GATE PY - 2000

SECTION - A

1. This question consists of TWENTY-FIVE multiple choice questions each carrying one mark:

2.

1.1 One of the substances listed is used as muco adhesive.
(a) Acacia
(b) S.C.M.C
(c) Burnt sugar
(d) Saccharin

1.2 In the preparation of multilayer tablets one of the substances listed is used for Hydrophilic matrix coating?
(a) C.M.C
(b) Shellac
(c) Stearlyl alcohol
(d) Bees Wax

1.3 Choose the correct pH of the lachrymal fluid.
(a) 8.0
(b) 6.0
(c) 7.4
(d)9.0

1.4 The dip tube in an aerosol container is made from one of the following. Choose the correct one.
(a) Polypropylene
(b) Glass
(c) Stainless steel
(d) Aluminium

1.5 The diameter of the mesh apt[fn the I.P. disintegration test apparatus is given below. Choose the correct size.
(a) 2.00 mm
(b) 4.00 mm
(c) 1.00 mm
(d) 1.50 mm

1.6 Choose the correct source of radiation for N.M.R. from the listed ones.
(a) Klystron oscillator
(b) Globar source
(c) Radio frequency oscillator
(d) Deuterium lamp

1.7 Choose the correct semi rigid gel used for exclusion chromatography.
(a) Sephadex
(b) Gelatin
(c) Cellulose
(d) Alumina

1.8 One of the following is measured in amperometric titration.
(a) Resistance
(b) Conductance
(c) Voltage
(d) Current

1.9 The oil obtained from Cymbopogan flexuousus contains one of the following.
(a) Citral

(b) x-terpeniol
(c) x-pinene
(d) Neral

1.10 Choose the correct key intermediate for the bio-synthesis of *C6 —C3* units, which serves as a precursor for the biosynthesis of amino acids.
(a) Shikimic acid
(b) Pyruvic acid
(c) Dehydro quinic acid
(d) Mevalonic acid

1.11 3-phenyl-N-alkyl piperidine moiety is largely responsible for activity in one of the following — choose the correct one.
(a) Buprenorphine
(b) Pethidine
(c) Cycloserine
(d) Amitryptiline

1.12 Which one of the following is a Histamine *H1* receptor antagonist?
(a) 4-(5-H di benzo [a,d] cylohepten-5-ylidene)-1-methyl pyridine hydrochloride
(b) 4-(5-H di benzo [a,d] cylohepten-5-ylidene)-1-methyl pyrimidine hydrochloride
(c) 4-(5-H di benzo [a,d] cylohepten-5-ylidene)-1-methyl piperidine hydrochloride
(d) 4-(5-H di benzo [a,d] cyclopentane-5-ylidene)-1-methyl piperidine hydrochloride

1.13 Dienoestrol is synthesized from
(a) 4-Hydroxy propiophenone
(b) 4-Amino acetophenone
(c) 4-Chloro butyrophenone
(d) 4-Bromo propiophenone

1.14 One of the following diuretics has similar structure as that of antihypertensive agent diazoxide.
(a) acctozolamide
(b) Chlorothiazide
(c) Spironolactone
(d) Furosemide

1.15 Which one of the following is an antifungal polyene macrolide antibiotic with seven conjugated double bonds, an internal ester, a free carboxyl group and a glycoside side chain with primary amino group?
(a) Streptomycin
(b) Echinocandins
(c) Refamycin
(d) Amphotericin-B

1.16 Choose the correct class IV anti-arrhythmic that is primarily indicated for the treatment of supra venticular tachyarrhythmias.
(a) Mexiletine
(b) Diltiazem
(c) Nifedipine
(d) Propanolol

1.17 One of the following antiviral agents exhibit the greatest selective toxicity for the invading virus.
(a) Amantadine
(b) Zidovudine
(c) Idoxuridine

(d) Acyclovir

1.18 Choose the drug that often causes tachycardia when given in regular doses.
(a) Verapamil
(b) Guanethidine
(c) Propranolol
(d) Isosorbide dinitrate

1.19. Choose one appropriate therapeutic use for imipramine.
(a) Insomnia
(b) Epilepsy
(c) Bed wetting in children
(d) Mania

1.20. The following prescription is given to the pharmacist by the physician to dispense Rx Calciferol solution 0.3 ml Water to Q.S. 5.0 ml Send 25 ml
Final dosage form of this prescription will be:
(a) Solution
(b) Elixir
(c) Emulsion
(d) Suspension

1.21. Purpose of a combined drug regimen in tuberculosis is to
(a) delay the emergence of drug resistance
(b) reduce the duration of active therapy
(c) schedule the onset of therapy
(d) promote a placebe effect on the patient

1.22. The R-W coefficient test is used to evaluate
(a) Antibiotic activity
(b) Sterility of packaging material
(c) Nature of organism in bacterial infection
(d) Bactericidal activity

1.23. Diclofenac tablet coated with cellulose acetate phthalate has been administered to a patient. Where do you except the drug to be released?
(a) Stomach
(b) Oral cavity
(c) Small intestine
(d) Liver

1.24. A microscopic examination of a culture isolate revealed spherical bodies with a smooth outline growing in long chains. Identify the micro organism.
(a) Staphylococcus aureus
(b) Streptococcus pyogenes
(c) Rhizopus stolonifer
(d) Bacillus subtilis

1.25 An original licence or renewed licence to sell drugs remains valid upto
(a) 31st March next year in which it is granted
(b) 3O' June of the following year in which it is granted or renewed
(c) 31st January of the same year in which it is granted
(d) 31st December of the following year in which it is granted or renewed.

2. Match each of the items 1 and 2 on the left with an appropriate item on the right [a, b, c, dl and write in the specific space provided in the answer book:

2.1 Taste sensations of some liquid oral formulations are given. Match the compatible flavour used in the formulation.

(1) Salt	(a) Wild cherry
(2) Sour	(b) Vanilla
	(c) Citrus
	(d) Chocolate

2.3. Excipients used in parenteral products are given. Match them.

(1) Chelating agent	(a) Benzyl alcohol
(2) Local anaesthetic	(b) Phenol
	RêGelatin
	(d) Disodium edentate

2.3. H.L.B. values are given. Match them with correct surfactant.

(1) 0-3	(a) Solubilizing agent
(2) 4-6	(b) Detergent
	(c) Antifoaming agent
	(d) W/O emulgents

2.4. Given below are the type of excipients. Match them with the examples.

(1) Disintegrant	(a) Talc
(2) Glidant	(b) P.V.P.
	(c) Lactose
	(d) Acacia

2.5. Listed below are the Schedules to the Drugs and Cosmetics Act. Match them.

(1) Schedule 'M'	(a) Standards for disinfectant fluids
(2) Schedule '0'	(b) Standards for ophthalmic preparations
	(c) Requirement of factory premises
	(d) Standards for cosmetics

2.7. The following receptors are associated with drugs mentioned. Match them.

(1) H1 receptor	(a) Ketanserin
(2) 5HT3 receptor	(b) Cimetidine
	(c) Diphenhydramine
	(d) Ondansetron

2.7. Match the following drugs with their receptor sub types.

(1) Methadone	(a) Agonist of p and ö receptors
(2) Enkephalins	(b) Antagonist of p, ö abd ic receptors

(c) Agonist of p receptors
(d) Agonist of p, ö abd ic receptors

2.9. Match the drugs with their mechanism of action

(1)	Mebendazole	(a) Unknown mechanism	
(2)	Ivermectin	(b) Neuromuscular blockade by interaction with nicotinic receptors (c) Intensifies GABA mediated neurotransmission in nematodes causes immobilization of parasistes (d) Selectively inhibits microtubule synthesis in nematodes	and

2.9 Match the following drugs with their mechanism of action.
(1) Procainamide (a) Blocks Ca channel
(2) Verapamil (b) Blocks K channel
(c) Blocks Na channel
(d) Blocks 3 adrenoceptors

2.10. The metabolic reactions of drugs mentioned in a to d are given. Match them.

(1) Nitro reduction	(a) Oxprenolol
(2) Deamidation	(b) Isoniazid
	(c) Chloramphenicol
	(d) Lidocaine

2.11. Drugs given below have the characteristics mentioned in a to d. match them.

(1) Ibuprofen	(a) An aryl acetic acid
(2) Acetaminophen	(b) A salicylic acid derivative
(3) C	(c) An active metabolite of another drug
(4) p	(d) Hydrolysed in the blood stream

2.12. The systematic names of the following drugs are given. Match them.

(1) Tinidazole	(a) 2-[4-3-2 trifluoro-methyl phenol selenazine-lO-yl) propyl piperazine-1-yl] ethanol
(2) Fluphenaziae decanaote	(b) 1-[2-(ethyl sulphonyl) ethyl]-2-methyl-5-nitroimidazole

(c) 1-[2-ethyl sulphonyl)-propyl]-2-methyl-5-nitroimidazole
(d) 2-[4-(3-(2-trifluoro-methyl phenothiazin-lO-yl) propyl piperazin1-yl] ethanol.

2.13. Match the heterocyclic system with the drugs.
(1) Aziridine (a) Thiotepa
(2) Pteridine (b) Azathioprine
(c) Atropine
(d) Methotrexate

2.14. Techniques mentioned in a to d used for the analysis of the following drugs.

(1) Sulphamethoxazole I.P.	(a) Conductometry
(2) Piroxicam I.P.	(b) H.P.L.C.
	(c) Non-aqueous titration
	(d) Dead stop end point

2.15. Match the correct formula for

(1) Molar absorption coefficient	(a) cl/A
(2) Frequency	(b) A/c.l
	(c) l/?,
	(d) c/?,

2.16. Match the values given with that of 1 and 2.

(1) Potential of standard Hydrogen electrode taken as	(a) Zero
(2) Base peak in mass spectra	(b) 100
	(c) 1
	(d) 10

2.17. In different samples of adulterated Atropa belladonna leaves, following unique characters are noted. Match with adulterants.

(1) Idioblast observed	(a) Solanum nigrum
(2) Lamina is denser Needle shaped crystals Anomocytic stomata Palisade ratio 2:4	(b) Phytolacca americana
	(c) Ailanthus glandulosa
	(d) Datura stramonium

2.18. Digitalis cardenolides mentioned below are different hydroxyl derivatives. Match them.

(1) Gitoxigenin	(a) 313, 1213, 1413 trihydroxy cardenolide
(2) Digoxigenin	(b) 313, 1413 dihydroxy cardenolide
	(c) 313, 1413, 1613 trihydroxy cardenolide
	(d) 313, 1213, 613 trihydroxy cardenolide

2.19. Match the following Vitamins with their biochemical roles.

(1) Riboflavin	(a) Free radical scavenger
(2) Pyridoxal	(b) As a coenzyme in redox reactions
	(c) Essential in the synthesis of rhodopsin
	(d) As a coenzyme for amino acid decarboxylases

2.21. Match the diseases with their clinical tests.

(1) Diabetes mellitus	(a) Decrease in Hemoglobin levels
(2) Cystic fibrosis	(b) Increase in blood sugar levels
	(c) D.N.A. diagnosis
	(d) Decreased levels of TSH

2.21. Match the correct pathways of the following:

(1) Glyceraldehyde-3-phosphate	a) Cholesterol synthesis pathway
(2) Arachidonic acid	(b) Citric acid cycle
	(c) Glycolysis
	(d) Prostaglandin synthesis pathway

2.22. Match the following terms with the definitions given.

(1) Biological half life	(a) Ratio of the median lethal dose to the median effective dose
(2) Therapeutic index	(b) Dosage used in the treatment
	(c) Elimination of the drug to 5O/c of its original concentration
	(d) Time taken for a drug to be absorbed

2.23. Given below are two vaccines. Their compositions are mentioned. Match them.

(1) B.C.G.	(a) Living attenuated Mycobacterium tuberculosis
(2) Whooping cough	(b) Experimentally killed and freeze dried polio virus
	(c) Antibodies obtained from the sera of tuberculosis patients
	(d) Killed Bordetella pertussis bacteria

2.24. Match the following diseases with their causative organisms.

(1) Helminthiasis	(a) Plasmodium falciparum
(2) Jaundice	(b) Taenia solium
	(c) Hepatitis-A-Virus
	(d) Toxoplasma gondii

2.26. Given below are the Schedules as per D and C Act 1940. Match them with the information to be given in the Table.

Schedule H	(a) For external use only
Schedule G	(b) For therapeutic use only
	(c) Caution — it is dangerous to take this preparation except under medical supervision
	(d) To be sold by retail on the prescription of a R.M.P. only

SECTION - B
This section consists of TWENTY questions of FIVE marks each. Attempt ANY FIFTEEN questions.

3. (a) What is the biological source of clove?
(b) Following Phytomedicinals are present in specific part of certain plants. Name the biological source mentioning the specific part in which they are present.
(i) Digitoxin (ii) Sennosides (iii) Papaverine (iv)Panaxadiol

4. Following tests are performed in different samples of Natural Drugs. On the basis of given results identify the class of chemical constituent.
(a) A thin section is treated with Tincture alkana — red colour is obtained
(b) An alcoholic extract of the leaf is treated with Dragendorffs reagent — Reddish brown precipitate is obtained.
(c) A pure orange coloured product is dissolved in dry chloroform and treated with dry solution of antimony trichloride in chloroform — Blue or bluish violet colour is obtained.
(d) A solution of the substance gives a positive Leibermann — Burchard reaction.
(e) A dilute alcoholic exreact is treated with Ninhydrin solution — Purple or Pink Colour develops.

5. A natural product is subjected to degradation reaction. Different derivatives are formed as shown below. Give the appropriate structures of A, B, C, D and E.
1, 3, 7-Trimethyl xanthine *B* %° *c* di/HCI *D + E*

6. Resorcinol is treated with p-toludine, the resulting product when reacted with 2-chloromethyl A2 imidazoline Hydrochloride gave product a. Write complete reaction sequence using appropriate structural formulae.

7. **Complete the following reactions giving equations:** 10-11 dihydro-5-H dibenz (b-f) azepine.
Acetic) *A* N-Bromo) *B* KOH *C COC/ D* NH3 *E*
an hydride succi n i m ide *CH5Oh CH5OH*

8. (a) Guanidine nitrate is treated as shown below. Product A B C are formed. What is the structural formula of Guanidine nitrate and the products A, B and C?
Guanidine nitrate *NCCHCN)A CH3COOH)B* BenzyiCyanide
(b) What is the common name of medicinal agent formed at C?

9. (a) In the formulation of liquid orals what are the four important criteria in the selection of a buffer?
(b) Define sustained release dosage forms in one sentence only.

10. List the I.P. tests to be complied by the plastic containers for ophthalmic preparations.

11. (a) Calculate the amount of sodium chloride required to make 1.S% solution of Pilocarpine Hydroxhloride isotonic with tear secretion.
Freezing point of 1% solution of Pilocarpine Hyrochloride = 0.13°C
Freezing point of 1% solution of NaCI = -0.576°C

12. (a) Name one Pure short acting opioid antagonist.
(b) Name the receptors which it blocks.
(c) Write the mechanism of action Ketorolac in one sentence only.
(d) Give one important therapeutic use of Ketorolac.
(e) Is Ketorolac associated with tolerance?

13. (a) Define pharmacokinetic interaction and pharmacodynamic interaction — in one sentence each.
(b) Comment in 3 sentences the interaction of allo-purinol and mercaptopurine.

14. Define natural killer cells, T cells, B cells cytokines and lymphokine — in one sentence each.

15. (a) Mention the organism from which streptomycin is isolated.
(b) Give the name of the test organism used for its assay as per I.P.
(c) Write the structural formulae of three important hydrolytic products of streptomycin.

16. (a) Name the intermediates formed in A, B, C, D
Acetyl Co—A) *A* Acontase) *B* dehydrogenase *C* dehydrogenase *D*) Succinyl Co A
(b) Give the name of the pathway in which the above reactions occur.

17. Five common advices that are given to patients during administration of certain drugs are given below. Choose the appropriate drug [only on each] from the list.
(a) Avoid milk products and Milk of magnesia half an hour before or after taking the medicine.
(b) Vitamin supplements containing pyridoxine should not be taken.
(c) Follow regular eating habits, especially immediately before and after taking this medicine.
(d) Do not worry about the reddishdiscolouration in the urine, sweat and saliva during the treatment.
(e) Take with an antacid.

(i) Disprin (ii) Rifampicin (iii) Isoniazid (iv)Ampicillin
(v) Doxycycline (vi) L-dopa (vii)Ibuprofen (viii) Rantidine
(ix) Insulin (x) Cetirizine

18. How do you characterize a biological inducator as per I.P.? Mention only five.

19. (a) To enhance response of a detector in liquid chromatography a modification to introduce a chromophore is done.
(i) What is it?
(ii) How is it classified?
(b) Name two cell materials used in I.R. for handling liquid samples.

20. (a) Define mass spectrum in one sentence only.
(b) Name the four types of electronic transitions involved in the ultraviolet spectroscopy.

21. (a) Name the titrants used in the I.P. assays for the following:
(i) Ascorbic acid
(ii) Ascorbic acid tablets
(iii) Ascorbic acid injection
(b) Name two instrumental methods used for determination of the concentration of the dispersed phase in a suspension.

22. (a) Write the heterocyclic ring system present in sulphomoxal.
(b) Give the half life equation for a zero order reaction.
(c) Define auxochrome in one sentence only.
(d) Which one of the following microorganisms is particularly dangerous to the eye?
(e) Which one of the following drugs is used as an immuno-suppressant?
(i) Amantadine
(ii) Cyclosporinee
(iii) Tetracycline.