GATE PY - 2004

Q.1 — 30 Carry One Mark Each.

1. The structural feature common fro propranolol, atenolol, pindolol, metopropol in the side chain is
(A) Isopropylamino propan-2-ol
(B) Dimethylamino propan-2-ol
(C) Diethylamino propan-2-ol
(D) Dibutylamino propan-2-ol

2. When N-methyl group of morphine is replaced with an allyl group, the compound formed is
(A) Naloxone-morphine antagonist
(B) Natrexone-morphine agonist
(C) Nalorphine-morphine antagonist
(D) Nalbuphine-morphine agonist/antagonist

3. Nitrazepam can be synthesized from
(A) 2-Bromo-5-amino benzophenone
(B) 2-Nitro-2-chloro acetophenone
(C) 2-Amino-5-nitro cyclohexanone
(D) 2-Amino-5-nitro benzophenone

4. Clavulanic acid has a beta lactam king fused to
(A) Thienyl system
(B) Thiadiazole system
(C) Thiazolidine system
(D) Oxazolidine system

5. A drug which has antipyretic, anti-inflammatroy and antiplatelet activity is
(A) Sulfinpyrazone
(B) Aspirin
(C) Ticlopidine
(D) Acetaminophen

6. Wild cherry bark contains prunasin which is a
(A) Phenolic glycoside
(B) Isothiocyanate glycoside
(C) Coumarin glycoside
(D) Cyanogenetic glycoside

7. Ephedra sinica and Ephedra equisetina can be distinguished by type of
(A) Branching
(B) Stomata
(C) Scaly leaves
(D)Alkaloids

8. Microprapagation of the plants is carried out through
(A) Cross fertilization
(B) Seed germination
(C) Plant tissue culture

(D) Grafting

9. Acontitine belongs to the group of
(A) Steroidal alkaloids
(B) Terpenoidal alkaloids
(C) Indole alkaloids
(D) Quinoline alkaloids

10. Crude fiber value of a drug is a measure of
(A) Soft tissue matter
(B) Woody matter
(C) Mineral matter
(D) Organic matter

11. One of the units used for expressing pressure is 'torr' and it is equal to
(A) cm of Hg
(B) mm of Hg
(C) psi
(D)gauss

12. Removal of a single electron from a molecule results in the formation of
(A) Fragment ion
(B) Metastable ion
(C) Molecular ion
(D) Rearrangement ion

13. Nuclear magnetic moment is NOT shown by
(A) *13C*
(B) **16Q**
(C) *1H*
(D) *15N*

14. Derivatisation techniques in HPLC are intended to enhance
(A) Molecular weight
(B) Detectability
(C) Reversibility
(D) Reproducibility

15. A conductance cell is calibrated by using a solution of known conductivity, i.e., usually a solution of
(A) NaCI
(B) *Hg2CI2*
(C) KCI
(D) *Na2SO4*

16. Metoclopramide is generally used for
(A) Prophylaxis of vomiting
(B) Preventing motion sickness
(C) Treating irritable bowel syndrome

(D) Treatment of pancreatic insufficiency

17. DNA amplification by the polymerase chain reaction uses
(A) Thermus aquaticus DNA polymerase
(B) DNA topoisomerase
(C) RNA polymerase
(D) DNA helicase

18. Identify the non-pathogenic organism
(A) Mycobacterium bovis
(B) Mycobacterium smegmatis
(C) Mycobacterium avium
(D) Mycobacterium intracellulare

19. Bioassays are carried out to
(A) Measure the pharmacological activity of a drug
(B) Avoid clinical trails for new drugs
(C) Detect the impurity in a given drug
(D) Screen fro pharmacognetic influences of new drugs.

20. A direct way of studying idiosyncratic reactions to a given drug is by
(A) changing the route of drug administration
(B) changing the assay method
(C) pharmacogenomics
(D) structure activity relationship studies of a family of compounds

21. An example of haemopoietic growth factor is
(A) platelet derived growth factor
(B) epidermal growth factor
(C) iron dextran
(D) erythropoietin

22. Safranin is used as a reagent to detect
(A) Gram-negative bacteria
(B) Gram-positive bacteria
(C) Acid fast bacteria
(D) Myxozoa

23. Sulphonamides do not have adverse drug interaction with
(A) Oral anticoagulants
(B) Sulfonylurea hypoglycemic agents
(C) Hydantoin anticonvulsants
(D) Dihydrofolate reductase inhibitors

24. Simvastatin belongs to
(A) HMG CoA reductase inhibitor type of antilipidemic agents
(B) HMG CoA reductase inhibitor type of anticoagulant agents
(C) Fibrate type of anticoagulant agents

(D) Fibrate type of antilipidemic agents

25. HIV infection can be clinically controlled with
(A) Cytarabine
(B) Acyclovir
(C) Zidovudine
(D)Amantadine

26. The measure of cohesive strength of the cross linking that occurs between gelatin molecules and is proportional to the molecular weight of gelatin is called
(A) Bloom strength
(B) Viscosity
(C) Surface tension
(D) Partition coefficient

27. A water soluble substance used as coating material in microencapsulation process is:
(A) Polyethylene
(B) Silicone
(C) Hydroxy ethyl cellulose
(D) Paraffin

28. One of the following is used as a solubilizing agent to solubilize testosterone in pharmaceutical liquid dosage forms.
(A) Sucrose monoesters
(B) Lanolin esters
(C) Lanolin ethers
(D) Tweens

29. One of the following is used as a pH dependent controlled release excipient.
(A) Carnauba wax
(B) Hydroxy proply methyl cellulose phthalate
(C) Methyl cellulose
(D) Glyceryl monostearate

30. The Schedule in D & C act that deals with the standards for disinfectant fluids is:
(A) Schedule B
(B) Schedule F
(C) Schedule 0
(D)Schedule M

Q.31 — 80 Carry Two Marks Each.
31. The carboxyl group of aspirin is esterified with N-acetyl-p-aminophenol to get
(A) 3-Acetamidophenly-O-acetyl salicylate
(B) 4-Acetamidophenly-O-acetyl salicylate
(C) O-(2-hydroxy benzoyl) salicylic acid
(D) 2-acetamidophenyl-O-acetyl salicylate

32. JUPAC system of nomenclature for diclophenac sodium (BP) is
(A) Sodium 2-[(2, 6-Dichlorophenyl) amino] phenyl acetate
(B) Sodium 3-[(2, 6-Dichlorophenyl) amino] phenyl acetate
(C) Sodium 2-[(2-Chlorophenyl) amino] phenyl acetate
(D) Sodium 2-[(6-Chlorophenyl) amino] phenyl acetate

33. 1-(2-Aminoethyl) perdydroazocine on treatment with S-methyl isothiourea gives rise to an adrenergic neuron blocking agent
(A) Bethanidine
(B) Mecamylamine
(C) Guanadrel
(D)Gauenthidine

34. Quercetin is
(A) 5, 7, 3-Trihydroxy flavone
(B) 5, 7, 3, 4-Tetradydroxy flavone
(C) 3, 5, 7, 3, 4-Pentahydroxy flavonol
(D) 3, 5, 7, 3, 4-Pentahydroxy flavonone

35. Meconic acid is a chemical marker for the genus
(A) Piper
(B) Pilocarpus
(C) Prunus
(D)Papaver

36. A novel diterpenoid isolated from the bark of Taxus brevifolia is
(A) Demecolcine
(B) Paclitaxel
(C) Vinblastin
(D)Brevifolicin

37. The absorption maximum for polar compounds is usually shifted with change in polarity of the solvents due to
(A) Hydrogen bonding
(B) Chemical reaction
(C) Ionization of the compounds
(D) Change in the chromophone

38. A titration in which potential applied across two electrodes is maintained at a constant value and the current is measured and plotted against volume of titrant is
(A) Potentiometric titration (B) Amperometric titration
(C) Displacement titration (D) Conductometric titration

39. The parameter in the elution curve that is proportional to the concentration of a compound in gas chromatographic effluent is the
(A) Number of peaks
(B) Width of the peak
(C) Area under the peak
(D) Shape of the peak

40. A drug solution has a half life of 21 days. Assuming that the drug undergoes first order kinetics, how long will it take for the potency to drop to 9O/c of the initial potency?
(A) 3.2 days
(B) 9.6 days
(C) 16 days
(D)6.4 days

41. An amphoteric surfactant used in pharmaceutical disperse system is:
(A) Bile salts
(B) Lecithin
(C) Sorbitan monolaurate
(D) Sorbitan monostearate

42. An abrasive used in dentifrices is
(A) Dicalcium phosphate
(B) Sodium carboxy methyl cellulose
(C) Sodium lauryl sulfate
(D) Dioctyl sodium sulfosuccinate

43. An electrochemical method that enhances the transport of some solute molecules by creating a potential gradient through the skin tissue with an applied electrical current or voltage is called
(A) Electrophoresis
(B) lontophoresis
(C) Osmosis
(D)Implants

44. A patient with rheumatoid arthritis has been taking acetyl salicylic acid regularly. However, recently she has been experiencing stiffness, swelling and pain due to salicylate resistance. She has occult blood in her faeces. Suggest an appropriate drug suitable for her from those mentioned below:
(A) Paracetamol
(B) Celecoxib
(C) Piroxicam
(D)Naproxen

45. The break down of fibrin is catalyzed by
(A) Plasmin
(B) Renin
(C) Urokinase
(D)Ptylin

46. Which one of the these best describes a process carried out to render a drug pharmacokinetically more acceptable?
(A) Enteric coating if diclofenac.
(B) Co-administration of aspirin with antacids.
(C) Use of colloidal suspensions or liposomes for administering amphotericin-B.
(D) Synthesis of an analogue to obtain high receptor specificity.

47. Azithromycin is clinically administered once daily as compared to erythromycin which is administered every 6 hours because, azithromycin
(A) Penetrates into most tissues and is released very slowly.
(B) Has a methylated nitrogen in its lactone ring which renders it much more potent than erythromycin.
(C) Is a very potent antibiotic but not tolerated well in the gastrointestinal tract.
(D) Is usually presented in a sustained release dosage form.

48. A patient showing muscle rigidity, bradykinesia, tremors and postural instability was administered levo-dopa. Which of the properties of levo-dopa is not true?
(A) Levo-dopa is preferred over dopamine because it can cross the blood brain barrier.
(B) Levo-dopa is the levorotatory stereoisomer of 3, 4-dihydroxy phenylalanine.
(C) Levo-dopa gets decarboxylated in the brain to dopamine.
(D) Levo-dopa is administered because of its strong antagonistic action on dopamine receptors.

49. Autoimmunity refers to
(A) an automatic trigger of the immune system directed against a specific pathogen.
(B) failure to distinguish between self and non-self
(C) an automatic segregation of T and B cells.
(D) failure of B-cells to interact with T-cells.

50. Which of these is true about the discovery of HB antigen in the blood of people infected with Hepatitis-B?
(A) It provided a basis for vaccine design.
(B) It indicated that specific vaccines cannot be designed for Hepatitis-B.
(C) It has not been of much significance.
(D) It indicated that Hepatitis-B is a viral disease

51. Which drug molecule DOES NOT have phenylethyl amine moiety?
(A) Amphetamine
(B) Glyburide
(C) Pheniramine
(D)Mescaline

Q.52-58 are multiple selection items. P, Q, R, S are the options. Two of these options are correct. Choose the correèt combination among A, B, C and D.

52. There are two methods by which the duration of action of insulin may be prolonged.
(P) Binding with resins.
(Q) Esterification of amio acid residues.
(R) Forming of complex of insulin with protein.
(5) Modification of particle size.
(A) Q, R (B) R, S (C) P.S (D)P, R

53. The attributes of cycloserine are
(P) No tautomerism shown.
(Q) Exists in equilibrium with its tautomeric enolic form.
(R) Stable in alkaline solution, destroyed rapidly at neutral or acidic pH.
(S) Stable in neutral solution, destroyed in alkaline pH.
(A) R, S (B) P, Q (C) Q, R (D)P, R

54. Compared to benzyl penicillin, amoxicillin has the following advantages in biological properties.
(P) The amino group renders the antibiotic resistant to acid catalysed degradation.
(Q) The spectrum of acidity is broadened.
(R) The amino group of renders penicillinase resistance to the compound.
(S) The phenolic group renders penicillinase resistance to the compound.
(A) P, Q (B) P, R (C) P. S (D)Q, R

55. The identification of propellants in pharamaceutical aerosols is carried out by
(P) Gas-chromatography
(Q) Tag-open cup apparatus
(R) Pyknometer
(S) JR Spectrophotometer
(A) P, Q (B) P, S (C) Q, R (D)R, S

56. Schedule 'H' and Schedule '5' as per the Drugs and Cosmetics Act deal with the following.
(P) Prescription drugs which are required to be sold by retail only on prescription of R.M.P.
(Q) Standards for cosmetics
(R) Biological and special products
(5) List of coal tar colours permitted to be used in cosmetics and soaps
(A) P, Q (B) P, R (C) Q, S (D)R, S

57. Myristica fragrans Houtt has two of the following characteristics.
(P) An indeciduous tree, which produces drupaceous, pale yellow fruits.
(Q) Each fruit has several round seeds with smooth surface and lignaceous tegument, and the orange red fleshy aril — the mace, is present inside the seed.
(R) A deciduous tall tree, which produces lignaceous capsules.
(S) Each fruit has a unique avoid seed, with lignified tegument, surrounded by orange red laciniate fleshly aril — the mace.
(A) Q, R (B) P, R (C) P.S (D)Q, S

58. Jn size exclusion chromatography the stationary phases used are:
(P) Alumina (Q) Dextran (R) Agarose (S)Styrene
(A) P, S (B) Q, R (C) Q, S (D)P, R

Q.59-65 ARE "MATCHING" exercises. Match Group I with Group II. Choose the correct combination among the alternatives A, B, C and D.

59.

Group I Synthetic Drugs	**Group II** Intermediates from which Group I drugs are synthesized
(P) Buclizin	(1) Aziridin and thiophosphoryl chloride
(Q) C h 10 ro ph en es in	(2) 4-Chlorophenol
(R) Thiotepa	(3) 4-Chlorobenzhydryl chloride
(S) Alprazolam	(4) 2-Amino-5-Chloro benzophenone

Codes:
(A) P - 3 Q - 2 R - 1 S-4
(B) P - 4 Q - 2 R - 1 S - 3
(C) P - 2 Q - 4 R - 3 S-1
(D) P - 1 Q - 2 R - 4 S - 3

60

Group I Cardiac Agents	**Group II** Mechanism of action
(P) Digitoxin	(1) Produces negative inotropic effect by blocking calcium channels
(Q) Dobutamine	(2) Depresses adrenergically enhanced calcium influx through beta receptor blockade
(R) Sotalol	(3) Causes elevation of cAMP levels by stimulation of adenylate cyclase.
(S) Nicardipine	(4) Inhibits membrane bound sodium potassium ATPase pump.

Codes:
(A)P-4Q-3R-2S-1
(B)P-3Q-4R-1S-2
(C)P-4Q-2R-3S-1
(D)P-4Q-3R-1S-2

61.

Group I Technique employed	**Group II** Source of Radiation
(P) Visible spectrophotometry	(1) *Rf* Source transmitter
(Q) JR spectrophotometry	(2) Xenon lamp
(R) NMR spectrophotometry	(3) Tungsten lamp
(S) Fluorescence	(4) Nernst glower

spectrophotometry	

Codes:
(A) P - 2 Q - 4 R-3 S-1
(B) P - 3 Q - 2 R - 1 S - 4
(C) P - 3 Q - 4 R- 1 S-2
(D) P - 4 Q - 1 R - 3 S - 2

62.

Group I Amino acids	**Group II** Common degradative products that are citric acid cycle intermediates or their precursors.
(P) Aspartic acid	(1) Suc,cinyl CoA
(Q) Arginine	(2) Alpha-Ketoglutarate
(R) Serine	(3) Fumarate
(S) Methionine	(4) Pyruvate

(A) P - 3 Q – 2 R-4 S-1
(B) P - 3 Q - 1 R - 4 S - 2
(C) P - 1 Q – 2 R-3 S-4
(D) P - 4 Q - 2 R - 3 S - 1

63.

Group J Tablet defects	Group JJ Explanation
(P) Picking	(1) A term used to describe the surface material from a tablet that is sticking to and being removed from the tablet's surface by a punch.
(Q) Sticking	(2) Term refers to tablet material adhering to the die wall.
(R) Mottling	(3) Term refers to an unequal distribution of colour on a tablet.
(S) Lamination	(4) Term refers to separation of a tablet into two or more distinct layers.

Codes:
(A) P -
(C) P -
(B) P - 3 Q - 4 R - 1 S - 2
(D) P - 4 Q - 1 R - 2 S - 3

64.

Group I Lanatosides	**Group II** Aglycone
(P) Lanatoside A	(1) Gitaxigenin
(Q) Lanatoside B	(2) Diginatigenin
(R) Lanatoside C	(3) Digoxigenin
(S) Lanatoside D	(4) Digitoxigenin

(A) P - 1 Q - 2 R-3 S-4
(B) p - 3 Q - 1 R -2 S-4
(C) P - 2 Q – 4 R-3 S-1
(D) P - 3 Q -3 R - 1 S-4

65.

Group I Specific chemical test	, **Group II** Phytoconstituents
(P) Thalleioquin Test	(1) Hyoscyamine
(Q) Murexide Test	(2) Barbaloin
(R) Vitali-Morin Test	(3) Quinine
(5) Modified Borntrager's Test	(4) Theobromine

(A) P - 4 Q – 1 R – 3 S - 2
(C) P - 3 Q – 4 R – 2 S - 1
(B) P - 1 Q – 3 R – 4 S - 1
(D) P - 2 Q - 2 R – 3 S - 4

Data for Q.66 – 90 are based on the statement/problem. Choose the correct answer for each question from among the options A, B, C and D.
Data for questions 66 to 68:
In a formulation development laboratory a tablet is to be formulated. The care tablet has a bad taste and requires physical and chemical protection of the drug from moisture. The tablet should also deliver the drug for local action in the intestine.

66. Suggest a suitable method.
(A) Sugar coating
(B) Film coating
(C) Enteric coating
(D)Sub coating

67. Choose the correct coating material to be used.
(A) Sugar
(B) Acacia
(C) Ethyl cellulose
(D) Cellulose acetate phthalate

68. Choose the correct solvent for the coating material.
(A) Acetone
(B) Water
(C) Propylene glycol
(D)Glycerine

Data for questions 69 and 70:
Compound **A** with the formula *C2H7N* shows the following important bands in the JR spectra; **(a) 3423 cm1 (b) 3236 cm1**

69. Assign these bands to the important group in the compound **A.**
(A) -CH3 **(B)** -NH **(C)** -CN (D)=C=N_

70. On treatment with nitrous acid the compound A is converted to B, which shows a strong band at 3430 cm* Assign the absorption band for the group formed in the product.
(A) -OH (B) =C=N_ (C) -COOH (D)-N=N_

Data for questions 71 to 73:
Jn the assay of sulfamethoxazole *J.P.(C1QH11N303S),O.2* g of the sample was dissolved in 50 ml of 2M HCI. To this was added 3 g of KBr and the titration was carried out.

71. Titration was carried out using
(A) NaNO2 to estimate the amino group.
(B) NaNO2 to estimate the sulphonamido group.
(C) NaOH to estimate the amino group.
(D) NaOH to estimate the sulphonamido group.

72. The end point in the assay was determined by
(A) Conductometric method
(B) Using an indicator
(C) Potentiometric method
(D) Photometric method

73. If the volume of 0.1 M titrant consumed was 7.8 ml, calculate the O,' purity of the sample.

(A) *99.70°h*
(B) *9.97°h*
(C) *8.87°h*
(D)98.79°h

Data for questions 74 and 75:
A drug, which is unstable to light, susceptible to oxygen and gets degraded in presence of metallic ions, has to be formulated in the form of a solution for injection.

74. Choose a suitable additive to improve the stability of the injection.
(A) Preservative
(B) Chelating agent
(C) Buffer
(D) Ton icity contributor

75. Select the appropriate filling and packing method for the above product.
(A) Filling in an amber colored ampoule with an addition of antioxidant, replacing the inside air with nitrogen and sealing.
(B) Filling with an antioxidant dissolved in the solution and sealing the ampoule.
(C) Filling in an amber colored ampoule with a preservative and sealing.
(D) Filling in an ampoule, sealing and giving directions to store it in dark.

Data for questions 76 and 77:
The usual adulterants for clove buds are clove stalks and anthophylli.

76. Clove stalks can be identified by the presence of
(A) Starch grains
(B) Cystoliths
(C) Lignified sclereids
(D) Acicular crystals of calcium oxalate

77. Anthrophylli can be identified by the presence of
(A) Lignified sclereids
(B) Acicular crystals of calcium oxalate
(C) Cystoliths
(D) Starch grains

Data for questions 78 to 80:
Plant tissue culture of carrot is being developed in the laboratory on a semisolid White's medium.

78. The micronutrient essential in the medium is:
(A) NaCI
(B) CoCI2
(C) KCI
(D)CaCI2

79. The pH of the medium is:
(A) 6.6
(B) 6.0
(C) 5.6

(D)5.0

80. The tissue growth observed is:
(A) Undifferentiated cells suspended in the medium.
(B) Undifferentiated cells in clusters distributed in the medium.
(C) Differentiated mass of cells.
(D) Surface growth of undifferentiated mass of cells.

Data for questions 81 and 82:
In glucose metabolism, name the enzymes catalyzing the following steps.

81. Conversion of glucose to glucose-6-phosphate.
(A) Hexokinase
(B) Glucose-6-phosphate dehydrogenase
(C) Glycogen phosphorylase
(D) Glycogen synthase

82. Conversion of 2-phosphoglycerate to phosphoenol pyruvate.
(A) Pyruvate kinase
(B) Phosphoglycerate mutase
(C) Phosphoglycerate kinase
(D) Enolase

Data for questions 83 and 84:
Methotrexate, Trimethoprim and Pyrimethamine are all known to be inhibitors of dihydrofolate red uctase. Yet, they are classified in different therapeutic categories.

83. Trimethoprim has an advantage over methotrexate in its therapeutic category beca use
(A) Trimethoprim binds to bacterial DHFR about 50,000 times more strongly as compared to the host DHFR.
(B) Trimethoprim can be administered orally.
(C) Trimethoprim exhibits no significant adverse effects.
(D) Trimethoprim has additional anti-inflammatory properties.

84. Methotrexate is thought to exert its action by
(A) Interfering with purine synthese.
(B) Intracellular formation of an amine adducts.
(C) Forming a conjugate with nucleic acids.
(D) Inhibiting the synthesis of folic acid.

Data for questions 85 to 87:
An administration officer having high blood pressure, gastric acidity and diabetes is prescribed famotidine, enalapril and tolbutamide.

85. From the structural features of the drugs, predict which will be ionized in the stomach.
(A) Famotidine
(B) Enalapril
(C) Tolbutamide

(D) Enalapril and tolbutamide

86. The patient cannot tolerate enalapril. Which of the following can be substituted?
(A) Omeprazole
(B) Losartan
(C) Rosiglitazone
(D)Clofibrate

87. Famotidine acts as
(A) H1 — histamine antagonist
(B) H2 — histamine antagonist
(C) Proton pump inhibitor
(D) H1 agonist

Data for questions 88 to 90:
2-Methoxy naphthalene on treatment with acetyl chloride in presence of AICI3 gives 2-acetyle-6-methoxy naphthalene. This is converted with a set of reagents-X to 6- methoxy-2-naphthyl acetic acid, which is esterified with methanol to the methyl ester. Ester on treatment with Y gives DL-2-(6-methoxy-2-naphthyl)-propionic acid methyl ester. This on hydrolysis gives Z (final compound).

88. The set of reagents-X are
(A) Morpholine/Suiphur followed by H2S04/H20
(B) Morphine/Sulphur followed by HCI/H20
(C) Formic acid/Cu followed by acetic acid
(D) Hydroiodic acid followed by H2504/H20

89. Identify the reagents — Y.
(A) NaOH/CH3OH (B) NaH/CH3I
(C) Hydrazine/CH3I (D) LiAIH4/CH3OH

90. The final compound Z is:
(A) Naphazoline
(B) Carprofen
(C) Pranoprofen
(D)Naproxen