MODEL ANSWER

WINTER– 17 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.

MODEL ANSWER

WINTER– 17 EXAMINATION

Subject Title: Pharmacology & Toxicology **Subject Code**: 0813

Q. No.	Sub Q. N.	Answer	Marking Scheme
1		**Define any EIGHT of the following terms with two examples of each**	
1	**a)**	**Contraceptives**: These are pharmacological agents when administered prevent conception and thus prevent pregnancy. Examples: Estrogen, Progesterone or combination of both, centchroman etc.	**1M def. Any two examples 1M.**
1	**b)**	**Antibiotics:** Are the agents produced by microbes having the property to inhibit the growth or destroy other microbes in high dilution. **Eg: Penicillin, streptomycin, Tetracycline etc.**	
1	**c)**	**Antiseptics:** These are the agents which are used to prevent microorganisms and can be applied to living tissues. **Eg:Phenol, potassium permanganate, boric acid, crystal violate etc.**	
1	**d)**	**Anthelmintic:** Are the agents used to treat the helminthiasis (worm infestation) **OR** Are the drugs used to eradicate or reduce the number of helminthic parasites from intestine of human or other animals. **Eg: Piperazine, mebendazole, albendazole, pyrantal pamoate etc**	
1	**e)**	e**) Antiemetics:** These are the agents used in treatment of vomiting. Eg: **Phenothiazine Hyoscine, Meclizine, Promethazine,** **Domperidone, Ondansetron ,Chlorpromazine etc**	
1	**f)**	**Purgatives:** - These are the drugs which facilitate or accelerate evacuation of bowel so that faeces may be expelled with ease. **Examples:-Senna, castor oil, magnesium sulphate, Methyl cellulose** etc	
1	**g)**	**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.**	
1	**h)**	**Antacids**: These are the pharmacological agents which when administered neutralize acid in the stomach and raise the gastric pH **Examples**: **Sodium bicarbonate, Aluminium hydroxide, calcium carbonate, magnesium trisilicate /oxide etc.**	
1	**i)**	**Local anaesthetics**: Are the pharmacological agents which when applied or injected block the conduction as well as generation of impulses in localized area & cause reversible loss of sensation without affecting degree of consciousness **Examples : Cocaine, Procaine, Amethocaine, Cinchocaine ,Lignocaine (Lidocaine),Bupivacaine etc.**	
1	**j)**	**Tranquilizers** Tranquilizers are the pharmacological agents which act on CNS and are used to reduce tension or anxiety or are the agents used to cause calming effect. E.g: **Chlorpromazine, Haloperidol, Reserpine, Clozapine etc.**	
2		**Attempt any FOUR of the following:**	**12M**
2	**a)**	**Classify various routes of administration of drugs which is the most common route. Give its merits and demerits.** **Routes of administration;** – Enteral – Parenteral – Local applications **Enteral** - drug placed directly in the GI tract: sublingual - placed under the tongue oral - swallowing	**1.5 for classify** **Route 1.5M** **Any 2 merit & demerit**

rectum - Absorption through the rectum (enema)

Parenteral: Injections & Inhalations

Injections:Intravascular,Intramuscular ,Intradermal, Subcutaneous ,

Intrathecal , Intraperitoneal , Intramedullary , Intraarticular

Inhalation -

Local Applications

Or tabular format

Enteral			**Parenteral**		**Local application**
Oral	Sublingual	Enema	Injections	Inhalations	
		Retention Evacuant	Intravenous		
			Intraarterial		
			Intramuscular		
			Subcutaneous		
			Intraperitoneal		
			Intrathecal		
			Intramedulllary		
			Intraarticular		

Merits:-Oral routes of administration is most common

i) Maximum preparation are consumed orally

ii) no special skill is essential

iii) most convenient and economical

iv) no complicated processes such as sterilisation**.**

Demerits:- i) not suitable for drugs destroyed by digestive juices

ii) it is not applicable for emergency cases

iii) It is not useful in cases of unconscious and non-cooperative patients.

iv) Slow onset of action

(any other correct merit and demerit can be considered)

2	**b)**	**Explain triple response of histamine.** **TRIPLE RESPONSE:-** When histamine is applied locally or injected intradermally on skin, histamine produces a typical response known as "triple response" which is characterized by three distinct signs: i. Flush- it is redness at the site of application because of hyperemia. ii. Flare- Patch formation in the vicinity of 1.5 cm of flush occurs due to vasodilation & this is called as flare. iii. Wheal- around 1.5cm of flare, permeation of fluid occurs, raising the surface and it's called as wheal (swelling formation)	**3M**
2	**c)**	**Define Diarrhoea. Classify antidiarrheal drugs. Mention their mechanism of action.** **Diarrhoea** is rapid increase in frequency of defecation with passage of watery faeces. It occurs due to increase in intestinal secretions and increase in intestinal motility. Dehydration is the main consequence of diarrhoea. **Classification:-** 1. **Adsorbents**: kaolin, Pectin, Chalk Activated charcoal. **MOA:** These adsorb intestinal toxins and microorganisms by coating them. 2. **Antimotility drugs**:- Opioids :- codeine, loperamide **MOA:-** Reduce peristalsis, delay passage of intestinal content and facilitate absorption of food. 3.**Oral Rehydration Salts**: Replace the lost fluid and electrolytes **4.Antispasmodics:-** Atropine derivatives **MOA:-** Relax gastrointestinal smooth muscles and relieve abdominal colic. **5.Other drugs:-**Probiotics: e.g. lactobacillus preparations restore normal bacterial flora in GIT	**1M def. 1M class. 1M Mechanism (for any 2 classes)**
2	**d)**	**Classify non-steroidal anti-inflammatory drugs, mention therapeutic uses of Aspirin**. A. Non selective COX inhibitors(traditional NSAIDS) 1. Salicylates:-Ex. Aspirin 2. Propionic acid derivatives:-ex. Ibuprofen,naproxen, ketoprofen, flurbiprofen.	**2M classify 1M any**

		3. Anthranilic acid derivatives:-ex. Mephenamic acid. 4. Aryl-acetic acid derivatives:- ex. Diclofenac, aceclofenac. 5. Oxicam derivatives:-ex. Piroxicam,tenoxicam. 6. Pyrrolo-pyrole derivative:-ex. Ketorolac. 7. Indole derivative:-ex. Indomethacin. 8. Pyrazolone derivatives:-ex. Phenyl butazone, oxyphenbutazone. B. Preferential COX-2 inhibitors Ex. Nimesulide, meloxicam, nabumetone C. Selective COX-2 inhibitors Ex. Celecoxib, etoricoxib, parecoxib D. Analgesic-antipyretics with poor anti-inflammatory action 1. Paraaminophenol derivative:- Ex. Paracetamol 2. Pyrazolone derivatives:- Ex. Metimazol, propiphenazone. 3. Benzoxazocine derivative:- Ex. Nefopam. **OR** **Classification** 1) Salicylates – eg Aspirin, Sodium salicylate 2) Para aminophenol derivatives – egParacetamol, Phenacetin 3) Indole acetic acid derivatives – eg indomethacin 4) Anthranilic acid derivatives - eg. mefenamic acid 5) Propionic acid derivatives – eg Ibuprofen, naproxen 6) Oxicam derivatives – eg Piroxicam 7) Pyrazolone derivatives – eg phenylbutazone, oxyphenbutazone 8) Phenyl acetic acid derivatives – eg Diclofenac 9) COX 2 inhibitors: Rofecoxib	**two uses**

		10) Miscellaneous:Nimesulide, Metamizol etc **Therapeutic uses of Aspirin**:- 1) As analgesic, antipyretic and anti-inflammatory used in fever, to relieve pain in musculoskeletal conditions, in rheumatoid arthritis, spondylitis , gout, Osteoarthritis etc. 2) Counter irritant and rubefacient. 3) Ant-platelet agent	
2	**e)**	**Give symptoms and treatment of acute barbiturate poisoning.** Symptoms:- Shallow respiration, fall in B.P., cardiovascular collapse, renal shut down, pulmonary complications, bullous eruptions. Treatment:- Gastric lavage: - leave a suspension of activated charcoal in the stomach to prevent absorption of the drug from intestine. Artificial respiration: Endotracheal 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).	**Treatment 2M Symptom 1M.**
2	**f)**	**Enlist and describe channels of drug elimination.** Channels of drug excretion I)Kidneys II)Lungs III) Intestines IV)Skin V)Saliva & milk VI) Bile **Kidneys:** Most of the drugs are excreted in urine Weak acids quickly excreted in alkaline urine & vice versa. **Lungs:**	**Enlist 1M** **Describe 2M.**

		• Excretion of gaseous inhalants. • Volatile general anesthetics, alcohol, paraldehyde. • Easily detected by breath smell **Intestines:** • Purgatives like senna are partly excreted in intestine • Heavy metals also through faeces. **Skin:** • Metalloids like arsenic, lead **Saliva & milk:** • Antibiotics, sulphonamides, morphine excreted in milk. **Bile:** Erythromycin, novobiocin eliminated in bile & reabsorbed in intestine.	
3		**Attempt any FOUR of the following:**	**12M.**
3	**a)**	Name atleast one drug contraindicated in: **i)** Insomnia – Analeptics like caffeine, amphetamine etc. **ii)** Peptic ulcer- Hydrocortisone, Salicylates. ,heparin **iii)** Head injury- Morphine **iv)** Pregnancy- Tetracycline, Morphine, clofibrate, Cortisone **v)** Constipation- Morphine, Atropine **vi)** Liver damage- Phenobarbitone sodium / Alcohol .	**0.5M each**
3	**b)**	Mention route of administration of following: i) Heparin- Parenteral.(IV,SC etc) ii) Mannitol- Parenteral (IV) iii) Diazepam- Oral /IV iv) Insulin- Parenteral (SC) v) Castor oil- oral,enema vi) Nitroglycerine- Sublingually/oral /parenteral /topical	**0.5M each**

3	**c)**	**Name one drug each produces following effect:** i) Cycloplegia- Atropine, Homatropine ii) Bone and teeth deformity- Tetracycline iii) Anaphylaxis-Cephalosporins, Penicillin G ,Tetracycline, sulfa drugs. iv) Thrombocytopenia- Sulpha drugs, Chloramphenicol v) Agranulocytosis- Sulpha drugs, Chloramphenicol, Procainamide vi) Blood dyscrasias- Chloramphenicol, Quinine	**0.5M each**
3	**d)**	**Mention adverse effect of following:** i) Streptomycin- Ototoxicity, skin rash, dermatitis, aplastic anaemia ii) Quinine- Cinchonism include tinnitus, deafness, optic neuritis iii) Aspirin- Heart burn, gastric distress, nausea ,ulcers, bleeding iv) Reserpine- Nasal congestion, salivation, vasodilation, increased motility of gut, weight gain, mental depression, nightmares, insomnia, suicidal tendency etc. **v)** Codeine- drowsiness, light-headedness, dizziness, sedation, shortness of breath, constipation, euphoria, abdominal pain, vi) Ethambutol:- Muscular weakness, anaphylaxis, vision problems	**0.5M each**
3	**e)**	**Mention drug of choice for following conditions:** i) Gout- Colchicin,Allopurinol. Probenecid, Diclofenac, Piroxicam, Corticosteroids ,any other NSAIDs ii) Gonorrhoea-Ceftriaxone, Penicillin G, Sulpha drugs iii) Glaucoma-Pilocarpine, Timolol,Betaxalol, Physostigmine, Acetazolamide, Glycerine,Mannitol. iv) Pernicious anaemia- Vitamin B12, Folic acid v) Reynaud's disease- Nifedipine,or other vasodilators vi) Resistant Schizophrenia- Clozapine, Olanzapine, Risperidone.	**0.5M each**
3	**f)**	**Mention antidote along with mechanism for following**: i) Morphine poisoning- Naolxone, Nalorphine **Mechanism**- antagonizes opioid effects by competing for the opiate receptor sites in	**0.5 M Each For**

		the CNS ii) Heavy metal poisoning- BAL/ Dimercaprol **Mechanism**- The sulfhydryl groups of dimercaprol form complexes with certain heavy metals thus preventing or reversing the metallic binding of sulfhydryl-containing enzymes. The complex is excreted in the urine. iii) Organophosphorus poisoning- Atropine Sulphate / Pralidoxime **Mechanism**- Atropine as muscarinic antagonist. Pralidoxime as a Cholinesterase Reactivator.	**Antidote and Mch Of action**
4		**Attempt any FOUR of the following:**	**12M.**
4	**a)**	Define and classify epilepsy. Give treatment of Status epilepticus **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. Classify antiepileptics with suitable examples 1. Drugs used in grandmal epilepsy: Phenytoin,Methoin,Phenobarbitone,Carbamazepine 2. Drugs used in Petit mal epilepsy: Trimethadione,Paramethadione,Phensuximide,Ethosuximide 3. Drugs effective in Psychomotor epilepsy: Phenytoin,Primidone 4. Drugs used in focal Cortical or Jacksonian Epilepsy: Phenytoin,Methoin,Phenobarbitone 5. Drugs used in Status epilepticus: Diazepam,thiopentone **OR** **Chemical classification can also be considered**. 1. Hydantoins eg Phenytoin, Mephenytoin 2. Barbiturates eg Phenobarbitone 3. Deoxybarbiturate eg Primidone	**1M Each**

		4. Iminostilbene eg Carbamazepine 5. Succinimide eg Ethosuximide 6. GABA transaminase Inhibitors egValproic acid 7. Benzodiazepinseg eg Diazepam,Clonazepam 8. Miscellaneous eg Acetazolamide 9. GABA analogues eg Gabapentin 10. Others eg Lamotrigine **Treatment of status epilepticus:** 1)Supportive treatment – a)Oxygen inhalation till paroxysm over b)Protection from injury c)Administration of IV fluid to maintain water and electrolyte balance and acid-base balance. 2)Drug therapy- a) Diazepam is the drug of choice administered I.V. slowly for adult 10mg and infants 0.25 mg/kg body weight. b) If convulsion is not controlled with Diazepam then Phenytoin IV in initial dose of 250mg if not successful further 150mg may be given after 30min. c) If convulsions still persist Paraldehyde (0.5ml/kg I/M) should be used.	
4	**b)**	**What are Sedatives and Hypnotics ? Give their classification with examples.** **Sedatives** are the agents which act on CNS , relieve anxiety or calm down the patients. **Hypnotics**- These are the drugs that produce sleep that resembles to natural sleep. **Classification-** I) Barbiturates- a) Long acting barbiturates e.g. Phenobarbitone b) Intermediate acting barbiturates e.g. Cyclobarbitone c) Short acting barbiturates e. g. Hexobarbitone	**Def. 0.5M each Class. 2M**

		d) Ultra short acting barbiturates e. g. Thiopentone II) Non barbiturates a) Benzodiazepine e.g. Diazepam b) Alcohols e.g. Chloral hydrate c) Aldehydes e. g. Paraldehyde d) Miscellaneous e.g. Hysocine	
4	**c)**	**Write a note on Oral hypoglycemic agents.** Oral hypoglycemics are the pharmacological agents when administered orally decrease blood glucose level. There are two classes of oral hypoglycemics:- i) Sulphonyl urea derivatives – Eg-tolbutamide, chlorpropamide,gliclazide,glibenclamide ii)Biguanides – Eg- Phenformin, metformin. Sulphonylureas stimulate the beta cells of islets of langerhans to secrete insulin. These agents are effective in patients who have residual insulin in their pancreatic beta cells. When administered, they are readily absorbed from g.i.t. Side effects include nausea, vomiting, weakness, epigastric discomfort. Biguanides are effective in absence of functioning pancreatic beta cells or residual insulin. They inhibit glucose absorption from g.i.t. and hepatic gluconeogenesis. It also increases utilization of glucose by peripheral tissues. They can be used in combination with sulphonylureas.	**3M**
4	**d)**	**What is Drug Tolerance? Describe different types of Drug Tolerance.** **Drug Tolerance-** On repeated administration of some drugs, they may prove ineffective in usual therapeutic dose. or It is insensitivity to the use of drug. **Types of tolerance:-** i) Natural or Congential:-It is by birth. 1) Species tolerance:-eg. Belladona alkaloids like atropine is toxic to human beings when given in high dose but rabbits can tolerate high amount of atropine	**1M** **2M**

2) Racial Tolerance:-eg. After administration of drug Ephedrine, Mydriasis is not produced in negros

ii) Acquired tolerance:- Repeated administration of some drugs leads to acquired tolerance.

1) Tissue Tolerance: In case of tissue tolerance, tolerance is developed to certain effects of the drugs. e.g Morphine is unable to produce its euphoria effect after repeated administration and thus requires higher dose, but the pupil & gastrointestinal tract effects never develop tolerance.

2) Cross tolerance: This tolerance is developed to a drug belonging to particular group, then there could be tolerance to all other drugs in the same group. Eg. when tolerance is developed to alcohol, patient may develop tolerance for use of general anesthetic and other CNS depressants.

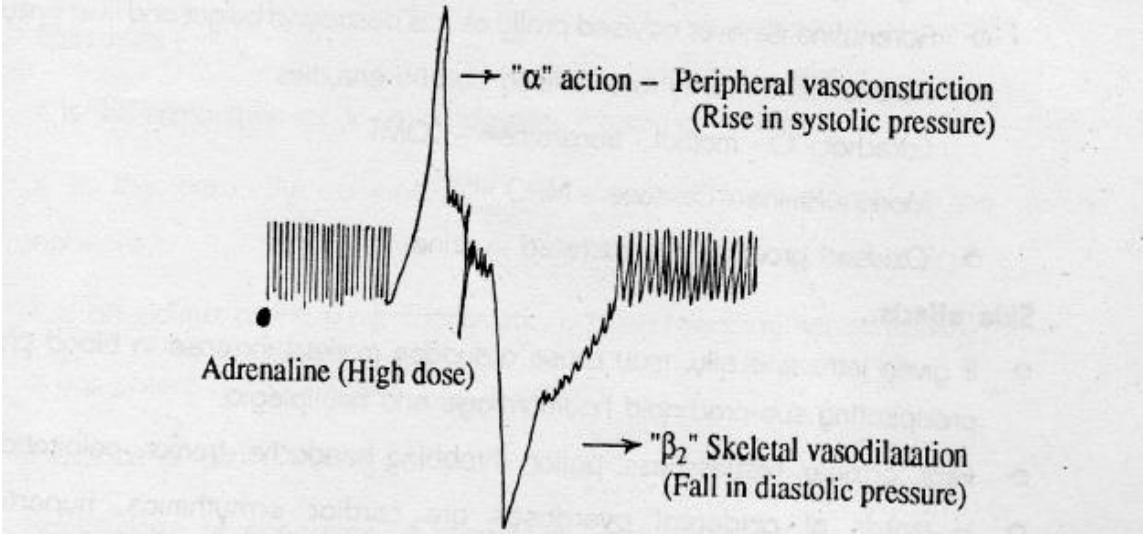
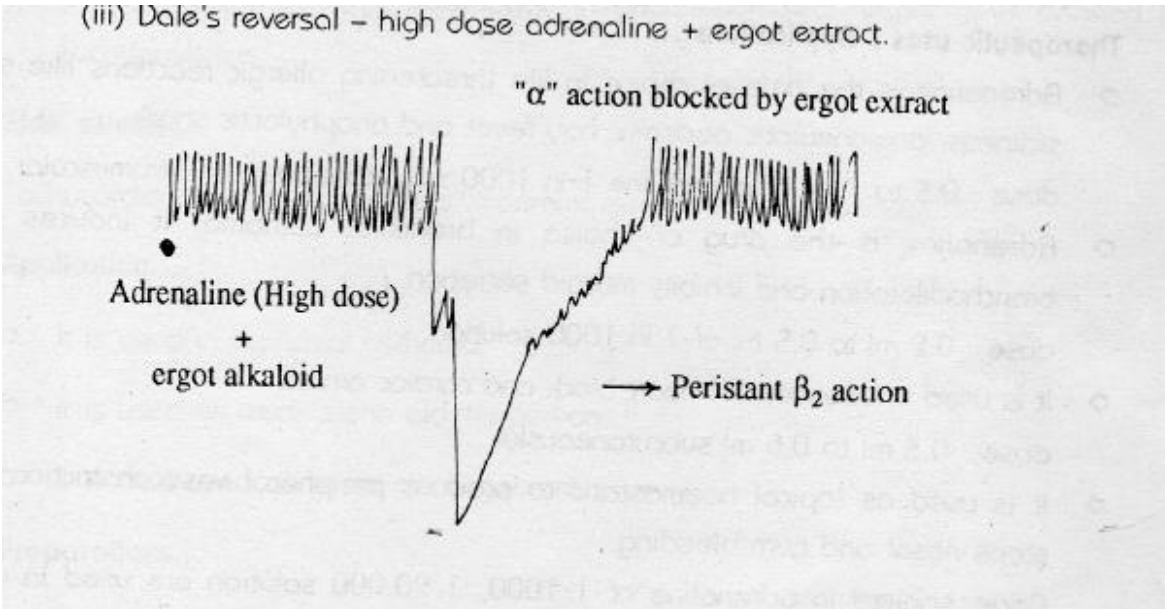
3) Pseudo tolerance: Observed only in oral route. When small dose of poison is taken repeatedly, tolerance to it is developed by the gastrointestinal tract. But if other route is chosen, poisoning will occur.

4) Tachyphylaxis: It is also known as acute tolerance, observed with certain drugs such as Ephedrine when administered repeatedly at very short intervals & the pharmacological response to that drug decreases

4 e) Differentiate between drug addiction and drug habituation — **3M (Any 3 correct comparisions)**

Drug Addiction:	**Drug Habituation**
It is a state of periodic or chronic intoxication produced by repeated consumption of a drug.	It is a condition resulting from repeated administration of a drug
There will be overpowering desire to continue taking the drug and obtain it by any means.	There will be desire but not compulsion to continue taking the drug for the sense of well-being.
There is a tendency to increase the dose.	Little or no tendency to increase the dose.

		A psychological and generally a physical dependence on the effect of the drug.	Some degree of psychic dependence but absence of physical dependence and hence of an abstinence syndrome.
		The effect is detrimental to the individual and to the society.	If any detrimental effect, it is on the individual.
4	**f)**	**Describe action of acetylcholine on eyes, skeletal muscle and Heart.** **Eyes**: It produces miosis on injecting and spasm of accommodation of eye by interacting with M3 receptors present in circular muscle of iris and ciliary muscle of eye respectively. **Skeletal muscle:** stimulates motor end plate of skeletal muscle in high doses leading to contraction of skeletal muscle. **Heart:** depresses the heart by acting on M2 receptors in myocardium which are inhibitory in nature. It slows heart rate and decreases force of contraction leading decrease in cardiac output.	**1M each**
5		**Attempt any Four of the following:**	**12**
5	**a)**	**What do you mean by 'Dales Vasomotor Reversal'?** In low doses, Adrenaline causes peripheral vasoconstriction, increase in resistance, output, and thereby rise in peripheral and systolic BP. In high doses, Adrenaline activates both alpha and beta receptors. It causes peripheral Vasoconstriction and leads to rise in systolic BP. This is followed by skeletal muscle dilation of blood vessels, decrease in resistance and output, fall in diastolic BP. This response of Adrenaline is known as biphasic response. Its vasoconstriction action is blocked by alpha blocker like ergotoxin, Adrenaline causes only fall in BP. This reversal action of conversion of biphasic to monphasic response on Blood pressure is called as Dale's vasomotor reversal. **Diagram:**	**1.5M Explain ation 1.5 graph**

		(ii) Adrenaline – high dose response on blood pressure. **Bi-phasic Response**  **Fig. 3** (iii) Dale's reversal – high dose adrenaline + ergot extract.  	
5	**b)**	**What are diuretics? Classify diuretics. Explain thiazides as diuretics**. **Diuretics:** These are the pharmacological agents which when administered, increase rate of formation of urine as well as excretion of urine. **Classification:**	**1M Each**

		1.Weak diuretics i) Osmotic diuretics a) Electrolytes-Sodium and Potassium salts b) Non electrolytes- Mannitol ii) Acidifying salts-Ammonium chloride iii) Xanthine derivatives- Theophylline iv) Carbonic anhydrase inhibitors- Acetazolamide 2. Moderately potent diuretics or Thiazide Diuretics-Thiazides like benzothiazide ,Hydrochlorothiazide 3. Very potent diuretic or Loop Diuretics- Frusemide, ethacrynic acid 4. Potassium sparing diuretics- Spironolactone, Aldosterone antagonist Classification as per mechanism of action can also be considered. **Thiazides:** are most widely used Diuretics. Thiazide diuretics act mainly in the distal tubule & decrease reabsorption of Na+. They have lesser effect in the proximal tubule. Because the site of action of thiazides is on the luminal membrane, these drugs must be excreted into tubular lumen to be effective. So in decreased renal function they lose efficacy.	
5	**c)**	**Write a note on Preanaesthetic medication.** **Preanaesthetic agents** are the drugs administered prior to an anesthetic to decrease anxiety & to obtain smoother induction of, maintenance of, & emergence from anesthesia. **Reasons for such medication are:** For sedation To make anesthesia safer & more agreeable to the patient. To reduce anxiety& apprehension without producing much drowsiness. To obtain an additive or synergistic effect. To relieve pre & post-operative pain. To suppress respiratory secretions & to reduce reflex excitability. To counteract certain adverse effects.	**3M.**

		Drugs used : Narcotic analgesics Like Morphine, Pethidine depress CNS & also produce analgesia. Anticholinergic agents like Atropine , Hyoscine reduce body secretions Antihistaminic like Promethazine for antiemetic action Tranquilizers like Diazepam to reduce anxiety.	
5	**d)**	**What is bronchial asthma? Give the drug therapy on asthma.** **Definition**: It is a clinical syndrome characterized by paroxysmal dyspnoea and wheeze due to increased airway resistance in narrowed bronchi. **Or** It is a condition of bronchoconstriction leading to difficulty in breathing **Drug therapy includes**: a)Bronchodilators : Sympathomimetic: Salbutamol, Terbutaline, Adrenaline,Isoprenaline,Ephedrine Xanthines: Theophylline, Aminophylline Anticholinergics: Atropine b)Anti-inflammatory agents: Systemic: Hydrocortisone, Prednisolone Inhalational: Beclomethasone,Triamcinolone c) Mast cell stabilizers: Disodium chromoglycate, Ketotifen d) Other agents: Montelukast	**1M def.** **2M.** **Therap** **y**
5	**e)**	**What are cytotoxic agents? Classify them with examples.** **Definition** : Cytotoxic drugs (sometimes known as antineoplastics) describe a group of medicines that contain chemicals which are toxic to cells, preventing their replication or growth, and so are used to treat cancer. Cytotoxic agents are the agents which are used in treatment of cancer. Classification with examples: I. Alkylating agents: • Nitrogen mustards:E.g.: Chlorambucil, Mechlorethamine	**1M.** **def.** **2M.** **classify**

		• Ethylenimines:E.g.: Triethylenemelamine, Triethylenethiophosphamide • Alkylsulphones:E.g. : Busulphan II. Antimetabolites: • Folic acid antagonists:E.g.: Methotrexate • Purine Antagonist:E.g.: 6-mercaptopurine • Pyrimidine Antagonist:E.g.: 5-Flurouracil, Cytosine III. Radioactive Isotopes: E.g.: Radioiodine, Radiophosphorous IV. Antibiotics: E.g.: Actinomycin-D, Mitomycin V. Hormones: E.g.: Androgens, Estrogens, Corticosteroids VI. Enzymes:E.g.: L-asparginase VII. Vinca alkaloids: E.g.: Vincristine, Vinblastin Miscellaneous Agents:E.g.: Hydroxyurea, Cis-platin	
5	**f)**	**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	**3M.**

		b) Angiotensin Receptor Blockers: Losartan, Telmisartan 10.Miscellaneous: MAO inhibitors (Pargyline)	
6		**Give reasons for any FOUR of the following:**	**16M.**
6	**a)**	**Acetylcholine is not used clinically.** I. Ach acts on all cholinergic sites throughout the body. II. It has short duration of action because it is susceptible to hydrolysis by Cholinesterase. III. When given orally it is rapidly hydrolysed in GIT. IV. On IV administration it has no appreciable actions because considerable amount is destroyed by pseudo cholinesterase at the site of action Thus Ach has very short duration of action.	**4M.**
6	**b)**	**Tincture of opium is used in diarrhoea.** Tincture of opium contains morphine, morphine has spasmogenic action on smooth muscles of G.I.T. It causes constriction of sphincters and decrease in the peristaltic movements of G.I.T. This action of morphine results in stagnation of intestinal contents causing maximum absorption of water and drying of faecal matter. It reduces sensitivity of intestinal walls to defecation reflexes. The above actions of morphine cause constipation Morphine possesses constipating action so it is used in diarrhoea.	**4M.**
6	**c)**	**Sulphonamides are not much in use nowadays.** Sulponamides 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. Since better drugs are available with fewer side effects for the treatment of diseases, Sulponamides are not much in use nowadays.	**4M.**
6	**d)**	**Anthelmintics are administered with purgatives.**	**4M.**

		Anthelmintics are either wormicidal or wormifugal in action. Thus after killing or paralyzing these worms by anthelmintic agent, these should be expelled out from the intestine. Hence purgatives are advised as supportive treatment with anthelmintics. Thus combination acts synergistically.	
6	**e)**	**Digitalis is called as Cardiotonic.** Digitalis has direct action on myocardium of heart. It increases the force of systolic contraction & leads to complete emptying of ventricles with increase in cardiac output. The duration of systole is decreased allowing greater time for ventricular filling & heart rest. The diastolic size of heart is reduced .Hence oxygen expenditure for given work output is reduced & thus working capacity of heart is increased. Digitalis doesn't increase energy production by cardiac muscle but improves its energy utilization (conversion of chemical energy into mechanical energy). The digitalized heart can thus do same work with less energy or more work with same energy expenditure. So digitalis is called as cardiotonic.	**4M.**
6	**f)**	**Why Carbidopa is given along with Levodopa?** 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	**g)**	**Antibiotics are generally given in combination.** Combination of antibiotics is useful : In mixed bacterial infection eg: UTI & pulmonary infection Severe infection of unknown etiology. eg: Septic shock with UTI To enhance spectrum of antibacterial activity or to produce synergistic effect. To avoid bacterial resistance Multiplication of bacilli can be avoided in combination therapy.	**4M.**