Q.1 – 30 Carry One Mark Each.

1. Colchicine is biogenetically derived from one of the following
   (A) Tyrosine and Phenylalanine (B) Tryptophan and Phenylalanine
   (C) Ornithine and Tryptophan (D) Ornithine and Phenylalanine

2. The diagnostic character for the microscopical identification of Kurchi bark is
   (A) fibres with Y-shaped pits (B) horse shoe shaped stone cells
   (C) slereids containing calcium oxalate crystals
   (D) stratified cork

3. It is possible to initiate the development of complete plants from callus cell cultures by suitable manipulation of medium with respect to
   (A) minerals (B) vitamins (C) carbohydrates (D) hormones

4. Polyploidy is defined as
   (A) addition of one chromosome
   (B) multiplication of entire chromosome set
   (C) submicroscopic changes in DNA material
   (D) gross structural changes

5. The starting material for the synthesis of ALPRAZOLAM is
   (A) 3-amino-5-bromoacetophenone (B) 2-amino-5-chlorobenzophenone
   (C) 2-amino-5-bromoacetophenone (D) 3-amino-5-chlorobenzophenone

6. Simplification of Morphinan system gave one BENZOMORPHAN derivative
   (A) Pentazocin (B) Pethidine
   (C) Levorphanol (D) Buprenorphine

7. A metabolite of SPIRONOLACTONE is
   (A) Aldosterone (B) Canrenone (C) Corticosterone (D) Pregnenolone

8. The IUPAC name for NAPROXEN is
   (A) (S)-2-(6-ethoxy-2-napththyl)-acetic acid
   (B) (S)-2-(6-methoxy-2-napththyl)-acetic acid
   (C) (S)-2-(6-ethoxy-2-napththyl)-propionic acid
   (D) (S)-2-(6-methoxy-2-napththyl)-propionic acid

9. The metabolic function of Riboflavin involves the following
   (A) FMN and FAD (B) NADP and NADPH
   (C) AMP and ATP (D) Retine and Retinine

10. X-ray spectral lines K_a doublet arises from transition of electrons from
   (A) M shell to K shell (B) L shell to K shell
   (C) L shell to M shell (D) M shell to L shell

11. The method of expressing magnetic field strength is
   (A) cycles/sec (B) pulses/sec (C) debye units (D) gauss

12. A solvent used in NMR studies is
   (A) chloroform (B) acetone
   (C) carbontetrachloride (D) methanol

13. A widely accepted detector electrode for pH measurement is
   (A) platinum wire (B) glass electrode
   (C) Ag-AgCl electrode (D) lanthanum fluoride

14. Commercial production of citric acid is carried out by the microbial culture of
   (A) Fusarium moniliformi (B) Rhizopus nigricans
   (C) Aspergillus niger (D) Candida utilis

15. For thermophilic microorganisms, the minimum growth temperature required is
   (A) 20°C (B) 37°C (C) 45°C (D) 65°C

16. Obligatory anaerobes
   (A) can tolerate oxygen and grow better in its presence
   (B) do not tolerate oxygen and die in its presence
   (C) can grow in oxygen levels below normal
   (D) can grow in presence of atmospheric oxygen

17. Plasmid is a
   (A) macromolecule involved in the protein synthesis
   (B) circular piece of duplex DNA
   (C) a hybrid DNA that is formed by joining pieces DNA
   (D) endogenous substance secreted by one type of cell

18. Lactose intolerance is because of the lack of
(A) acid phosphatase (B) lactate dehydrogenase
(C) galactose-1-phosphate-uridyl transferase
(D) amylase

19. Synthesis of UREA takes place exclusively in
(A) kidney (B) liver
(C) gall bladder (D) urinary bladder

20. A term which describes a cofactor that is finally bound to an apoenzyme is
(A) holoenzyme (B) prosthetic group
(C) coenzyme (D) transferase

21. How many parts of 10% ointment be mixed with 2 parts of 15% ointment to get 12% ointment?
(A) 2 (B) 3 (C) 5 (D) 6

22. The correct non-ionic surfactant used as a penetration enhancer in the preparation of mucoadhesives is
(A) oleic acid (B) tween-80
(C) glycerol (D) propylene glycol

23. One of the ex-officio member of the Pharmacy Council of India is
(A) Director General of Health Services
(B) Government Analyst
(C) Registrar of the State Pharmacy Council
(D) Director General of Indian Veterinary Research Institute

24. The Schedule in Drugs and Cosmetics Act that deals with the requirements and guidelines for clinical trials, import and manufacture of new drugs is
(A) Schedule 'O' (B) Schedule 'M' (C) Schedule 'F' (D) Schedule 'Y'

25. A retardant material that forms a hydrophilic matrix in the formulation of matrix tablets is
(A) H.P.M.C (B) C.A.P
(C) Polyethylene (D) Carnauba Wax

26. A drug which causes pink to brownish skin pigmentation within a few weeks of the initiation of therapy is
(A) itraconazole (B) clofazimine (C) lomefloxacin (D) neomycin

27. The risk of Digitalis toxicity is significantly increased by concomitant administration of
(A) triamterene (B) lidocaine (C) captopril
(D) hydrochlorthiazide

28. An agent used in Prinzmetal angina has spasmolytic action which increases coronary blood supply is
(A) nitroglycerine (B) nifedipine
(C) timolol (D) isosorbide mononitrate

29. An organism which has been implicated as a possible cause of chronic gastritie and peptic ulcer is
(A) Campylobacter jejuni (B) Escherichia coli
(C) Helicobacter Pylori (D) Giardia lamblia

30. A $5HT_{ID}$ receptor agonist useful in migraine is
(A) sumatriptan (B) ketanserin (C) ergotamine (D) methysergide

Q.31 – 80 Carry Two Marks Each.

31. At present, different species of Papaver such as P. bracteatum and P. orientale are being cultivated instead of P.somniferum because they contain
(A) more of morphine (B) less of morphine
(C) only codeine (D) only thebaine

32. Guggulipid, a resin is
(A) a hypolipidemic agent obtained from cotton plants containing multifunctional compound (±) gossypol
(B) a lipid obtained from Arctium lappa, asteraceae and traditionally used for the treatment of dermatoses
(C) cathartic glucoresin obtained from Ipomoea orizabensis and used since ancient time
(D) 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 $CH_3COOH+H_2SO_4+C_2H_5OH$
(A) hydantoin (B) 1-5-diamino hydantoin
(C) 1-3-diamino hydantoin (D) 1-amino-hydantoin

34. 4-hydroxy-3-hydroxymethyl benzaldehyde is treated with acetic anhydride and then kept with ether solvent, t-butyl cyanide and acetic acid for ten days. Resulting compound is reduced with $LiAlH_4$ in tetrahydrofuran. The final product is

(A) isoprenaline (B) dobutamine (C) salbutamol (D) oriciprenaline

35. 2-iminothiazolidine is treated with phenyloxirane to get a drug used in roundworm infection is

(A) piperazine (B) tetramisole (C) thiabendazole (D) levamisole

36. Thiamine hydrochloride on treatment with alkaline potassium ferricyanide gives

(A) thymochrome with fluorescence

(B) oxythiamine with golden yellow colour

(C) neopyrithiamine with orange yellow colour

(D) tiochrome with blue fluorescence

37. A new drug delivery system which is composed of phospholipids that spontaneously form a multilamellar concentric bilayer vesicles with layers of aqueous media separating the lipid layers is

(A) prodrugs (B) liposomes

(C) osmotic pumps (D) nanoparticles

38. Unless otherwise stated in the individual monograph of the pharmacopoeia, in the disintegration test for enteric coated tablets, first the dissolution is carried out in

(A) 0.1 M HCl (B) phosphate buffer

(C) water (D) 0.1 MH_2SO_4

39. What is the proportion of NaCl required to render a 1.5% solution of drug isotonic with blood plasma? The freezing point of 1% w/v solution of drug is -0.122°C and that of NaCl is -0.576°C

(A) 0.65% (B) 0.585% (C) 0.9% (D) 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

(A) % Absorbance against Wave number.

(B) % Transmittance against Concentration

(C) % Absorbance against Concentration

(D) % Transmittance against Wave number.

41. ESR is applied to only those substances showing paramagnetism which is due to the magnetic moment of
(A) neutrons (B) protons
(C) paired electrons (D) unpaired electrons

42. Rotation of electrons about the proton generates a secondary magnetic field which may oppose the applied magnetic filed. The portion is then said to be
(A) shielded (B) shifted
(C) hydrogen bonded (D) deshielded

43. The analyte is used in the form of a solution in flame photometry because it should undergo
(A) evaporation (B) condensation
(C) nebulisation (D) precipitation

44. The mechanism of antiparasitic action of Mebendazole and thiabendazole involves
(A) stimulation of acetylcholine receptors at neuromuscular junctions
(B) inhibition of dihydropolate reductase
(C) interference with microtubule synthesis and assembly
(D) block thiamine transport

45. Isoniazid is a primary antitubercular agent that
(A) requires pyridoxine supplementation
(B) causes ocular complications that are reversible if the drug is discontinued
(C) is ototoxic and nephrotoxic
(D) should never be used due to hepatotoxic potential

46. Decreased risk of Atherosclerosis is associated with increase in
(A) very low density lipoproteins (B) low density lipoproteins
(C) cholesterol (D) high density lipoproteins

47. The mechanism of action of Paclitaxel is
(A) bind to DNA through intercalation between specific bases and block the synthesis of new RNA or DNA, cause DNA strand scission
(B) mitotic spindle poison through the enhancement of tubulin polymerization
(C) competitive partial agonist – inhibitor of estrogen and binds to estrogen receptors
(D) S-Phase specific antimetabolite that is converted by deoxykinase to the 5′-mononuleotid

48. Lycopodium spore method can be used to find out percentage purity of crude drugs which contain
(A) multi-layered tissues or cells
(B) well defined particles which can be counted
(C) oil globules
(D) characteristic particles of irregular thickness, the length of which can be measured

49. The microscopical character of flower buds of Eugenia caryophyllus is
(A) collenchymatous parenchyma containing in its outer part numerous ellipsoidal schizolysigenous oil glands
(B) small translucent endosperm containing aleurone grains
(C) wide parenchymatous starchy cortex, the endosperm containing volatile oil
(D) outer surface consisting of external perisperm, rough, dark brown with reticulate furrows

50. In protein biosynthesis, each amino acid
(A) recognizes its own codon by a direct interaction with the m-RNA template
(B) is added in its proper place to a growing peptide chain throught he "adaptor" function of t-RNA
(C) is first attached to an anticodon specific for the amino acid
(D) undergoes fidelity translation which is assured by the presence of traces of DNA on the ribosome

51. Rabies Antiserum I.P. is a
(A) a freeze dried preparation containing antitoxic globulin
(B) a preparation containing specific globulin or its derivatives obtained by purification of hyperimmune serum or plasma of healthy horses
(C) a sterile preparation containing antitoxic globulin
(D) a sterile preparation containing antitoxic globulins obtained by purification of hyperimmune serum of horses

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

52. Total ash value in case of crude drug signifies
(P) organic content of the drug
(Q) mineral matter in the drug
(R) addition of extraneous matter such as sand, stone etc.
(S) woody matters present in the drug
(A) R, S (B) Q, R (C) P, Q (D) P, S

53. The compounds listed below contain σ, π and η electrons
(P) Acetaldehyde
(Q) Butadiene
(R) Formaldehyde
(S) Benzene
(A) P, S (B) Q, R (C) P, R (D) Q, S

54. A 60 year old patient presents with glaucoma. Therapy should include
(P) topical atropine
(Q) topical pilocarpine
(R) oral acetazolamide
(S) oral pilocarpine
(A) P, Q (B) Q, R (C) R, S (D) P, S

55. Measurement of particle size in pharmaceutical Aerosols is by
(P) Cascade impactor
(Q) light scatter decay
(R) Karl-Fischer method
(S) IR spectrophotometry
(A) P, Q (B) Q, R (C) R, S (D) P, S

56. The common attributes of ascorbic acid, an antiscrobutic vitamin, are
(P) exist in nature in both reduced and oxidized form and in a state of reversible equilibrium
(Q) has a 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 free carboxyl group
(A) P, R (B) Q, R (C) R, S (D) P, Q

57. Two properties of Radiopharmaceuticals are
(P) slow localization in target tissue
(Q) very long half-life to provide enough exposure 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 statements 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-D_3 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) Q, S

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 (Tablet Additives)	**Group II** (Examples)
(P) Binder	(1) Acacia
(Q) Insoluble lubricant	(2) Light mineral oil
(R) Film coating material	(3) Hydroxy ethyl cellulose
(S) Direct compression diluent	(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.

Group I (IR Detectors)	**Group II** (Composition)
(P) Thermocouple	(1) Oxides of Mn, CO and Ni
(Q) Pyroelectric Detector	(2) Bi-Sb
(R) Golay cells	(3) Xenon
(S) Thermistor	(4) Triglycine sulphate

(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

61.

Group I (Alkaloid)	Group II (Ring system)
(P) Coniine	(1) Isoquinoline
(Q) Papaverine	(2) Pyridine-Piperidine
(R) Anabasine	(3) Yohimbane
(S) Reserpine	(4) Piperidine

(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

62.

Group I (Immunoglobulins [Ig])	Group II (Actions)
(P) IgG	(1) Agglutinating and cytolytic
(Q) IgA	(2) Antiallergic
(R) IgM	(3) Neutralises toxins
(S) IgE	(4) Antimicrobial

(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 - 1 S - 3

63.

Group I (Antibiotics)	Group II (Microorganism used in I.P. assay)
(P) Streptomycin	(1) Bacillus cereus
(Q) Erythromycin	(2) Stahylococcus epidermidis
(R) Gentamycin	(3) Klebsiella pneumoniae
(S) Tetracycline	(4) Micrococcus luteus

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

64.

Group I (Synthetic estrogtenic drugs)	Group II (Methods of synthesis)
(P) Ethinyl estradiol	(1) 4, 4′ Dimethoxy benzophenone is treated with 4-methoxy benzoyl chloride + Mg, resulting product is treated with PTS followed by Cl_2 + CCl_4
(Q) Dienoestrol	(2) Deoxyanisoin is alkylated and product subjected to Grignard reaction, the resulting tertiary alcohol is dehydrated and demethylated with alcoholic KOH
(R) Chlorotrianisine	(3) By Pinacol reduction of p-hydroxy propiophenone and subsequent removal of water
(S) Stilboestrol	(4) From Estrone by the action of Potassium acetylide

(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

65.

Group I (Immunosuppressants)	Group II (Mechanism of action)
(P) Azathioprine	(1) Destroys proliferating lymphoid cells
(Q) Tacrolimus	(2) Prodrug transformed to mercaptopurine which on further conversion inhibits purine metabolism
(R) Glucocorticoids	(3) Inhibits the cytoplasmic phosphatase Calcineurin
(S) Cyclophosphamide	(4) Interferes with the cell cycle of activated lymphoid cells

(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 - 2 R - 3 S - 1

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:

Leaves of Digitalis purpurea were subjected to morphological, microscopical and chemical screening.

66. Morphological character with respect to the 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 cells
(C) multicellular, uniseriate with 10-14 cells
(D) multicellular, multiseriate with 10-14 cells

68. The drug gives positive
(A) Borntrager's test
(B) Murexide test
(C) Legal's test
(D) Thaleoquin test

Data for questions 69 and 70:

In a synthetic procedure 5-chloro-2, 4-diamino sulfomyl aniline is treated with P to obtain 7-amino sulfomyl-6-chloro-3-chloro-methyl-2H-1, 2, 4-benzothiadiazin-1:1 dioxide. Subsequently it is refluxed with C_6H_5-CH_2-SH + NaOH + DMF to yield Y.

69. Select the reagent P
(A) Chloroacetyldehyde
(B) Formaldehyde
(C) Formic acid
(D) Acetaldehyde

70. The final product Y is
(A) 3-benzyl methyl-6-chloro-2H-1, 2, 4-benzothiadiazine-7 sulphonamide 1, 1-dioxide
(B) 3-benzyl thiomethyl-6-chloro-2H-1, 2, 4-benzothiadiazine-7 sulphonamide 1, 1-dioxide
(C) 3-benzyl thiomethyl-5-chloro-2H-1, 2, 3-benzothiazine-7 sulphonamide 1, 1-dioxide
(D) 3-benzyl thiomethyl-5-chloro-2H-1, 2, 3-benzothiadiazine-7 sulphonamide 1, 1-dioxide

Data for questions 70 to 73:

Proguanil is synthesized by diazotization of p-chloroaniline and treating with dicynamide to yield p-chlorophenyldicyandiamide which is converted to Proguanil by reaction with an aliphatic amine. Proguanil is metabolized to a triazine derivative which is an active metabolite.

71. What is the reagent used for diazotization?
(A) $NaNO_2$ + dilute HCl
(B) KNO_3 + dilute H_2SO_4
(C) Zn + dilute 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

Data for questions 74 to 76:

Calculate the λmax for the following compounds. Base value for Benzaldehyde in ethanol is 250 mm.

74. λmax of p-promobenzaldehyde in nm is
(A) 265 (B) 255 (C) 275 (D) 260

75. λmax of p-hydroxy benzaldehyde in nm is
(A) 253 (B) 275 (C) 261 (D) 270

76. λmax of o-chlorobenzaldehyde in nm is
(A) 275 (B) 265 (C) 255 (D) 250

Data for questions 77 and 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 minutes 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 + HCl
(A) Benzoic acid
(B) p-aminobenzoic acid
(C) Glutamic acid
(D) Succinic acid

78. Select the reagent used for the development of colour
(A) N-1-naphthyl ethylene diamine didydrochloride
(B) Ninhydrin reagent
(C) p-dimethylamino benzaldehyde
(D) Phloroglucinol

Data for questions 79 and 80:

Parkinsonism is a common neurological movement disorder. Signs include rigidity of skeletal muscles, akinesia, flat facies and tremors at rest. Both L-DOPA and Carbidopa are used.

79. Carbidopa is used because
(A) it crosses blood brain barrier
(B) it inhibits aromatic L-aminoacid decarboxylase
(C) it inhibits MAO type A
(D) it inhibits MAO type B

80. Select the specific unwanted effect of L-DOPA
(A) Dementia (B) Hypertension
(C) Dyskinesia (D) Excitotoxicity

Data for questions 81 and 82:

The decomposition of a drug in aqueous acid solution was found to follow first order reaction. The initial concentration was found to be 0.056 M. The concentration after a period of 12 hours was 4.10×10^{-2} moles/litre. The reaction rate constant is 0.02599 $-hr^{-1}$.

81. What is the quantity of drug remaining undecomposed after 8 hours?
(A) 0.455 moles/litre (B) 0.25 moles/litre
(C) 0.0455 moles/litre (D) 0.10 moles/litre

82. What is the amount of drug deteriorated during the period of 24 hours?
(A) 0.026 moles/litre (B) 0.0026 moles/litre
(C) 0.03 moles/litre (D) 0.053 moles/litre

Data for questions 83 to 85:

In a formulation development laboratory, you have to formulate an oral dosage from 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 labeling directions
(A) Keep in the refrigerator (B) No preservatives added

(C) Schedule 'G' (D) Shake well before use

Data for questions 86 and 87:

Successive solvent extraction of a crude drug with petroleum ether, benzene, chloroform, ethyl alcohol and water was performed. Qualitative chemical testing of petroleum ether extract gave positive Keller-Kiliani and Salkowski's reactions. Ethyl alcohol and aqueous extract gave positive $FeCl_3$ reaction and acqueous extract gave foamy solution

86. What constituents are present in the petroleum ether/benzene extract?
(A) Plant sterols (B) Tropane alkaloids
(C) Sesquiterpenoids (D) Purines

87. What constituents are present in the ethyl alcohol and aqueous extracts?
(A) Plants lipids (B) Anthraquinone glycosides
(C) Alkaloids (D) Plant phenols and saponins

Data for questions 88 to 90:

A business executive while playing tennis complained of chest pain and ws brought to emergency room. He has history of mild hypertension and elevated blood cholesterol. ECG changes confirmed the diagnosis of myocardial infraction. 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) anistreplase (D) vit. K

89. Mechanism of action of aspirin is
(A) inhibit vitamin K absorption (B) antithrombin activity
(C) inhibit metabolism of heparin (D) inhibit platelet aggregation

90. Mechanism of action of antithrombic lagent is
(A) conversion of plasminogen to plasmin (B) activation of clotting factors
(C) inhibit platelet function (D) agonist of vitamin K