GPAT QUESTION PAPER 2001 WITH ANSWER KEY

PHARMACEUTICAL SCIENCE

MM : 200 **Time : 3 hours**

Read the following instruction carefully.

1. *All answer must be written in ENGLISH.*
2. *This question paper consists of TWO SECTIONS : Section 'A' and 'B'.*
3. *Section A consists of two questions of the multiple choice type. Question 1 consists of TWENTY FIVE sub-questions of ONE mark each and Questions 2 consists of TWENTY FIVE sub-question of TWO marks each.*
4. *Answer Section A only ont he special machine-gradable OBJECTIVE RESPONSE SHEET (ORS). Questions in Section A will not be gradeed if answered elsewhere.*
5. *Write your name, registration number and the name of the center at the specified locations on the right half of the ORS for Section A .*
6. *Using a HB pencil, darken the appropriate bubble under each digit of your registration number. .*
7. *Questions in Section A are to be answered by darkening the appropriate bubble (marked A, B, C or D) using a HB pencil against the question number on the left hand side of the ORS. In case, you wish to change an answer, erase the old answer completely using a good sort eraser.*
8. *The ORS will be collected after 120 minutes from the start of the examination. In case you finish Section A before the expiry of 120 minutes, you may start answering Section B.*
9. *There will be NEGATIVE marking in Section A. for each wrong answer to 1-and 2- mark sub-questions, 0.25 and 0.5 marks will be deducted respectively. More than one answer marked against a question will be deemed as an incorrect response and will be negatively marked.*
10. *Answer questions in Section B in the answer book. Section B consists of TWENTY questions FIVE marks each. ANY FIFTEN out of them have to answered. If more number of questions are attempted, score off the answers not to be evaluated, else only the first fifteen unscored answered will be considered.*
11. *Answer for each question in Section B should be started on a fresh page. Question numbers must be written legibly and correctly in the answer book.*
12. *In all 5 mark questions questions (Section B), clearly show the important steps in your answers. These intermediate steps will carry partial credit.*

SECTION - A

☞ **The question consists of TWENTY FIVE sub-questions (1.1-1.25) of ONE mark each. For each of these sub-questions, for possible answers (A, B, C and D) are given, out of which one is correct. Answer each sub-question by darkening the appropriate bubble on the OBJECTIVE RESPONSE SHEET (ORS) using a soft HB pencil. Do not use the ORS for any rough work. You may like to use the Answer Book for any rough work,if needed.**

1.1 Starting material for the synthesis of L-Thyroxine is

(a) 2-amino-5-chloro-acetophenone (b) Phenyl alanine

(c) 2-amino-5-chloro-benzophenone (d) L-tyrosine

1.2 One of the following antianxiety agent is an azaspirodecanedione derivative.

(a) Lorazepam (b) Cycloheptadiene (c) Meprobamate (d) Buspirone

1.3 Include the following drug under proper classification. NIFEDIFINE

(a) Quinoline derivative (b) Aryl piperidine

(c) Isoquinoline derivative (d) Pyridine derivative

1.4 Acetazolamide can be synthesized from on of the following intermediates.

(a) 5-amino-2-mercapto-1, 3-thiazole (b) 5-amino-2-mercapto-1, 3, 4-thiadiazole

(c) 5-amino-2-mercapto-1, 2, 3-thiadiazole (d) 5-amino-2-mercapto-1, 3, 4-tetrazole

1.5 Choose the correct trichomes of *Digitalis purpurea*

(a) Numerous covering trichomes and a few glandular trichomes

(b) Few covering trichomes

(c) Few glandular trichomes and few covering trichomes

(d) Few glandular trichomes

1.6 PANAXADIOL is a constituent of

(a) Ginger (b) Jatamansi (c) Ginseng (d) Pepper

1.7 The plant hormone which shows specific effect on the cell division is

(a) Auxins (b) Abscisic Acid (c) Cytokinins (d) Ethylene

1.8 One of the following condition is maintained in programmed temperature gas chromatography

(a) Temperature of the whole column is raised during analysis

(b) Temperature at the sample injection system is raised

(c) Temperature at the detector is gradually raised

(d) Temperature at the recorder alone is raised

1.9 A BOLOMETER consist of

(a) Two metals welded together

(b) A thin blackened platinum strip in an evacuated vessel

(c) Deuterated triglycine sulphate

(d) Tungsten wire

1.10 Choose the correct excepient for enhancing solubility in tablet manufacture.

(a) PEG (b) Microcrystalline cellulose

(c) Talc (d) Lactose

1.11 Two or more ions present together can be determined successfully by polarographeven if their half wave potentials overlap or interfere by

(a) Titration (b) Complexation (c) Filtration (d) Heating

1.12 One of the following is selective. SEROTONIN reuptake inhibitor

(a) Desipramine (b) Fluoxetine (c) Buspropion (d) Maprotiline

1.13 Plasmodial resistance of CHLOROQUINE is due to

(a) Induction of inactivating enzymes

(b) Change in receptor structure

(c) Increase in theactivity of DNA repair mechanism

(d) Decreased carrier-mediated drug transport

1.14 One of the following actions of opioid analgesic is mediated via kappa receptors

(a) Cerebral vascular dilation (b) Euphoria

(c) Spinal analgesia (d) Physical dependence

1.15 One of the following drugs has activity against Herpes simplex virus type I and is used topically. Systematic administration of the same results in bone marrow depression, hepatic dysfunction and nephrotoxicity.

(a) Acyclovir (b) Amantadine (c) Vidarabine (d) Idoxuridine

1.16 A woman has to be treated for upper respiratory tract infection. Six years back she was found hypersensitive to penicillin V. The cultures now reveal a strain of Streptococcus pneumonia that is sensitive to all of the following drugs. Which one would be the best choice for the patient

(a) Amoxicillin (b) Erythromycin (c) Cefaclor (d) Cyclacillin

1.17 The units of measurement for conductance is

(a) Ohms (b) Amperes (c) Mhos (d) Milli volts

1.18 The shells of soft gelatin capsules made elastic or plastic like, by addition of

(a) Sorbitol (b) Povidone (c) PEG (d) HPMC

1.19 The rate of drug bioavailability is most rapid when the drug is formulated as a

(a) Controlled release product (b) Hard gelatin capsule

(c) Tablet (d) Solution

1.20 The loading dose of a drug is usually based on

(a) Total body clearance of the drug

(b) Percentage of the drug bound to plasma proteins

(c) Fraction of drug excreted unchanged in urine

(d) Apparent volume of distributionand desired drug concentration in plasma

1.21 Browne's tubes are most commonly used chemical indicator for

(a) Ethylene oxide sterilization (b) Radiation sterilization

(c) Heat process sterilization (d) Filtration sterilization

1.22 A specimen obtained from a patient's cerebrospinal fluid, cultured in specializedmedia for about five weeks showed the presence of bent rods and tested positive with Ziehl-Neelsen reagent. Identify the organism

(a) *Nesseria meningitides* (b) *Mycobacterium tuberculosis*

(c) *Bacteroides fragilis* (d) *Leptospira interrogans*

1.23 Staphylococcus aureus is used for the I.P. assay of

(a) Doxycycline (b) Bleomycin (c) Kanamycin (d) Carbenicillin

1.24 State pharmacy council should have the following number of elected members

(a) Six (b) Nine (c) Five (d) Seven

1.25 Drug combination WARFARIN/VITAMIN-K results in a specific interaction. Identify.

(a) Antagonistic (b) Increased sedation

(c) No known interaction (d) Harmful only in the presence of oxidizing agent

PY-2. ***The question contains of Twenty Five sub question(2.1-2.25) of TWO mark each. For each of these sub-question, four possible answers(A,B,C and D) are given, out of which one is correct. Answer each sub-question by darkening the appropriate bubble on the OBJECTIVE RESPONSE SHEET(ORS) using a soft HB pencil. Do not use the ORS for any rough work. You may like to use the Answer Book for any rough work,if needed.***

2.1 In the glucuronidation reaction of OXAZEPAM-the functional group responsible is

(a) OH (b) COOH (c) SH (d) NH_2

2.2 Benzhydryl bromide when treated with 2-dimethyl amino ethanol in presence of K_2CO_3 gives one of the following

(a) 2-diphenyl ethoxy-N, N-dimethyl ethylamine (b) 2-diphenyl methoxy-N, N-diethyl ethylamine

(c) 2- diphenyl methoxy-N, N-dimethyl ethylamine (d) 2-diphenyl methoxy-N, N-diethyl methylamine

2.3 Demeclocycline differs from Chlortetracycline only by

(a) Absence of methyl group on C_6 (b) Absence of OH group on C_6

(c) Absence of dimethylamino group on C_4 (d) Absence of OH group on C_3

2.4 Choose the IUPAC name for Carbamazepine

(a) 5[3-(dimethylamino)ethyl] 10-11 dihydro-5H dibenz[b, f]azepine

(b) 5H dibenz[b, f] azepine-5-carboxamide

(c) 5H dibenz[b, f] azenpine-5-acid chloride

(d) 5[3-(dimethylamino)propyl]10-11 dihydro-5H dibenz[b,f]azenpine

2.5 Reserpine is derived from

(a) Squalene (b) Homoserine

(c) Tryptophan and tryptamine (d) Asparazine

2.6 An alkaloid from Atropa belladone having the molecular formula $C_{17}H_{23}O_3N$ having α-$D22^0$ when warmed with ethanolic alkaline solution is converted into

(a) (-) Hyoscyamine (b) (±) Hyoscyamine (c) (+) Hyoscyamine (d) (±) Hyoscine

2.7 Choose the appropriate description for Ergot

(a) Loosely arranged or in small more or less agglutinated angular mass

(b) A pseudoparenchyma formed by the interwooving closely appressed compact septate hyphae

(c) The crystocarps have fallen out leaving corresponding oval perforations in the ramuli

(d) Colourless septate hyphae about one quarter the width of the cotton trichome and they become twisted together

2.8 Characteristic bands observed in the IR spectra of alcohol result from

(a) OH and CO stretching (b) OH stretching (c) CO stretching only (d) CH bending only

2.9 Bulking agent used for parenteral preparation is

(a) Sodium metabisulphide (b) Benzyl alcohol (c) Carbolic acid (d) Sorbitol

2.10 Identify the correct non-flammable propellant

(a) Trichloromonofluoromethane (b) Dichloromonofluoromethane

(c) Dimethylether (d) Difluoromethane

2.11 Elastomer used in rubber stopper formulation is

(a) Polybutadiene (b) Butyl stearate

(c) Titanium dioxide (d) Butylated hydroxyl toluene

2.12 Schedule D as per D & C Act is concerned with

(a) List of drugs exempted from the provision of import of drugs

(b) Diseases or aliments which a drug may not purport to prevent or cure

(c) Requirements of factory premises

(d) List of prescription drugs

2.13 Official method for the analysis of Ciprofloxacin is by

(a) Potentiometry (b) HPLC

(c) Gas Chromatography (d) Non-aq. titration

2.14 The radiofrequency radiation is associated with

(a) Light consisting of one colour only (b) Nuclear Magnetic Resonance

(c) Mass Spectrometry (d) ESR

2.15 How many grams of drug should be used in preparing 500 ml of a 1:2500 solution

(a) 0.2 (b) 0.02 (c) 0.4 (d) 1.25

2.16 The pyroelectric detector converts electromagnetic radiation into

(a) Electrical Signal (b) Fluoroscence (c) Electrons (d) Visible light

2.17 The mechanism of Digitalis is

(a) Decreases intracellular Na concentration

(b) Inhibits Na-K ATPase

(c) Activated adenyl cyclase which produces c-AMP

(d) Decreased Release of Calcium from Sarcoplasmic reticulum

2.18 The mechanism of action for Dactinomycin is

(a) Inhibits Topoisomerase II (b) Cross links DNA

(c) Inhibits functions of microtubules (d) Inhibits DNA Polymerase

2.19 One of the drugs when coadministered with Terfenadine may lead to life threatening Cardiac dysarhythmia

(a) Lomafloxacine (b) Clofazimine (c) Itraconazole (d) Neomycin

2.20 Adverse effects of one of the drug include amenorrhea, bone marrow depression gastrointestinal distress and haemorrhagic distress. Identify?

(a) Cyclizine (b) Piroxicam (c) Cyclophosphamide (d) Cimetidine

2.21 *Varicella zoster* is the causative organism for

(a) Small Pox (b) Dermatophytosis

(c) Herpes (d) Infectious mononucleosis

2.22 One of the following is confirmed by diagnosis test

(a) Hyperuricemia (b) Cystic fibrosis (c) Acute pancreatitis (d) Hyperlipidemia

2.23 The conversion of fructose 1,6-biphosphate to Glyceraldehyde-3-phosphate is catalysed by

(a) Phosphoglycerate kinase (b) Enolase

(c) Aldolase (d) Triose phosphate isomerase

2.24 Morphine undergoes microsomal oxidation by

(a) N-dealkylation (b) Aromatic hydroxylation

(c) Oxidative deamination (d) O-dealkylation

2.25 SULFASALAZINE is a prodrug that is activated in the intestine by bacterial enzymes. The enzyme responsible is :

(a) Azoreductase (b) Choline esterase

(c) Glucuronyl transferase (d) Amylase

SECTION - B

This section consists of TWENTY questions of FIVE marks each. Attempt ANY FIFTEEN questions. Answers must be given in the answer book provided. Answer for each question must start on a fresh page and must appear at one place only. (Answers to all parts of a question must appear together).

3. (a) Which is the active isomer of dimethyl stilbestrol?

(b) Inhibition or decreased enzyme activity can result from different types of interaction namely:

(i) Non-covalent interaction between the enzyme and drug.

(ii) Covalent interaction between the enzyme and drug.

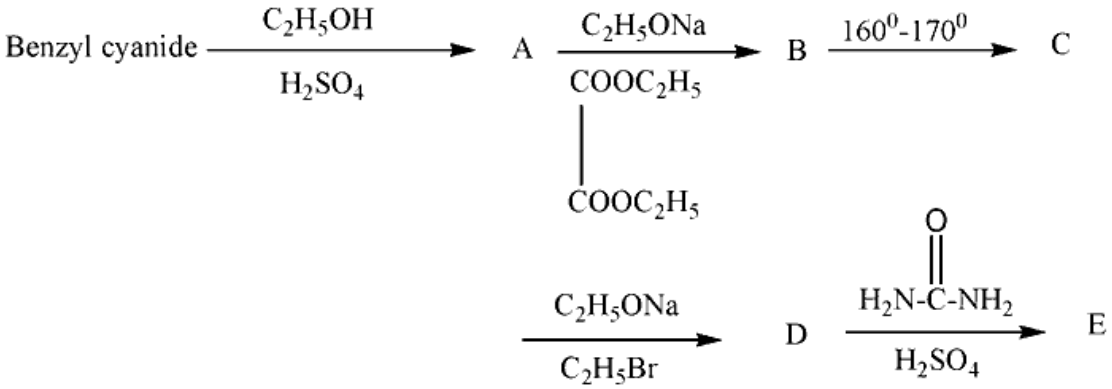
(iii) Mutually exclusive binding of the substtate and inhibitor. (iv) Binding on an allosteric site on the enzyme.

4. Complete the following reactions by giving appropriate structures:

(a) 2, 6-dimethyl aniline is treated with chloroacetyl chloride

(b) Product at (a) is treated with dimethylamine to get the final product. (c) What is the generic name of the final product?

5. Complete the following by giving appropriate structures at A, B, C, D, E.



6. Following modifications of the prototypes of HYDROCORTISONE represent attempts to increase glucocorticoid activity while decreasing mineralocorticoid activity:
   (a) Introduction of double bond at C_1 and C_2.
   (b) Fluorination at C_9.
   (c) Introduction of double bond at C_1 and C_2 with fluorination at C_9.
   (d) Double bond C_1 and C_2, fluorination at C_9 and α hydroxyl at C_{16}.
   (e) Double bond at C_1 and C_2 fluorination at C_9, α methyl at C_{16}.
   Give the generic names of the products formed.

7. (a) Name the part of *Syzygium aromaticum* which is used officially as the drug.
   (b) Where does the ovary situated in the above drug.
   (c) Which type of typical stomata is present in the above drug.
   (d) The G.C. analysis of the volatile oil from the above drug gives two characteristic major peaks. Name the probable constituents.

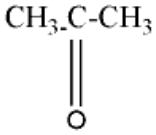
8. PAPAVERINE an alkaloid of molecular formula $C_{20}H_{21}O_4N$ undergoes degradation reactions. Give only the structural formulae of the products formed in the following reactions.
   (a) With hot concentrated Potassium permanganate
   (b) With cold dilute Potassium permanganate

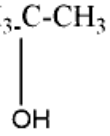
9. Following statements are characteristic for particular terms used. Identify and name the terms:
   (a) In plant breeding it is a possible means of combining in a single variety the desirable characters of two or more lines, variety or species and occasionally of producing new and desirable characters not found in either parent.
   (b) Changes in the genetic make up of the plant.
   (c) Chromosomes can be grouped not in pairs, but in threes, fours or higher numbers.
   (d) Plants occur with one or more chromosomes extra to the somatic number
   (e) Plant protoplasts which can be maintained in culture and can be induced to fuse either with others of the same or different species.

10. List the five important components in mass spectrometer.

11. In the assay of Pyridoxine Hydrochloride I.P.
   (a) Name the solvent used for dissolution of sample
   (b) Name the inorganic reagent which is added subsequently
   (c) What is the reason for its addition?
   (d) Name the tirant used.
   (e) Give the structure of the final product.

12. (a) Give the number of NMR signals given by the following compounds:

(i) 

(ii) 

(b) Why a solvent free of proton should be used for conventional NMR spectroscopy.

(c) Name the reference material used for proton spectro in non-aqueous medium.

(d) Why the signals in NMR are split? Answer in one sentence only.

13. List the five steps involved with capsule shell manufacture in an automatic process.

14. Give five advantages of loaded RBC as drug delivery system.

15. Penicillin solution has a half life of 21 days. How long will it take for the potency to drop to 80% of initial potency. Penicillin undergoes first order kinetics. Give all steps in the calculation.

16. List the five official tests which are performed for plastic containers for injectables.

17. Give the names of:

(a) A vasodilator that can cause hirsuitism.

(b) An ACE inhibitor that may cause renal damage in the foetus.

(c) A local anaesthetic that can interfere with the action of guanethiding.

(d) A class of vasodilators that is useful to reduce proteinuria in diabetics.

(e) A receptor, blocking of which is important for neuroleptic action.

18. (a) What are the two major limitations to the general use of immuno suppressive agents? Answer in one sentence each.

(b) Name two main kinds of motor disturbances produced by neuroleptic drugs.

(c) Name the class of drug that is dangerous when the person had a meal with a high content of fermented foods.

19. (a) Give the name of a Phosphonoformate derivative which has antiviral activity.

(b) What is its mechanism of action? Answer in one sentence only.

(c) Name two major adverse effects of the drug.

20. Given below are some typical bio-chemical reactions. Write the names of the enzymes which catalyses these reactions:

(a) $CH_3CH_2.OH + NAD^+ \rightarrow CH_3CHO + NADH + H^+$

(b) $Glucose + ATP \rightarrow Glucose\text{-}6\text{-}phosphate + ADP + H^+$

(c) Pyruvate $\rightarrow$ Acetaldehyde + CO_2 .

(d) Glyceraldehyde-3-phosphate $\rightarrow$ Dihydroxy acetone phosphate.

(e) Glutamate + NH_3 + ATP $\rightarrow$ Glutamine + ADP + Pi.

21. (a) What is the chemical nature of Glucogon?

(b) For which biochemical reaction is it required for.

(c) Give the name of the clinical condition for which it is used for.

(d) What type of dosage form in which it is used?

(e) Where is it secreted?

22. (a) In Type I and Type II hypersensitivity reactions name the corresponding antibodies.

(b) Name a mood elevator which is an amphetamine analog.

(c) The drug at - (b) when coadministered with, which class of drug can result side effects like arrhthmia and hypertension.

(d) When digoxin is used with Omeprazole, Plasma levels digoxin is increased or decreased?

End of paper

ANSWER KEY GATE - 2001

Section – A

1.1 - d	1.2 – d	1.3 – d	1.4 – b	1.5 – a
1.6 – c	1.7 – c	1.8 – a	1.9 – a	1.10 – d
1.11 – b	1.12 – b	1.13 – d	1.14 – c	1.15 – a
1.16 – b	1.17 – c	1.18 – a	1.19 – d	1.20 – d
1.21 – c	1.22 – b	1.23 – a	1.24 – d	1.25 – a
2.1 – a	2.2 – c	2.3 – a	2.4 – b	2.5 – c
2.6 – b	2.7 – b	2.8 – a	2.9 – d	2.10 – a
2.11 – a	2.12 – a	2.13 – b	2.14 – b	2.15 – a
2.16 – a	2.17 – b	2.18 – a	2.19 – c	2.20 – c
2.21 – c	2.22 – b	2.23 – c	2.24 – a	2.25 – a