

GATE-2003

- Colchicine is biogenetically derived from one of the following
 - Tyrosine and phenylalanine
 - Tryptophan and phenylalanine
 - Ornithine and tryptophan
 - Ornithine and phenylalanine
- The diagnostic character for the microscopical identification of Kurchi bark is
 - Fibres and Y shaped pits
 - Horse shoe shaped stones cells
 - Sclereids containing calcium oxalate crystals
 - Stratified cork
- It is possible to initiate the development of complete plants from callus cell cultures by the suitable manipulation of medium with respect to
 - Minerals
 - Vitamins
 - Carbohydrates
 - Hormones
- Polyplidy is defined as
 - Addition of one chromosome
 - Multiplication of entire chromosome set
 - Submicroscopic changes in DNA materials
 - Gross structural changes
- Starting material for the synthesis of ALPRAZOLAM is
 - 3-amino-5-bromoacetophenone
 - 2-amino-5-chloroacetophenone
 - 2-amino-5-chlorobenzophenone
 - 3-amino-5-chlorobenzophenone
- Simplification of morphinan system gave one Benzomorphan derivative
 - Pentazocin
 - Pethidine
 - Levorphanol
 - Buprenorphine
- A metabolite of spironolactone is
 - Aldosterone
 - Canrenone
 - Corticosterone
 - Pregnenolone
- IUPAC name for Naproxen is
 - (S)-2-(6-ethoxy-2-naphthyl)-acetic acid
 - (S)-2-(6-methoxy-2-naphthyl)-acetic acid
 - (S)-2-(6-ethoxy-2-naphthyl)-propionic acid
 - (S)-2-(6-methoxy-2-naphthyl)-propionic acid

9. Metabolic function of Riboflavin involves the following
- FMN and FAD
 - NADP and NADPH
 - AMP and ATP
 - Retin and Retinine
10. X-Ray spectral line $K\alpha$ doublet arises from transition of electrons from
- M shell to K shell
 - L shell to K shell
 - L shell to M shell
 - M shell to L shell
11. The method expressing magnetic field is
- cycles/sec
 - pulse/sc
 - debye
 - gauss
12. A solvent in NMR studies is
- Chloroform
 - acetone
 - carbon tetrachloride
 - methanol
13. A widely accepted detector electrode for pH measurement is
- Platinum wire
 - Glass electrode
 - Ag-AgCl electrode
 - Lanthanum fluoride
14. Commercial production of citric acid is carried out by the microbial culture
- Fusarium moniliformi
 - Rhizopus
 - Aspergillus niger
 - Candida utilis
15. For thermophile microorganisms, the minimum growth temperature required is
- 20°C
 - 37°C
 - 45°C
 - 65°C
16. Obligatory anaerobes
- can tolerate oxygen and grow better in its presence
 - do not tolerate oxygen and die in its presence
 - can grow in oxygen level below normal
 - can grow in presence of atmospheric oxygen

17. Plasmid is
- Macromolecules involve in protein synthesis
 - A circular pieces of duplex DNA
 - A hybrid DNA that is formed by joining pieces of DNA
 - Endogenous substance secreted by one type of cell
18. Lactose intolerance is because of lack of
- Acid phosphate
 - Lactate dehydrogenase
 - Amylase
 - Galactose -1-phosphate-uridyl transferase
19. Synthesis of UREA takes place exclusively in
- Kidney
 - Liver
 - Gall bladder
 - Urinary bladder
20. A term which describes a cofactor that is finally bound to an apoenzyme
- Holoenzyme
 - Prosthetic group
 - Coenzyme
 - Transferase
21. How many parts of 10% ointment be mixed with 2 parts of 15% ointment to get 12% ointment
- 2
 - 3
 - 5
 - 6
22. The correct non-ionic surfactant used as a penetration enhancer in the preparation of mucoadhesives is
- Oleic acid
 - Tween 80
 - Glycerol
 - Propylene glycol
23. One of the ex officio members of the Pharmacy Council of India is
- Director general of health services
 - Government analyst
 - Registrar of State Pharmacy Council
 - Director general of Indian Veterinary Research Institute
24. The Schedule in Drugs and cosmetics act that deals with the requirement and guidelines for clinical trials, import and manufacture of new drug is
- Schedule O
 - Schedule M
 - Schedule F
 - Schedule Y

25. A retardant material that forms a hydrophilic matrix in the formulation of matrix tablets is
- H.P.M.C
 - C.A.P
 - Polyethylene
 - Carnauba wax
26. A drug which causes pink to brownish skin pigmentation within a few weeks of the initiation of therapy is
- triamterene
 - Clofazimine
 - Lomefloxacin
 - Neomycin
27. The risk of Digitalis toxicity is significantly increased by concomitant administration
- Triamterene
 - Lidocaine
 - Captopril
 - Hydrochlorthiazide
28. An agent used in Prinzmetal angina has spasmolytic action which increases coronary blood supply is
- Nitro glycerine
 - Nifedipine
 - Timolol
 - Isosorbide mono nitrate
29. An organism which has been implicated as possible cause of chronic gastritis and peptic ulcer is
- Campylobactor jejuni
 - Escherichia coli
 - Helicobactor pylori
 - Giardia lamblia
30. A 5HT_{1D} receptor agonist useful in migraine is
- Sumatriptan
 - Ketanserin
 - Ergotamine
 - Methysergide
31. At present, different species of Papaver such as P. orientale are being cultivated instead of P. somniferum because they contain
- More of morphine
 - Less of morphine
 - Only codeine
 - Only thebaine
32. Guggulipid, a resin is
- A hypolipidemic agent obtained from cotton plan containing multifunctional compound (\pm) gossypol
 - A lipid obtained from *Arctium lappa*, A steracese traditionally used for the treatment of dematoses
 - Cathartic glucoresin obtained from *Ipomoea orizabensis* and used since ancient time
 - A hypolipidemic agent obtained from *Commiphora mukul* consisting of a mixture of sterols including Z-pregna-(20)-diene-3,16-dione

33. In nitrofurantoin synthesis, 5-nitrofurfuraldehyde diacetate is treated with one of the following intermediate in presence of Acetic, sulphuric acid and ethanol
- Hydantoin
 - 1,5-diamino hydantoin
 - 1,3-diamino hydantoin
 - 1-amino hydantoin
34. 4-hydroxy-3-hydroxymethyl benzaldehyde is treated with acetic anhydride and then kept with ether solvent, t-butylcyanide and acetic acid for ten days. Resulting compound is reduced with LiAlH_4 in tetrahydrofuran. The final product is
- Isoprenaline
 - Dobutamine
 - Solbutamol
 - Orciprenaline
35. 2-iminothiazolidine is treated with phenyl oxirane to get a drug used in round worm infection –
- Piperazine
 - Tetramisole
 - Thiabendazole
 - Levamisole
36. Thiamine hydrochloride on treatment with alkaline potassium ferricyanide gives
- Thymochrome with fluorescence
 - Oxythiamine with golden yellow colour
 - Neopyrithiamine with orange yellow colour
 - Thiochrome with blue fluorescence
37. A new drug delivery system which is composed of phospholipid that spontaneously form a multilamellar concentric bilayer vesicle with layer of aqueous media separating the lipid layers is
- Prodrug
 - Liposomes
 - Osmotic pump
 - Nanoparticles
38. Unless otherwise stated in the individual monograph of the pharmacopeia, in the disintegration test for enteric coated tablets, first the dissolution is carried out in
- 0.1M HCl
 - Phosphate buffer
 - Water
 - 0.1M H_2SO_4
39. What is the proportion of NaCl required to render a 1.5% solution of drug isotonic with blood plasma?
- 0.65%
 - 0.585%
 - 0.9%
 - 0.5%
40. IR spectra appear as dips in the curve rather than maxima as in UV-Visible spectra because It is a plot of
- % Absorbance against wave number
 - % Transmittance against concentration
 - % Absorbance against concentration
 - % Transmittance against Wave number

41. ESR is applied to only those substances showing para magnetism which is due to the magnetic moments of
- Nutrons
 - Protons
 - Paired electron
 - Unpaired electrons
42. Rotation of electrons about the proton generates a secondary magnetic field which may oppose the applied field. The proton is then said to be
- Shielded
 - Shifted
 - Hydrogen
 - Deshielded
43. The analyte is used in the form of solution in flame photometry because it should undergo
- Evaporation
 - Condensation
 - Nebulization
 - Precipitation
44. The mechanism of antiparasitic action of mebendazole and thiabendazole involves
- Stimulaiton of acetylcholine receptors at neuromuscular junction
 - Inhibition of dihydrofolate reductase
 - Interference with microtubule synthesis and assembly
 - Block thiamine transport
45. Isoniazide is primary anti-tubercular agent that
- Require pyridoxine supplementation
 - Causes ocular complication that are reversible if the drug is discontinued
 - It is ototoxic and nephrotoxic
 - Should never be used due to its hepatotoxicity
46. Decrease of risk of atherosclerosis is associated with increase in
- Very low density lipoprotein
 - Low density
 - Cholesterol
 - High density
47. Mechanism of action of paclitaxel is
- Bind to DNA through intercalation between specific bases and block the synthesis of new RNA or DNA, causes DNA strand scission.
 - Mitotic spindle poison through the enhancement of tubulin polymerization.
 - Competitive partial agonist-inhibitor of estrogen and binds to estrogen receptors
 - S-phase specific antimetabolite that is converted by deoxy kinase to the 5'-mononucleotide
48. Lycopodium spore method can be used to find out percentage purity of crude drugs which contain
- multi-layeredti tissues or cells
 - well defined particles which can be counted
 - oil globules
 - characterisitc particles of irregular thinkness , the length of which can be masured

- 49 . The microscopical character of flower buds of *Eugenia caryophyllus* is
- Collenchymatous parenchyma containing in its outer part numerous ellipsoidal schizolysigenous oil glands
 - Small translucent endosperm containing aleurone grains
 - Wide parenchymatous starchy cortex , the endosperm containing volatile oil
 - Outer surface consisting of external perisperm , rough dark brown with reticulate furrows

50. In protein biosynthesis, each amino acid
- Recognises its own codon by a direct interaction with the m-RNA template
 - Is added in its proper place to a growing peptide chain through "adaptor" function of t-RAN
 - Is first attached to an anti-codon specific for the amino acid
 - Undergoes fidelity translation which is assured by presence of traces of DNA on the ribosome

51. Rabies Antiserum I.P.is
- A freeze dried preparation containing antitoxic
 - A preparation containing specific globulin or its derivatives obtained by purification of hyper immune serum or plasma of healthy horses
 - A sterile preparation containing antitoxic globulin
 - A sterile preparation containing antitoxic globulin obtained by purification of hyper immune serum of horse

Q. 52 – 58 are multiple selection items. P,Q,R and S are the options. Two of these options are correct. Choose the correct combination from among the alternatives.

52. Total ash value in case of crude drug signifies
- Organic content of drug
 - Mineral matter in the drug
 - Addition of extraneous matter such as sand, stone etc
 - Woody matters present in the drug

- a. R,S b. Q,R c. P,Q d. PS

53. The compound listed below contain σ , π and η electrons

- Acetaldehyde
- Formaldehyde
- Butadiene
- Benzene

- a. R,S b. Q,R c. P,R d. Q,S

54. A 60 yr. old patient presents with glaucoma, therapy should include

- Topical atropine
- Topical pilocarpine
- Oral acetazolamide
- Oral pilocarpine

- a. P,Q b. Q,R c. R,S d. P,S

55. Measurement of particle size in pharmaceutical Aerosol is by

- P. Cascade impactor
- Q. Light scatter decay
- R. Karl Fischer method
- S. IR spectroscopy

- a. PQ b. Q,R c. R,S d. P,S

56. The common attribute of ascorbic acid, an antiscorbutic vitamin, are

- P. Exist in nature in both reduced and oxidised form and in a state of reversible equilibrium
- Q. Has keto-enol system in the molecule
- R. Has an aldehyde group since it gives positive Schiff's reaction
- S. Salt forming properties are due to the presence of the free carboxylic group

- a. P,R b. Q,R c. R,S d. Q,S

57. Two properties of radiopharmaceuticals are

- P. Slow localization in target tissue
- Q. Very long half-life to minimize radiation exposure yet long enough to get imaging information
- R. Short half-life to minimize radiation exposure yet long enough to get imaging information
- S. Rapid localization in target tissue and quick clearance from non-target organs

- a. P,Q b. Q,R c. R,S d. P,S

58. Two correct statement concerning vitamin D are

- P. The active molecule 1,25-dihydroxy cholecalciferol binds to intracellular receptor proteins
- Q. Cholecalciferol is found in vegetables
- R. 1,25-dihydroxy-D₃ is the most potent vitamin D metabolite
- S. It is required in the diet of individuals exposed to sunlight

- a. P,S b. P,R c. R,S d. P,S

q.59 – 65 are matching exercises. Match Group I with Group II. Choose the correct combinations from among the alternatives

59.

Tablet additive

- P. Binder
- Q. Insoluble lubricant
- R. Film coating material
- S. Direct compression diluent

Examples

1. Acacia
2. Light mineral oil
3. Hydroxy ethyl cellulose
4. Microcrystalline cellulose

- a. P-2,Q-1,R-3,S-4
b. P-3,Q-2,R-1,S-4
c. P-4,Q-3,R-2,S-1
d. P-1,Q-2,R-3,S-4

60.

IR detector

P. Thermocouple

Q. Pyroelectric detector

R. Golay cell

S. Thermistor

a. P-4,Q-2,R-3,S-1

b. P-3,Q-1,R-4,S-2

c. P-1,Q-3,R-2,S-4

d. P-2,Q-4,R-3,S-1

Composition

1. Oxides of Mn,Co and Ni

2. Bi-Sb

3. Xenon

4. Triglycine sulphate

61.

Alkaloid

P. Coniine

Q. Papaverine

R. Anabasine

S. Reserpine

a. P-2,Q-3,R-1,S-4

b. P-4,Q-3,R-2,S-1

c. P-4,Q-1,R-2,S-3

d. P-2,Q-4,R-3,S-1

Ring System

1. Isoquinoline

2. Pyridine-piperidine

3. Yohimbane

4. Piperidine

62.

Immunoglobulines

P. IgG

Q. IgA

R. IgM

S. IgE

a. P-4,Q-3,R-2,S-1

b. P-3,Q-4,R-1,S-2

c. P-2,Q-3,R-4,S-1

d. P-2,Q-1,R-4,S-3

Actions

1. Agglutination and cytolysis

2. Anti-allergic

3. Neutralises toxins

4. Antimicrobial

63.

Antibiotics

P. Streptomycin

Q. Erythromycin

R. Gentamycin

S. Tetracycline

a. P-4,Q-3,R-1,S-2

b. P-3,Q-4,R-2,S-1

c. P-3,Q-2,R-1,S-4

d. P-3,Q-4,R-1,S-2

Test organism as per IP assay

1. Bacillus cereus

2. Staphylococcus

3. Klebsiella pneumoniae

4. Micrococcus luteus

64.

Synthetic estrogenic drug

P. Ethinyl estradiol

Q. Dienosterol

R. Chlorotrainisine

S. Stilboestrol

a. P-4,Q-3,R-1,S-2

b. P-4,Q-1,R-3,S-2

c. P-1,Q-4,R-2,S-3

d. P-3,Q-1,R-4,S-2

Methods of synthesis

1. 4',4-dimethoxybenzophenone is treated with 4-methoxybenzoylchloride + Mg, resulting product is treated with PTS followed by $Cl_2 + CCl_4$

Deoxy anisoin is alkylated and product subjected to Grignard reaction, the resulting tertiary alcoholic KOH

By pinacol reduction or p-hydroxypropiofenone and subsequent removal of water

From the estrone by the action of potassium acetylide

65.

Immunosuppressants

P. Azathioprine

Q. Tacrolimus

R. Glucocorticoids

S. Cyclophosphamide

a. P-3,Q-2,R-1,S-4

b. P-2,Q-3,R-4,S-1

c. P-2,Q-1,R-3,S-4

d. P-4,Q-3,R-2,S-1

Mechanism of action

1. Destroy proliferating lymphoid cells

2. Prodrug transformed to mercaptopurine which on further conversion inhibit purine metabolism

3. Inhibit cytoplasmic phosphate calcineurin

4. Interfere with the cell cycle of activated lymphoid cell

Instruction: Data for Q.66-90 are based on the statement/Problem. Choose the correct answer for each question

Q.No 66-68: Leaves of Digitalis purpurea were subjected to morphological, microscopical and chemical screening

66. Morphological character with respect to leaf is

a. Ovate lanceolate with entire margin

b. Ovate lanceolate with crenate margin

c. Linear lanceolate with serrate margin

d. Linear lanceolate with sinuate margin

67. Microscopical character of trichomes is

a. Unicellular warty

b. Multicellular uniseriate with 2-7 cell

c. Multicellular uniseriate with 10-14 cell

d. Multicellular multiiseriate with 10-14 cell

68. Drug gives positive

a. Borntrager's test

b. Murexide test

c. Legal's test

d. Thaleoquin test

Q. No 69-70: In synthetic procedure of 5-chloro-2,4-diaminosulfonyl aniline is treated with P to obtain 7-amino sulfonyl -6-chloro-3-chloromethyl-2H-1,2,4-benzothiadiazine-1:1 dioxide . Subsequently it is refluxed with $C_6H_5CH_2SH + NaOH + DMF$ to yield Y

69. Select the reagent P

- a. Chloroacetaldehyde
- b. Formaldehyde
- c. Formic acid
- d. Acetaldehyde

70. The final product Y is

- a. 3-benzylmethyl-6-chloro-2H-1,2,4-benzothiadiazine-7-sulfonamide -1,1-dioxide
- b. 3-benzyl thiomethyl-6-chloro-2H-1,2,4-benzothiadiazine-7-sulfonamide -1,1-dioxide
- c. 3-benzylmethyl-5-chloro-2H-1,2,3-benzothiadiazine-7-sulfonamide -1,1-dioxide
- d. 3-benzylmethyl-6-chloro-2H-1,2,4-benzothiadiazine-7-sulfonamide -1,1-dioxide

Q.No 71-73: Proguanil is synthesised by diazotisation of p-chloroaniline and treating with dicyanamide to yield p-chlorophenyyl dicyanamide which is then converted to Proguanil by reaction with a aliphatic amine. Proguanil is metabolised to triazine derivative which is an active metabolite .

71. What is the reagent used for diazotization?

- a. $NaNO_2 + dil. HCl$
- b. $KNO_3 + dil. HCl$
- c. $Zn + dil H_2SO_4$
- d. $Tin + H_2SO_4$

72. Name the aliphatic amine used

- a. Dimethylamine
- b. Isopropylamine
- c. Isobutylamine
- d. Diethylamine

73. Name the metabolite

- a. Thioguanil
- b. Diguanil
- c. Cycloguanil
- d. p-chlorophenyl biguanide

Q.No-74-76: Calculate the λ_{max} for the following compound. Base value for benzaldehyde in ethanol is 250nm.

74. λ_{max} of p-bromobenzaldehyde in nm is

- a. 265
- b. 255
- c. 275
- d. 260

75. λ_{max} of p-hydroxybezaldehyde in nm is

- a. 253
- b. 275
- c. 261
- d. 270

76. λ max of o-chlorobenzaldehyde in nm is

- a. 275
- b. 265
- c. 255
- d. 250

Q. No. 77-78: In the assay of Folic acid I.P., a weighed quantity is dissolved in 0.1 M NaOH solution and subsequently treated with Zn and HCl. The resulting product is mixed with ammonium sulphamate, kept for 2 min. and a reagent is added to get final coloured product whose absorbance is measured.

77. Select the product obtained when folic acid is heated with Zn and HCl

- a. Benzoic acid
- b. p-aminobenzoic acid
- c. Glutamic acid
- d. Succinic acid

78. Select the reagent used for development of colour

- a. N-1 -naphthyl ethylene diamine dihydrochloride
- b. Ninhydrin reagent
- c. p-dimethylamino benzaldehyde
- d. Phloroglucinol

Q.No. 79-80: Parkinsonism is common neurological movement disorder. Signs include rigidity of skeletal muscles, akinesia , flat faces and tremors at rest. Both L-DOPA and Carbidopa are used.

79. Carbidopa is used because

- a. It cross blood brain barrier
- b. It inhibits aromatic L-aminoacid decarboxylase
- c. It inhibits MAO type A
- d. It inhibits MAO type B

80. Select specific unwanted effect of L-DOPA

- a. Dementia
- b. Hypertension
- c. Dyskinesia
- d. Excitotoxicity

Q.No.81-82: The decomposition of a drug in aqueous acid solution was found to follow first order reaction. The initial concentrations was found to be 0.0056M. The concentration after a period of 12 hour was 0.041M. The reaction rate constant is 0.02599 hr^{-1} .

81. What was the quantity of drug remaining un decomposed after 8 hr.

- a. 0.455 moles/lit
- b. 0.25 moles/lit
- c. 0.0455 moles/lit
- d. 0.10 moles/lit

82. What is the amount of drug deteriorated during the period of 24 hr.

- a. 0.026 moles/lit
- b. 0.0026 moles/lit
- c. 0.03 moles/lit
- d. 0.053 moles/lit

Q.No 83-85: In a formulation development laboratory, you have to formulate an oral dosage form containing olive oil vitamin A and water.

83. Suggest a suitable dosage form

- a. Solution
- b. Suspension
- c. Emulsion
- d. Capsule

84. Suggest a substance to be incorporated into the formulation

- a. Glycerine
- b. Acacia
- c. Cetrimide
- d. Alcohol

85. Select one of the appropriate labelling direction

- a. Keep in the refrigerator
- b. No preservatives
- c. Schedule 'G'S'
- d. Shake well before use

Q. 86-87: Successive solvent extraction of a crude drug with petroleum ether, benzene, chloroform, ethyl alcohol and water was performed. Qualitatively chemical testing of petroleum ether extract gave positive Keller Killiani and Salkowski's reaction. Ethyl alcohol and aqueous extract gave positive FeCl_3 reaction and aqueous extract gave foamy solution.

86. What constituents are present in the petroleum ether/benzene extract?

- a. Plant sterols
- b. Tropane alkaloid
- c. Sesquiterpenoids
- d. Purines

87. What constituents are present in the ethyl alcohol and aqueous extracts?

- a. Plant lipid
- b. Anthraquinone glycoside
- c. Alkaloid
- d. Plant phenols and saponins

Q. No. 88-90: A business executive while playing tennis complained of chest pain and was brought to the emergency room. He has history of mild hypertension and elevates blood cholesterol. ECG changes confirmed the diagnosis of myocardial infarction. The decision is made to open his occluded artery by using thrombolytic agent and also use aspirin later.

88. The thrombolytic agent used is

- a. Heparin
- b. Warfarin
- c. Anistreptase
- d. Vit.K

89. Mechanism of action of aspirin is

- a. Inhibit vit.K absorption
- b. Anti-thrombin activity
- c. Inhibit metabolism of heparin
- d. Inhibit platelet aggregation

90. Mechanism of action of antithrombic agent is

- a. Conversion of plasminogen to plasmin
- b. Activation of clotting factors
- c. Inhibit platelet aggregation
- d. Agonist of vitamin K

ANSWER KEY FOR GATE 2003

1(A)	2(B)	3(D)	4(B)	5(C)	6(A)
7(B)	8(D)	9(A)	10(B)	11(D)	12(C)
13(B)	14(C)	15(C)	16(B)	17(B)	18(C)
19(B)	20(B)	21(B)	22(B)	23(A)	24(D)
25(A)	26(B)	27(D)	28(B)	29(C)	30(A)
31(A)	32(D)	33(D)	34(C)	35(C)	36(D)
37(B)	38(A)	39(B)	40(D)	41(D)	42(A)
43(C)	44(C)	45(A)	46(D)	47(B)	48(B)
49(A)	50(B)	51(B)	52(B)	53(C)	54(B)
55(A)	56(D)	57(C)	58(B)	59(D)	60(D)
61(C)	62(B)	63(B)	64(A)	65(B)	66(B)
67(B)	68(C)	69(C)	70(B)	71(A)	72(B)
73(C)	74(A)	75(B)	76(D)	77(B)	78(A)
79(B)	80(C)	81(C)	82(A)	83(C)	84(B)
85(D)	86(A)	87(D)	88(C)	89(D)	90(A)