GPAT QUESTION PAPER 1994 WITH ANSWER KEY

PHARMACEUTICAL SCIENCES

Time : 3 hours **Maximum Marks : 150**

PART - A

N.B. *(1) There are 2 Section in this part.*

(2) Answer all questions in both Section 1 and 2.

(3) Answer should be given in serial order in the answer book.

(4) Do not skip questions while writing the answers.

(5) Write the question number and show your answer by writing the alphabet (Against) in capital letters.

(6) In section 1 each question carries 1 mark.

(7) In section 3 each question carries 2 marks.

(8) A model is shown at the beginning of each section in part A.

(9) Answer to the question in this must be written in the first 3 (three) pages of the answer books only.

SECTION - I

CHOOSE THE CORRECT ANSWER

Multiple choice Questions

1.1 Natural camphor is:

(a) An optically inactive aldehyde obtained from *cinnamomum camphora*

(b) A white dextrorotatory ketone obtained from the wood of *cinnamomum camphora*

(c) A white optically inactive ketone obtained form the bark of *cinnamomum camphora*

(d) A white volatile aldehyde obtained from the bark of *cinnamomum camphora*

1.2 Ingredients used for capsulation in soft capsule should flow by gravity at a temperature Not exceeding

(a) 35°c (b) 30°c (c) 25°c (d) 20°c

1.3 The region of the electromagnetic spectrum below 200 nm is known as

(a) Vacuum ultra violet region (b) Far uv region

(c) Low uv region (d) Microwave region

1.4 O/W micro emulsion containing hydrophilic surfactant produces

(a) Translucent emulsion (b) Transparent emulsion

(c) Milky white emulsion (d) Intense white emulsion

1.5 Which of the following steroids shows predominant mineralo corticoid action?

(a) Hydrocortisone (b) Spironolactone

(c) Dexamethasone (d) Fludrocortisone

1.6 The factors affecting diffusion current in polarography can be denoted by

(a) Nernst equation (b) Ilkovic equation

(c) Lambert's law (d) Mark-Houwink equation

1.7 Rotosort is an equipment used

(a) To separate unfilled capsules

(b) To fix the cap and body of the capsules after filling

(c) To separate the improper tablets

(d) To adjust the required compression for the tablets

1.8 As per G.M.P. permitted limit of slid contents in water for injection is:

(a) 100 ppm (b) 1.0 ppm (c) 0.1 ppm (d) 10.0 ppm

1.9 Nujol is

(a) Hexachlorobutadiene (b) Mineral oil

(c) Perfluorokerosene (d) Flurolube

1.10 Which of the following is a microsomal enzyme inducer?

(a) Indomethacin (b) Clofibrate (c) Tolbutamide (d) Glutethamide

1.11 Fiducial limit is a term used in

(a) Microbiological assay (b) Biologically assay

(c) Chemical assay (d) Instrumental methods of assay

1.12 Phenothiazines are metabolized

(a) In the hepatic microsomal system by hydroxylation followed by conjugation with glucuronicacid

(b) In the liver by oxidation

(c) In the hepatic microsomal system by reduction

(d) In the hepatic microsomal system by oxidation followed by conjugation withy glycine.

1.13 Benzodiazipines potentiate

(a) The binding of protein to nervous tissue (b) The binding of GABA to liver

(c) The binding of GABA to receptors (d) The binding or GABA to carbohydrates

1.14 Benzalkonium chloride is a germicidal surfactant which is rendered inactive in the presence of

(a) Organic acid (b) Cationic surfactants (c) Soaps (d) Inorganic salts

1.15 Enkephalins are

(a) Exogenous compounds useful in Analgesia

(b) Endogenous ligands which are pentapeptides that are localized in some nerve endings.

(c) Endogenous ligands which are tripeptides that are present in nervous tissue

(d) Endogenous ligands which are tetrapeptides that are present in cardiovascular tissue.

1.16 Benorylate is a Prodrug, chemically it is polymeric condensation product of

(a) Aluminium oxide and asprin
(b) An acetyl salicylic ester of phenol
(c) An acetyl salicylic ester of paracetamol
(d) An acetyl salicylic ester of β –naphthol

1.17 Listed below are some of the common vehicles, which one is most appropriate for the intravenous admixture of ampicillin 500 mg/50 ml?

(a) 5% Dextrose injection
(b) 5% Dextrose and 0.9% Sodium Chloride solution
(c) 2.5% Dextrose and 0.45% Sodium Chloride injection
(d) 0.9% Sodium Chloride injection

1.18 Acetonides are prepared to improve the bioavailability of certain drugs. Which of the following is available as acetonide?

(a) Clonidine (b) Prednisolone (c) Pyrimethamine (d) Tramicinolone

1.19. Which one of the following indicators is used in Complexometric Titration?

(a) Crystal Violet (b) Murexide (c) Eosin (d) Methyl Orange

1.20. Betamethasone is:

(a) 9α Fluro 11 β , 17 α, 21 trihydroxy 16 β methyl pregna-1, 4 diene 3, 20 dione
(b) 9α Fluro 12 β , 13 α, 21 trihydroxy 17 β methyl pregna-1, 4 diene 3, 20 dione
(c) 9α Fluro 11 β , 17 α, 21 trihydroxy 16 β methyl estra-1, 4 diene 3, 20 dione
(d) 9α Fluro 11 β , 17 α, dihydroxy 16 β methyl pregna-1, 4 diene 3, 20 dione

SECTION - II

2. FILL IN THE BLANKS

(A) The anti-inflammatory agent sulindac has the closest structural similarity to _____.

(B) A long polypeptide which possesses potent analgesic activity and found in the Pituitary and hypothalamus is _____.

(C) Aminophylline I.P. contains Theophylline and _____.

(D) Radiopharmaceuticals are filled up in suitable containers in a protected_____ laminar flow cabinet.

(E) Efficiency of a filter used for sterilization is determined by its _____.

(F) The finger print region in IR spectrum ranges from _____ cm^{-1}.

(G) _____ is the ideal micro-encapsulation process for thermostable ingredients

(H) Spinning of a nucleus perpendicular to the applied field is known as_____.

(I) The test organism for the microbiological assay of chloramphenicol IP is_____.

(J) Spiranolactone is a competitive antagonist of _____.

(K) Colchicine is an alkaloid obtained from _____.

(L) A typical auxin of plant, which is found in growing tissue is _____.

(M) The largest peak in the mass spectrum is known as _____.

(N) Procainamide when given intravenously can cause a drop in blood pressure probably from_____.

(O) The most important property of Digitalis glycosides is their positive_____.

(P) In non-aqueous titration of amine halides, the halide ion is removed by the addition of ____.

(Q) Milk of Magnesia is a preparation containing between 7 and 8.5% of_____.

(R) Light-liquid paraffin IP and Liquid paraffin IP is differentiated by their_____.

(S) Papain is a _____ enzyme.

(T) The systematic name of _____ is L-threo-2,3,4,5,6-penta hydroxy-2-hexenoic acid-4-lactone.

SECTION - III

3. State whether the following are TRUE or FALSE. If the statements are FALSE, correct them . Give reasons and justify the statements in one or two sentences only.

(A) Quinidine is often given intra-muscularly

(B) Micropore cellulose membrane filters are disposed after use by burning.

(C) The glass electrode used in potentiometry should not be used in aqueous media.

(D) Lidocaine can be given by continous intravenous infusion.

(E) Acetazolamide is a sulfonamide type drug used as anti-bacterial.

(F) Liquids containing water above 5% and low molecular weight water soluble organic compounds are not encapsulated in soft gelatin capsules.

(G) Neutral molecules produced in the fragmentation cannot be detected in the mass spectrometer.

(H) Stable and metastable polymorphs are only included in the preparation of chloramphenicol suspension.

(I) Dimethly sulphoxide is used as permeation inhibitor in transdermal preparations.

(J) The main oxidation product of ß carotene is 2 molecular portion of geronic acid hence it shows the presence of a ionone ring structure.

(K) Thymol and menthol gives a violet colour reaction with neutral ferric chloride solution.

(L) Dry mixtures are the common pediatric dosage froms, because of their extended half life.

(M) The reversible oxidation and reduction system of Ascorbic acid accounts for its biologic function.

(N) Digitalis leaves, after collection should be dried as rapidly as possible at a temperature of about 60°C.

(O) The process of gel filtration involves separation of materials on the basis of particle size.

SECTION - IV

MATCH THE FOLLOWING

4.1 The biological indicators mentioned below are used for specific type of sterilization listed (A) to (E). Match them.

(1) *Bacillus subtilis*
(2) *Bacillus stearothermophilus*
(3) *Bacillus pumulis*
(4) *Pseudomonas diminuta*

(A) Ionising radiaton
(B) Dry heat st erilization
(C) Filtration
(D) Moist heat sterilization
(E) Gaseous sterlizaton

(a) 1-B, 2-A, 3-C, 4-D
(b) 1-B, 2-D, 3-A, 4-C
(c) 1-E, 2-A, 3-B, 4-C
(d) 1-B, 2-C, 3-E, 4-A

4.2 Following are some of the starting materials for the synthesis of compounds listed from (A) to (E). Match them correctly.

(1) γ – Picoline
(2) 4-Nitro 2-Amino Toluene
(3) Piperazine and Diethyl Carbamoyl Chloride
(4) 2-Chloro Phenothiazine

(A) Diethyl Carbamazine
(B) Isoniazid
(C) Chlorpromazine
(D) Diltiazem
(E) P.A.S.

(a) 1-B, 2-A, 3-C, 4-D
(b) 1-A, 2-B, 3-D, 4-C
(c) 1-B, 2-A, 3-A, 4-C
(d) 1-B, 2-C, 3-E, 4-A

4.3 Microscopical characters (A) to (E) are associated with the plant drugs listed below. Match them.

(1) *Elettaria cardamomum*
(2) *Quillaia saponaria*
(3) *Digitalis purpurea*
(4) *Atropa belladonna*

(A) Rhytidomes
(B) Clothing and glandular trichomes
(C) Thin membraneous arillus
(D) Stomata of the anisocytic type
(E) Concave midrib

(a) 1-C, 2-A, 3-B, 4-D
(b) 1-A, 2-B, 3-D, 4-C
(c) 1-E, 2-A, 3-B, 4-C
(d) 1-B, 2-C, 3-E, 4-A

4.4 The equipment listed (A) to (E) are used for the identification of the properties of aerosol mentioned below. Match them.

(1) Particle size determination
(2) Identification of propellants
(3) Stability of foam
(4) Flash point

(A) Pycnometer
(B) Rotational viscometer
(C) Tag open cup apparatus
(D) Infrared spectroscopy
(E) Cascade impactor

(a) 1-B, 2-A, 3-C, 4-D
(b) 1-A, 2-B, 3-D, 4-C
(c) 1-E, 2-D, 3-B, 4-C
(d) 1-B, 2-C, 3-E, 4-A

4.5 Match the terms mentioned from (A) to (E) with the corresponding spectroscopic methods.

(1) IR	(A) Antibonding orbital
(2) Mass Spectra	(B) Stretching and bending
(3) NMR	(C) Metastable ion
(4) UV	(D) Chemical shift
	(E) Depolarisation

(a) 1-B, 2-A, 3-C, 4-D (b) 1-A, 2-B, 3-D, 4-C

(c) 1-E, 2-A, 3-B, 4-C (d) 1-B, 2-C, 3-D, 4-A

4.6 Pharmacological activity of certain well known plant drugs are listed (A) to (E). Match them.

(1) Papaverine	(A) Weak analeptic
(2) Camphor	(B) Vasodilator
(3) Veratrum alkaloids	(C) Antineoplastic
(4) Vincristine	(D) Central vasoconstrictor
	(E) Anxiolytic

(a) 1-B, 2-A, 3-C, 4-D (b) 1-B, 2-A, 3-B, 4-C

(c) 1-E, 2-A, 3-B, 4-C (d) 1-B, 2-C, 3-E, 4-A

4.7 Given below are some of the common reactions. Their definitions are listed (A) to (E). Match them.

(1) Saponification	(A) Reaction of acids and bases to from salt and water
(2) Esterification	(B) Reaction of an oil with an alkali to form soap and glycerol
(3) Neutralisation	(C) Reaction in which hydrogen atoms are added to double bonds
(4) Hydrolysis	(D) Reaction in which hydroxyl group is replaced by alkoxy group
	(E) Reaction of salt or ester with water to form acids and bases oralcohol.

(a) 1-B, 2-D, 3-A, 4-E (b) 1-A, 2-B, 3-D, 4-C

(c) 1-E, 2-A, 3-B, 4-C (d) 1-B, 2-C, 3-E, 4-A

4.8 Listed below are some of important drugs. Classify them as per the relevant Schedules of Drugs and Cosmetics Act.

(1) Chlorpropamide	(A) Schedule G
(2) Detamethasone benzoate	(B) Schedule M
(3) Amaranth	(C) Schedule H
(4) Dexamphetamine	(D) Schedule Q
	(E) Schedule X

(a) 1-B, 2-A, 3-C, 4-D (b) 1-A, 2-B, 3-D, 4-C

(c) 1-E, 2-A, 3-B, 4-C (d) 1-A, 2-C, 3-D, 4-E

4.9 Match the coatings given below with their corresponding techniques listed (A) to (E).

(1) Compression coating	(A) Air in the coating pan is replaced with nitrogen

(2) Dip Coating
(3) Electrostatic Coating
(4) Vacuum Film coating

(B) Application of coating to conductive substrates
(C) Acid insoluble coating
(D) A tablet within a tablet
(E) Repeated coating and drying

(a) 1-E, 2-E, 3-B, 4-A
(b) 1-A, 2-B, 3-D, 4-C
(c) 1-E, 2-A, 3-B, 4-C
(d) 1-B, 2-C, 3-E, 4-A

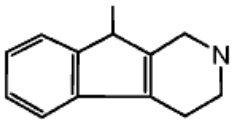
4.10 The most appropriate pharmacological actions of the following drugs are listed in (A) to (E). Match them.

(1) Verapamil
(2) Propranolol
(3) Dipyridamole
(4) Hydralazine

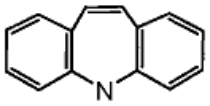
(A) Calcium channel blocker
(B) Coronary vasodilator
(C) β -Adrenergic blocker
(D) Arteriolar vasodilator
(E) Arterial and venous vasodilator

(a) 1-B, 2-A, 3-C, 4-D
(b) 1-A, 2-C, 3-B, 4-D
(c) 1-E, 2-A, 3-B, 4-C
(d) 1-B, 2-C, 3-E, 4-A

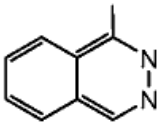
5. Following ring structures are present in well known drugs oe their pharmacological category is indicated. Complete the structure by introducing the relevant groups and their common name?



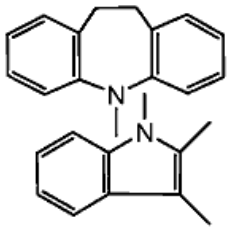
an antihistaminic



Analegestic specific in trigerminal neuralgia



Antihypertensive



Antidepressant

Antiinflammatory Analgesic

6. Give the names of five important factors which protect the chemical stability of medicaments in parenterals.

7. Give reasons for the following:

(i) Temperature programming gives the best result in gas chromatography.
(ii) The detectors used in U.V. and visible region cannot be used in longer wave length.
(iii) In polarographic analysis expelling dissolved oxygen by passing of inert gas is done before the actual measurement.
(iv) Phenol and anisole fluorescence at pH 7, but at pH 12 Phenol does not show fluorescence.
(v) Buffered solution is always used in E.D.T.A. titrations.

8. Draw inferences for the following:

(i) Microscopic examination of powdered digitalis leaves showed small leaf parts with densely covered large wooly hairs.

(ii) Two different samples of squill . One gives reddish purple colour with iodine and another pale yellow colour.

(iii) A transverse section of Belladonna root sample showed number of concentric cambia, Parenchyma showed acicular calcium oxalate crystals.

(iv) To an alkaloidal salt solution in water bromine water and dilute ammonia solution are added - a bright green colour is produced.

(v) An alkaloid when treated with p-dimethyl amino benzaldehyde reagent in presence of H_2SO_4 and traces of Ferric chloride gives blue violet colour.

9. Give the mechanism of action of the following drugs. Answer each in not more than two sentences.

(1) Nifedipine
(2) Hexamethonium
(3) Interferons
(4) Pyrantel pamoate
(5) Erythromycin

PART - B

10. Draw the heterocyclic system present in the drugs listed below and name them:

(A) Nitrofurantoin
(B) Cloxacillin
(C) Primidone
(D) Mebendazole
(E) Methotrexate

11. Give reasons for the following:

(A) Using opaquent-extenders in film-coating of tablets.

(B) Elevation of storage temperature in Accelerated stability studies.

(C) Grossing in syrup coating

(D) Application of Stoke's law in emulsion preparation

12. Mention 5 important factors for selection of Fluid Bed Spray Granulator.

13. (A) Draw the configurational, boat and chair structures of:

(i) 3α Hydroxy tropane

(ii) 3β Hydroxy tropane

(iii) 6, 7β Epoxy-3α-hydroxy tropane

(B) Adult dose of a drug is 150 mg/kg and the drug is available as tablets of 2 mg strength. Calculate the requirement for a boy aged 14 years, weighing 35 kg.

14. (A) When was Pharmacy Act passed?

(B) Define the following as per Pharmacy Act.

(i) Central Register

(ii) First Register

(iii) Education Regulation

(iv) Schedule F

15. Give the names and chemical nature of the principal constituents present in the volatile of

(A) *Coriandrum sativum* (B) *Carum carvi*

(C) *Pimpinella anisum* (D) *Myristica fragrans*

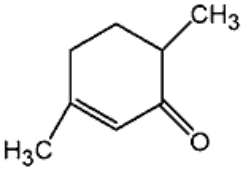
(E) *Anethum graveolens*

16. (A) Define:

(i) Chromophone

(ii) Equivalent Conductance

(B) What is λ max? How λ max in the following structure is calculated?



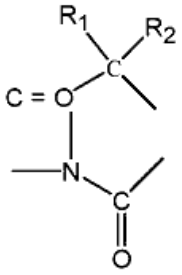
17. (A) Name 4 important additives used in the formulation of hard gelatin capsule.

(B) What peak plasma concentration might be obtained by administering 60 mg of a drug (V_d = 0.4 l/kg) to a boy weighing 40 kg.

18. The MAO inhibitors form stable complexes with monoamine oxidase, irreversibly inactivating it and thereby preventing the oxidative deamination of biogenic amines. Name 5 of these biogenic amines.

19. Give the principle, with relevant equations of the reactions involved and the method of assay of Amylobarbitone IP. http://www.xamstudy.com

20. Anti convulsants containing the ureide structure is depreted by the common formula given below. Different classes of these compounds have different groups which are missing in the structure, enter them and give their names.



21. Show the structural alternation in the compounds mentioned, state what improvement in their activity is resulted.

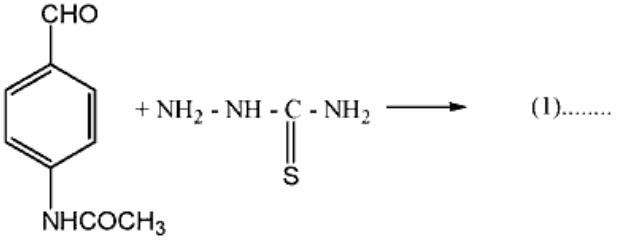
(i) Introduction of ethinyl group at C_{17} in Estradiol.

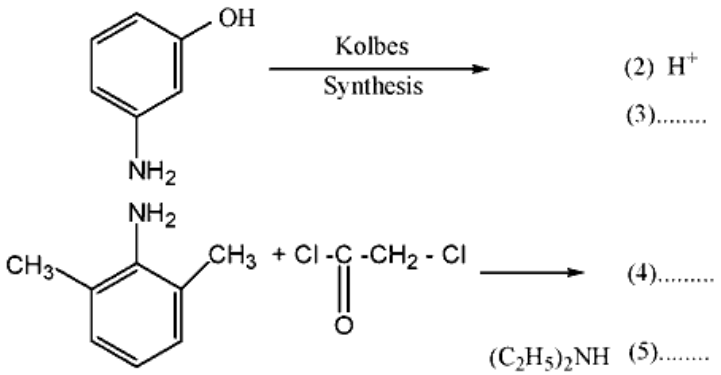
(ii) Attachment of tertiary amino group to the 4th carbon of the butyrophenone.

(iii) Introduction of 3, 5 dimethoxy-4-ethoxy carbohydroxy group at C_{18} in Reserpine.

(iv) Introduction of chloro group at 7 position of 1:3 dihydro-1- methyl, 5, phenyl 2H, 1-4 benzodiazepine 2-one.

22. Complete the following reactions given the name and structural formula of the final product.





23. Give the mechanism of action of osmotic diureties.

24. What happens when? Give complete equations.

(i) Succinaldehyde, methylamine and acetone are condensed at room temperature.

(ii) Chloramphenicol (?) is hydrolyzed, the resulting product is oxidized with periodate.

25. Starting from the following, outline the synthesis of:

(i) Bephenium hydroxyl naphthoate from 1-Chloro-2-phenoxy ethane.

(ii) trimethoprim from trimethoxy benzaldehyde and 3 ethoxy-propionitrile.

26. Complete the following reaction:

(1) Scillaren A $\xrightarrow[\text{Hydrolysis}]{\text{Enzyme}}$ (1).....+ glucose $\xrightarrow{\text{acid hydrolysis}}$ (2).....+ (3).....

(2) Scillaren A $\xrightarrow[\text{Hydrogen}]{\text{Acid}}$ (4).....+ (5).....

27. Draw the structural formula for the following:

(i) Methyl 11, 17α dimethoxy 18β (3, 4, 5 trimethoxy benzoyloxy) 3 ß, 20α – Yohimbane - 16 β carboxylate.

(ii) 3, 7 dihydro-1, 3, 7 trimethyul purine 2, 6 dione

(iii) 4-Chloro-N-fufuryl-5-sulphamoyl anthranilic acid

(iv) 11β, 17α, 21 trihydroxypregna-14-diene-3, 20-dione.

(v) N – (5-methyl isoxazol-3-yl) Sulphanilamide.

28. List the important parts of a UV double beam spectrophotometer and mention their Functions

29. Show how the following drugs are transformed. Name their metabolic product:

(i) Meprobamate (ii) Salicylic acid (iii) INH

(iv) Nor-epinephrine (v) Glyceryl trinitrate

End of paper

ANSWER KEY GATE 1994

Section -I

1.1	b	1.2	a	1.3	b	1.4	b
1.5	d	1.6	b	1.7	a	1.8	d
1.9	b	1.10	d	1.11	a	1.12	a
1.13	c	1.14	c	1.15	b	1.16	c
1.17	d	1.18	d	1.19	b	1.20	a

Section – IV

4.1	b	4.2	c	4.3	a	4.4	c
4.5	d	4.6	b	4.7	a	4.8	d
4.9	a	4.10	b				