysis in the liver. 6. Antiallergic action: - Adrenaline is a physiological antagonist of histamine and counters the bronchoconstriction and hypotension of anaphylactic shock. 7. If combined with local anesthetic prolongs its action locally.	**3M**
4	**c)**	**Define haematinics. Explain: Vitamin B12 injection is given in pernicious anaemia.** **Haematinics:** Are the drugs which when administered favour erythropoiesis i.e. synthesis of red blood cells and increase the oxygen carrying capacity of the blood. Eg: cynocobalamine, folic acid, iron etc. Pernicious anaemia is a type of vitamin B_{12} deficiency that results from impaired uptake of vitamin B_{12} due to the lack of a substance known as intrinsic factor produced by the	**1M defn.** **2M Expln.**

		stomach lining. So Vitamin B_{12} injection is given in pernicious anaemia because oral absorption is not possible due to lack of intrinsic factor	
4	**d)**	**Define epilepsy. Justify: During the treatment of epilepsy antiepileptic drugs should not be withdrawn abruptly.** Epilepsy is neurological disorder characterized by sudden periodic attacks of motor, sensory or psychological malfunction. The attacks called as seizures are initiated by the abnormal & irregular discharges of electricity from millions of neurons in the brain. Epilepsy is a periodic disturbance in the rhythm of the brain. The drugs used for the treatment of epilepsy require long term administration in order to prevent epileptic attacks. Since the antiepileptics mainly act by depressing the CNS, they may lead to recurrence of epileptic attack if withdrawn suddenly. So, during the treatment of epilepsy, drugs should be withdrawn gradually to avoid withdrawal syndrome.	**1M def.** **2M Expl.**
4	**e)**	**Classify Parasympathomimetics with examples.** **Parasympathomimetics-** These are the drugs which produce the actions similar to those seen by the stimulation of parasympathetic nervous system. **Classification:** □ Esters of choline- Methacoline, carbachol, Acetylcholine □ Cholinomimetic alkaloids- Piolcarpine, Muscarine □ Cholinestrase inhibitors- a) Reversible :-Neostigmine, physostigmine, pyridostigmine. b) Ireversible:- Organophosphorus compounds, (malathion, parathion)	**1.5M Types** **1.5M Examples**

4	**f)**	**Discuss the stages of general anaesthesia. Give two examples of parenterally administered general anaesthetics.** Stages of anaesthesia i. Stage of analgesia ii. Stage of delirium or excitement iii. Stage of surgical anaesthesia iv. Stage of respiratory paralysis STAGE 1- Stage of analgesia --- This stage is characterized by loss of pain sensation. Minor surgical operations and dental extractions are performed in stage STAGE 2-Stage of delirium --- This stage is characterized by excitement, thus no surgical procedures are performed in this stage STAGE 3- Stages of Surgical Anaesthesia: As more anaesthetic agents gets in deep breathing starts and the patient passes into the third stage of anaesthesia. The stage extends from the end of second stage until cessation of spontaneous respiration. The effects of this stage are recognized by following signs: 1. Regular respiration is regained after second stage. 2. Skeletal muscles are relaxed. 3. The gradual loss of reflexes such as eyelid and conjunctival reflexes and 4. The eye balls are roving. Major surgical operation is done in this stage. STAGE 4- Stage of respiratory paralysis--- Excessive administration of anaesthetic agent may lead to this stage. It is characterized by stoppage of breathing, fall of blood pressure	**2M for stages 1M for any two correct examples**

		and cardiac collapse. It leads to the death. **Examples Of general anaesthetic:** By Inhalation: Diethyl ether, Halothane, Trichloroethylene, Nitrous oxide. By intravenous : Thiopental sodium, Methohexital, Etomidate, Ketamine, Propofol	
5		**Attempt any <u>FOUR</u> of the following:**	**12M**
5	**a)**	**Classify antihypertensives with examples.** Classification (According to site of action): 1. Centrally acting Drugs: Clonidine, Methyl Dopa 2. Drugs acting on autonomic ganglia: Hexamethonium 3. Drugs acting on post ganglionic sympathetic nerve endings a) Adrenergic neuron blockers; Guanethidine b) Catecholamine depletors: Reserpine 4. Drugs acting on adrenergic receptors: a)Alpha adrenergic blockers: Phentolamine b) Beta adrenergic blockers: Propranolol 5. Vasodilators: Hydralazine 6. Drugs acting reflexly by stimulating baroreceptors: Veratrum 7. Oral Diuretics: Thiazides, Frusemide, spironolactone, amilorideetc 8. Calcium Channel Blockers: Nifedipine, Amlodipine, Felodipine 9. Drugs acting on rennin angiotensin system: a) ACE inhibitors: Enalapril, Ramipril b) Angiotensin Receptor Blockers: Losartan, Telmisartan 10.Miscellaneous: MAO inhibitors (Pargyline)	**3M**
5	**b)**	**What is cancer? Give examples of two anticancer drugs. Mention common side effects of anticancer drugs.** Cancer is uncontrolled growth of abnormal cells. It is characterized by excessive cell growth (in the form of tumor), ability to metastasize & a shift of cellular metabolism.	**1M def. 1M.any 2 correct examples**

		Examples of anticancer drugs: Chlorambucil, Cyclophosphamide,Busulphan Methotrexate, 6-mercaptopurine, 5-Flurouracil, Cytosine,Radioiodine, Radiophosphorous, Mitomycin, Actinomycin,Vincristine,Vinblastine etc. **Common side effects of anticancer drugs:** • Anemia ,Tiredness. • Nausea, vomiting. • Loss of appetite. • Constipation or diarrhoea. • Hair loss.(Alopecia) • Skin changes or reactions, Joint Pain • Electrolytes changes • Cardiac side effects	**1M any 4 side effects**
5	**c)**	**Classify antibiotics with example.** Classification of antimicrobial agents can be based on: Their site of action or Chemical structure or Activity against particular type of organisms. Based on site of action antibiotics can be classified as: 1. Inhibitors of cell wall synthesis eg Penicillins 2. Inhibitors of cell membrane function eg Polymixin 3. Inhibitors of protein synthesis eg Tetracyclins 4. Inhibitors of nucleic acid synthesis/ function; eg Rifampicin 5. Inhibitors of metabolism eg Sulpha drugs **Or** • Effective against gram +ve bacteria: Penicillin etc • Effective against gram -ve bacteria: Streptomycin etc • Effective against both gram +ve & gram -ve bacteria:	**3M.**

		Tetracycline, Chloramphenicol.etc Effective topically :Framycetin ,Polymixin B,neomycin etc **Any other correct classification can be considered.**	
5	**d)**	**Define analgesics. Justify: Morphine should not be given in abdominal pain.** **Analgesics:** These are the pharmacological agents which relieve or suppress the pain sensation. **Examples: N**arcotic analgesics like Morphine, Codeine etc., Non narcotics like Aspirin, Paracetamol, Indomethacin, Ibuprofen, Piroxicam, Diclofenac etc. **Justify: Morphine should not be given in abdominal pain.** Morphine is not given in severe abdominal pain before diagnosis is made because morphine is narcotic analgesic which relieves pain without modifying the underlying pathological process. It interferes with the diagnosis by masking pain and creates a false sense of security. It also induces vomiting. Its spasmogenic actions on the G.I.T. and biliary tract are additional drawbacks. Therefore morphine is not given in severe abdominal pain before diagnosis is made.	**1M Defn** **2M** **Jstifn**
5	**e)**	**Give pharmacological profile of aspirin.** i) Analgesia- aspirin relieve pain by acting centrally as well as peripherally by inhibiting the formation of prostaglandins. Epigastric distress, gastric bleeding and ulcers. ii) Antipyrexia- aspirin reduce body temperature by acting on hypothalamus (central effect) iii) Action on Gastrointestinal Tract: Aspirin causes GI irritation,.nausea, vomiting, dyspepsia, epigastric distress, gastric bleeding and ulcers. iv) Uricosuric effect- In large doses it inhibits reabsorption of urate by nephron. This results in uricosuria. v) Anti-inflammatory- aspirin acts as potent anti-inflammatory agent by	**3M for any six points**

		inhibiting prostaglandin synthesis. It decreases capillary permeability, reduces exudation of fluid & reduces development of inflammatory edema. vi) On blood- aspirin reduces platelet aggregation vii) On respiration- Aspirin stimulates respiration by direct action on medullary respiratory centre. It increases oxygen consumption by skeletal muscles thereby increasing plasma CO_2 concentration. viii) Hepatic and renal effects- may damage liver and kidneys in large doses. ix) Metabolic effects- aspirin causes conversion of large part of energy into heat. So it may cause hyperpyrexia in large doses. It may also cause hypoglycaemia.	
5	**f)**	**Give symptoms and management of acute barbiturate poisoning.** **Symptoms:-** Shallow respiration, fall in B.P., cardiovascular collapse, renal shut down, pulmonary complications, bullous eruptions. **Management:-** **Gastric lavage:** - leave a suspension of activated charcoal in the stomach to prevent absorption of the drug from intestine. **Artificial respiration:** Endo tracheal intubation: to treat hypoventilation **Supportive measures:** Intravenous fluids to prevent dehydration, to maintain blood volume and use of vasopressor if needed. **Alkaline diuresis:** - with sodium bicarbonate 1meq/kg iv. With or without mannitol (is helpful only in the case of long acting barbiturates which are eliminated primarily by renal excretion). Use of analeptic if needed	**1M Symptoms 2M Management**
6		**Give reasons for any <u>FOUR</u> of the following:**	**16M**
6	**a)**	**Sulphonamides are not much in use nowadays.** Sulphonamides show a number of side effects such as intolerance, fever, severe skin rashes, joint pain, toxic hepatitis, toxic nephritis, acute haemolytic anemia. It causes renal irritation, crystallurea, haematuria and obstruction of urine flow. Bacterial resistance is also a problem with sulpha drugs.	**4M**

		Since better drugs are available with fewer side effects for the treatment of diseases, Sulponamides are not much in use now a days.	
6	**b)**	**Atropine is given along with neostigmine in myasthenia gravis.** Myasthenia gravis is a skeletal muscle disorder causing muscle weakness and muscle fatigue. Nicotinic receptors are present in skeletal muscles and muscarinic receptors are present in heart blood vessels and eye balls. Neostigmine acts on both the receptors. In myasthenia gravis, only nicotinic action of neostigmine is required. Hence to mask the muscarinic actions of neostigmine, and thus to avoid the side effects, the muscarinic blocker atropine is given in combination	**4M**
6	**c)**	**Levodopa is given in combination with carbidopa.** Levodopa is the precursor of dopamine. And is used in treatment of parkinsonism. Levodopa can cross the blood brain barrier but dopamine cannot. In brain, L-dopa is metabolized to dopamine thereby replenishing the deficient neurotransmitter. The metabolism takes place in the presence of DOPA decarboxylase. Large amount of L-Dopa gets peripherally converted to dopamine and thus small amount reaches the brain. To overcome this problem, higher dose of Levodopa is required to increase the clinically effective level of dopamine in the brain which results in toxicity. Carbidopa does not cross the blood brain barrier but it inhibits peripherally dopa decarboxylase. Thus Carbidopa does not interfere with the conversion of L-dopa to dopamine in the CNS but prevents the conversion of Levodopa to dopamine peripherally.	**4M**
6	**d)**	**Penicillin are called lifesaving as well as life threatening drug.** Penicillin is an antibiotic used in different diseases like Syphillis ,Gonorrhea, Diphtheria, Gangrene, Tetatus, Meningitis etc. Thus it is a lifesaving drug. Penicillin in therapeutic dose if randomly administered by parenteral route to an individual without checking its allergy, then it may produce severe allergic reaction such as anaphylactic shock. Hence it is a life threatening drug.	**4M**
6	**e)**	**Quinidine is given to patient who is on digoxin therapy.** Quinidine is antiarrythmic drug while Digoxin is Cardiotonic drug.	**4M**

		Major adverse effect of digoxin is that it causes cardiac arrhythmias like extra systole & Bradycardia. Quinidine reduces heart rate and automaticity and corrects arrhythmia. Hence to avoid cardiotoxicity induced by digoxin, quinidine may be given. (Note: In some cases, Quinidine is found to increase the Digoxin serum concentration and may induce Digoxin toxicity and thus Digoxin- Quinidine interaction should be avoided or precautions should be taken.)	
6	**f)**	**Higher the therapeutic index, safer will be drug. Justify the statement.** Therapeutic index indicates the relative margin of safety of a drug. A dose of the drug which produces the stated effects in 50% of individuals within the population is called as 'median dose'. Depending on the stated effect it can be designated as 'median effective dose' (ED_{50}) and median lethal dose (LD_{50}). Therapeutic Index(TI) = $\frac{LD_{50}}{ED_{50}}$ The TI indicates how close the effective does is to the lethal dose for 50% of the test population. Thus, it gives an idea about the margin of safety. As the ED50 approaches the LD50, the danger of the drug toxicity increases significantly. Therefore, a drug with larger therapeutic index is safer than one with smaller therapeutic index. Hence, drug with lesser therapeutic index should be administered cautiously.	**4M**