Roll No. .....

Question Booklet Number

O. M. R. Serial No.

M. Sc. (Fourth Semester)

(NEP) EXAMINATION, 2025-26

CHEMISTRY

(Medicinal Chemistry)

Paper Code							
B	0	2	1	0	0	4	T

Questions Booklet Series
B

Time : 1:30 Hours] [*Maximum Marks : 75*

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.

2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.

3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।

2. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।

3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page) **(शेष निर्देश अन्तिम पृष्ठ पर)**

(Only for Rough Work)

1. Which of the following chemical compositions remains main constituents of sanitizer, a local anti-infective agent ?

(A) Ethyl alcohol

(B) Isopropyl alcohol

(C) n-Butanol

(D) All of the above

2. Which of the following medical indications are contagious in nature ?

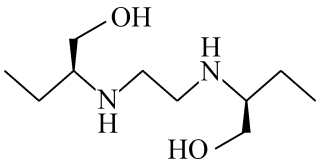
(A) Tuberculosis

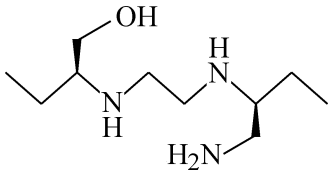
(B) Hypertension

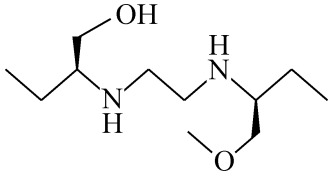
(C) Cancer

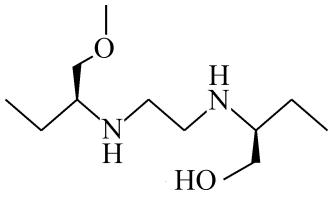
(D) Malaria

3. Which of the following is correct chemical structure of Ethambutol, anti-infective drug ?

(A) 

(B) 

(C) 

(D) 

4. How many nitrogen atoms are present in the Chloroquine molecule ?

(A) 3

(B) 5

(C) 4

(D) 5

5. What is the molecular mass of Norfloxacin ?

(A) 319 g/mol

(B) 323 mg/kg

(C) 329 g/mol

(D) 333mg/mol

6. Ciprofloxacin, an anti-infective agent, has how many piperazine moieties ?

(A) 1

(B) 2

(C) 3

(D) 4

7. How many hetero toms are present in Ethionamide, an anti-infective agent ?

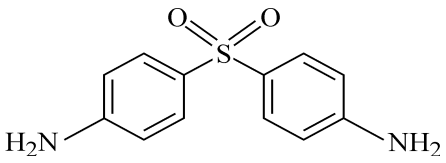
(A) 2

(B) 3

(C) 4

(D) 5

8. Which symmetry elements are present in Dapsone molecule with the given structure ?



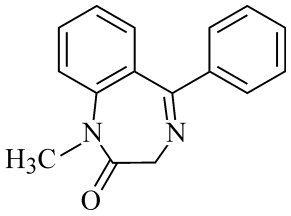
(A) C2

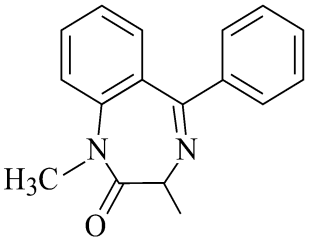
(B) σ

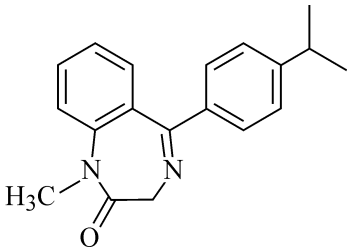
(C) Both (A) and (B)

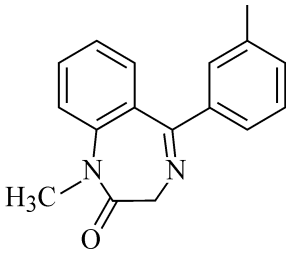
(D) None of the above

9. What is the correct chemical structure of drug, Diazepam ?

(A) 

(B) 

(C) 

(D) 

10. Which of the following best explains the effect of a CNS depressant ?

(A) Increased alertness and heart rate

(B) Slowed brain activity and relaxation

(C) Enhanced focus and energy

(D) Increased metabolism

11. What is the primary medical use of sedative-hypnotic CNS depressants ?

(A) To increase alertness

(B) To treat insomnia and anxiety

(C) To treat depression

(D) To reduce blood pressure

12. Which out of the following drugs is not as CNS depressant ?

(A) Alcohol

(B) Barbiturates

(C) Benzodiazepines

(D) Nicotine

13. GABA, a receptor in anti-anxiety medication stands for :

(A) Gamma Amido Butyric Acid

(B) Gamma Amino Butyric Acid

(C) Gamma Amino Steric Acid

(D) Gamma amino Barbituric Acid

14. Buspirone, an anti-anxiety, belongs to which class of drug ?

(A) Anxiolytic, Azapirone

(B) Anxiolytic, Azlactone

(C) Antiseptic, Azapirone

(D) Anxiolytic, Azatadine

15. A drug has molar mass 379.43g/mol, which is equipped with three nitrogen atoms along with two oxygen atoms and a fluorine atom. If all these atoms are replaced with carbon atoms, what will be percentage variation in drug molar mass ?

(A) 5.27%

(B) 6.27%

(C) 7.27%

(D) 4.27%

16. Most of the oral drug are in salt form, which is easier to manufacture as well as for the therapeutic uses and this property of the drugs is an attribution of :

(A) Nitrogen presence

(B) Sulphur presence

(C) Oxygen presence

(D) Halogen presence

17. What is the correct chemical name of Paracetamol ?

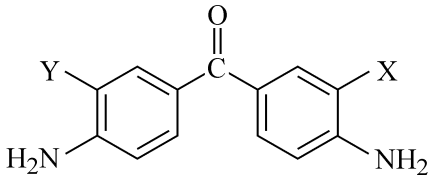
(A) N-Acetyl p-amino phenol

(B) N-Acetyl m-amino phenol

(C) N,N'-Di-acetyl p-amino phenol

(D) N-Acetyl p-amino phenoxide

18. How are X and Y connected in the below given molecule ?



(A) X Diatropic, Y Paratropic

(B) Y Diatropic, X Paratropic

(C) Both resonate at the same frequency

(D) All of the above

19. Water molecule with C_{2V} symmetry, is microwave active because off ?

(A) Presence of permanent dipole moment.

(B) Change in dipole moment

(C) Capacity to form H-bonding

(D) All of the above

20. What is the minimum quintessential condition for a molecule to possess chirality ?

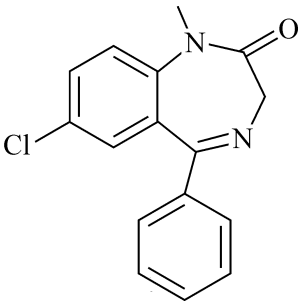
(A) Asymmetry

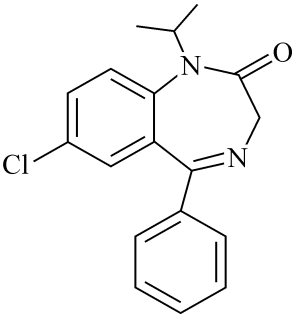
(B) Dissymmetry

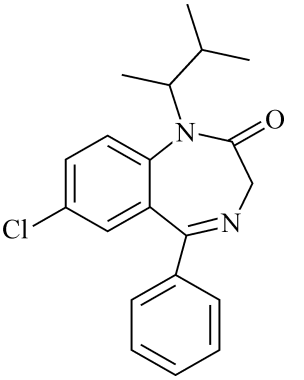
(C) Both (A) and (B)

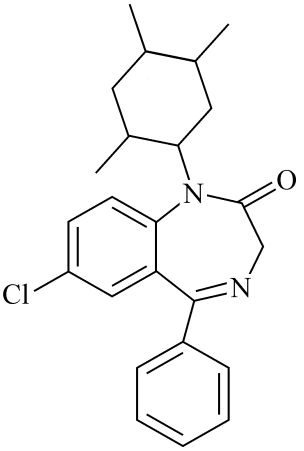
(D) None of the above

21. Which one, out of the given structure entails to diazepam ?

(A) 

(B) 

(C) 

(D) 

22. How many carbon atom (s) have sp^3 hybridization in the diazepam structure ?

(A) 1

(B) 2

(C) 3

(D) 4

23. Oxazepam, an antipsychotic drug belongs to which series of drug ?

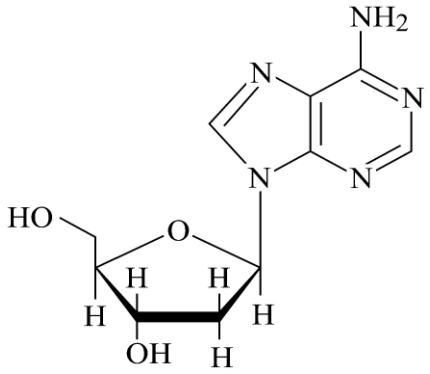
(A) Lactam

(B) Lactone

(C) Both (A) and (B)

(D) None of the above

24. Which one of the following sugar moieties are present in the DNA base pair, Guanidine ?



(A) Furanose

(B) Pyranose

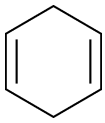
(C) Oxetose

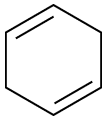
(D) None of the above

25. Which one, out of the given structures are aromatic in nature ?

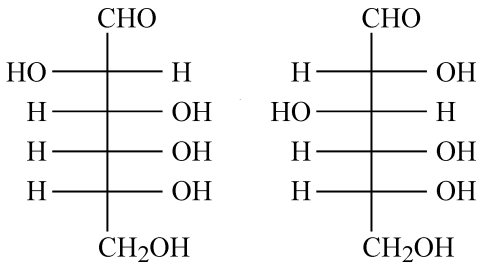
(A) 

(B) 

(C) 

(D) 

26. Which one, out of the given chemical structure represents D-Glucose ?



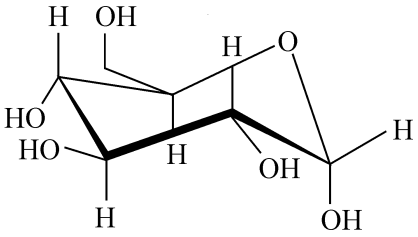
(A) A

(B) B

(C) Both (A) and (B)

(D) None of the above

27. How many stereocenters are present in the given hexose structure ?



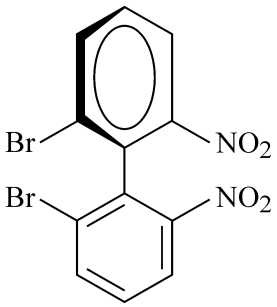
(A) 2

(B) 3

(C) 4

(D) 5

28. Choose the correct statements about the given molecule ?



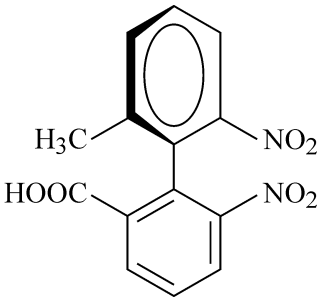
(A) Compound is chiral with chiral axis

(B) Compound is achiral with chiral axis

(C) Compound is achiral with chiral center

(D) Compound is chiral with chiral plane

29. What is the absolute configuration of the given molecule ?



(A) R

(B) S

(C) D

(D) L

30. Which enzyme is instrumental in the process of hydrolysis of protein ?

(A) Peptidases

(B) Proteinases

(C) Helicases

(D) Both (A) and (B)

31. Which of the following statement is true about antibiotics ?

(A) They are produced by microorganism

(B) They work by inhibition of cell wall synthesis

(C) They work by inhibition of protein synthesis

(D) All of the above

32. Which drug, out of the given, is considered as broad-spectrum antibiotic ?

(A) Penicillin G

(B) Streptomycin

(C) Amoxicillin

(D) Azithromycin

33. Which of the given antibiotics acts by the virtue of inhibiting cell wall synthesis ?

(A) Tetracycline

(B) Penicillin

(C) Erythromycin

(D) Azithromycin

34. Broad spectrum antibiotics are commonly associated with which phenomenon of their aggressive uses :

(A) Superinfection

(B) Antibiotic resistance

(C) Minimal resistance

(D) All of the above

35. Choose the right statement with respect to Penicillin G and Penicillin V, out of the following given option ?

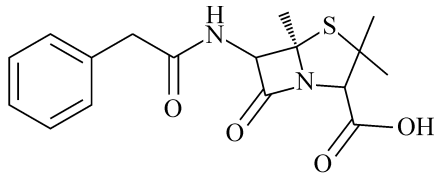
(A) Both belong to beta lactam series

(B) Only Penicillin G belongs to beta lactam series

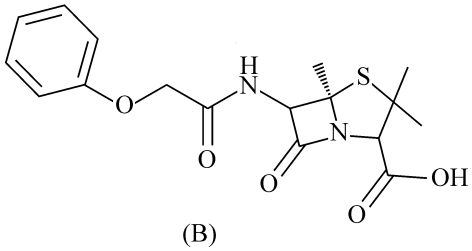
(C) Only Penicillin V belongs to beta lactam series

(D) None of the above

36. Which of the following given structure represents Penicillin V ?



(A)



(B)

(A) Structure A

(B) Structure B

(C) Both structures

(D) None of the structure

37. Which of the statement is true about Penicillin G ?

(A) More susceptible to acid degradation

(B) Most appropriate to intramuscular injection

(C) Less prone to acid degradation

(D) Both (A) and (B)

38. Protein synthesis, a quintessential step in biological functioning at the cellular level, is explained by which terminology ?

(A) Transcription

(B) Translation

(C) Both (A) and (B)

(D) Apoptosis

39. Protein alkylation is a suicidal step for most of pathogens and is best defined as :

(A) Addition of ethyl group

(B) Addition of methyl group

(C) Both (A) and (B)

(D) Addition of acetyl group

40. $-NO_2$ group present in chloramphenicol, exerts its effect on drug molecule by which means of actions ?

(A) + I, - R

(B) -I, +R

(C) -I, -R

(D) +I, +R

41. Amoxicillin, a broad-spectrum antibiotic has, how many amine functional groups ?

(A) 3

(B) 4

(C) 5

(D) 1

42. Acetylation of amoxicillin, could certainly be executed at how many amine nitrogen atoms ?

(A) 2

(B) 3

(C) 4

(D) 1

43. How many four-membered rings are present in tetracycline, a broad-spectrum antibiotic ?

(A) 2

(B) 0

(C) 4

(D) 5

44. Lactam ring present in drug molecules is ascertained with the help of IR spectroscopical means and reflects at ?

(A) 1710 cm^{-}

(B) 1780 cm^{-}

(C) 1690 cm^{-}

(D) 1810 cm^{-}

45. Which statement is correct w.r.t. streptomycin, an antibiotic ?

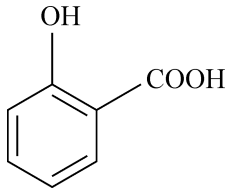
(A) Glucosamine based and quite water soluble

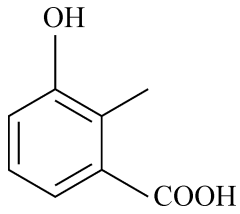
(B) Glucosamine based and not water soluble

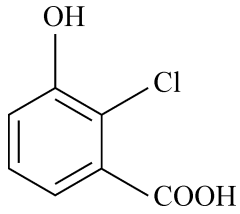
(C) Guanidine based broad spectrum antibiotics

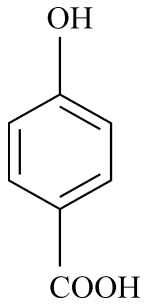
(D) Both A & C

46. Which of the following molecules exemplify process of chelation ?

(A) 

(B) 

(C) 

(D) 

47. For which medical indication streptomycin is used ?

(A) Tuberculosis

(B) Fungal infection

(C) Viral infection

(D) All of the above

48. Streptomycin, an antibiotic, is obtained from which organism ?

(A) *Streptomyces griseus*

(B) *Streptomyces venezuelae*

(C) *Streptomyces chrysogenum*

(D) None of the above

49. From symmetry point of view meso compounds are best described as ?

(A) Possessing plane

(B) Possessing center of inversion

(C) Lack of any symmetry

(D) None of the above

50. Which statement is true regarding the term Eutomer in stereochemistry ?

(A) An enantiomer with desired property

(B) An enantiomer without desired property

(C) Racemic mixture

(D) None of the above

51. Which of the followings are hall mark properties of prodrug ?

(A) Bio reversibility in vivo

(B) Release of drug

(C) Both (A) and (B)

(D) None of the above

52. What are the key factors which affect bioactivity ?

(A) Solubility

(B) Partition Coefficient

(C) Ionization

(D) All of the above

53. Bio isostere are in general aimed for :

(A) Better therapeutic index

(B) Improved pharmacokinetic properties

(C) Decrease solubility

(D) Both (A) & (B)

54. What defines chirality of a molecule with respect to symmetry criterion ?

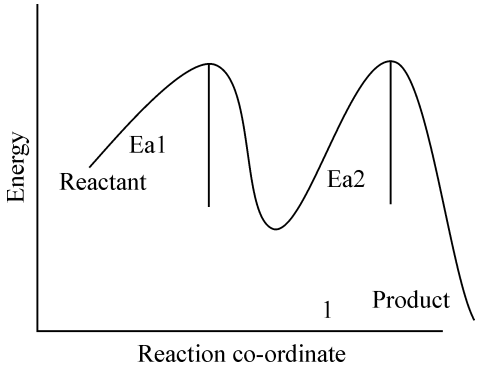
(A) Presence of alternate axis of rotation

(B) Absence of alternate axis of rotation

(C) Presence of simple axis of rotation

(D) Both (B) & (C)

55. How does catalysis affect chemical reactions ?



(A) By lowering the activation energy

(B) By increasing activation-energy

(C) By eliminating side products energy

(D) By releasing excessive energy

56. For the above-mentioned reaction energy profile diagram, enthalpy of the system will :

(A) Increase

(B) Decrease

(C) Not affected

(D) None of the above

57. Structure Activity Relationship in the drug design helps in calculating :

(A) To understand minimum required interaction

(B) To understand the relationship between protein and ligand

(C) To understand the spatial arrangement of the ligand (Drug molecules)

(D) All of the above

58. Lipinski rule for drug likeness in oral category of medication stress on the following parameters :

(A) Molecular weight should not exceed beyond 500 Da

(B) Hydrogen bond doner should not exceed 5

(C) Hydrogen bond acceptor should not exceed 10

(D) All of the above

59. Partition Coefficient of drug molecules reflects, which quality of drug ?

(A) Hydrophobicity

(B) Lipophilicity

(C) Neutrality

(D) Both (A) and (B)

60. What are key aspects of Bio-Orthogonal reactions ?

(A) Low selective

(B) Toxic in nature

(C) Do not affect native biological reactions

(D) Occurs in different directions

61. Who was the scientist pioneering the Induced-Fit theory ?

(A) Emil Fischer

(B) Koshland

(C) Max Plank

(D) Bernard

62. Which out of the following given amino acids, is secondary in nature ?

(A) Proline

(B) Aspartic acid

(C) Serine

(D) Tyrosine

63. Which enzymes are instrumental in digestion of protein molecules ?

(A) Peptidases

(B) Proteinases

(C) Kinases

(D) Both (A) and (B)

64. Primary structure of protein are held together by the virtue :

(A) Covalent

(B) Ionic bond

(C) Hydrogen bond

(D) Dipole induced dipole

65. Methylation of protein primarily occurs at which functional groups ?

(A) Alcohol

(B) Amine

(C) Carboxylic acid

(D) All of the above

66. Both DNA & RNA holds negative charge, primarily because of ?

(A) Ribose sugar

(B) Phosphate group

(C) Both (A) and (B)

(D) De-oxyribose sugar

67. LD_{50} of the drug molecules refers to toxicity of drug and is expressed as ?

(A) mg/Kg

(B) mg/L

(C) Kg/L

(D) Nm/Kg

68. Lead compound in the process of drug discovery is based on which of the following traits ?

(A) Chemical properties

(B) Pharmacological properties

(C) Pharmacokinetics

(D) All of the above

69. Which of the following properties of drug are not defined by pharmacokinetics ?

(A) Absorption

(B) Solubility

(C) Metabolism

(D) None of the above

70. Topical means of drug administrations are applied through :

(A) Skin

(B) Oral

(C) Intravenous

(D) All of the above

71. What does the term "bioequivalence" mean ?

(A) Plasma protein binding degree of substance

(B) Similar bioavailability of the same drug preparation from different company.

(C) Similar bioavailability of a different drug preparation from same company.

(D) Fraction of an uncharged drug reaching the systemic circulation following any route administration

72. In which of the following part in our body, weak bases with lower Pka values, are absorbed ?

(A) Stomach

(B) Colon

(C) Intestine

(D) GIT

73. Higher absorption of drugs in small intestine occurs citing to which reason ?

(A) Kercking

(B) Microvilli

(C) Villi

(D) All of the above

74. Drugs, which are acidic in nature primarily bind with which protein ?

(A) Albumin

(B) Glycoprotein

(C) Globulin

(D) None of the above

75. Which factor of a drug don't affect its Half-life (t ½) ?

(A) Biotransformation

(B) Conc of drug in plasma

(C) Both (A) and (B)

(D) Time of drug absorption

76. Drug excretion in the body is controlled by :

(A) Kidney

(B) Lungs

(C) Both (A) and (B)

(D) None of the above

77. Which out of the following given polymorphic form of drugs, have highest solubility ?

(A) Amorphous

(B) Metastable

(C) Hydrated

(D) All of the above

78. Efficacy of a drug is best explained as :

(A) To have max possible effect

(B) To have min possible effect

(C) To have moderate effect

(D) None of the above

79. What is the primary aim of pharmacodynamics studies ?

(A) How the body absorbs, distributes, and eliminates drugs

(B) How drugs interact with receptors to produce their effects

(C) The chemical structure of drugs

(D) How drugs are metabolized in the liver

80. Xenobiotics of drug primarily refers to :

(A) Substances which are foreign to the body.

(B) Substances which are familiar to the body.

(C) Both (A) and (B)

(D) None of the above

81. Biotransformation of drug mainly occurs by the virtue of.

(A) Enzymatic action

(B) Non-enzymatic action

(C) Both (A) and (B)

(D) None of the above

82. Biotransformation of drug primarily occurs in which organ of the body ?

(A) Liver

(B) Stomach

(C) Brain

(D) Skin

83. Drug metabolism of a drug is primarily concerned with :

(A) Conversion of lipophilic substance to polar one

(B) Conversion of lipophilic substance to more lipophilic substance

(C) Both (A) and (B)

(D) None of the above

84. The term "first-pass effect" refers to which property of drug ?

(A) Drug filtration in the kidney

(B) Drug metabolism in the intestinal wall

(C) Drug metabolism during its first pass through the liver

(D) Rapid onset of drug action

85. An inhibitor of CYP enzymes can cause :

(A) Faster metabolism

(B) Drug inactivation

(C) Increased drug concentration and toxicity

(D) Improved therapeutic index

86. What is the fate of most drugs after metabolism ?

(A) Stored in bone

(B) Excreted in bile

(C) Excreted in urine or bile

(D) Remain unchanged in plasma

87. Which type of drug is less susceptible to extensive biotransformation ?

(A) Hydrophilic drug

(B) Lipophilic drug

(C) Weak base

(D) Prodrug

88. Alcohol metabolism inside body mainly occurs with the help of which enzyme ?

(A) CYP3A4

(B) ADH and ALDH

(C) Both (A) and (B)

(D) MAO

89. Which consequence is a resultant effect of enzyme inhibition ?

(A) Shorter half-life of drug

(B) Increased clearance of drug

(C) Higher plasma drug conc

(D) Reduced absorption

90. Drugs aimed to treat cancer are known as :

(A) Antineoplastic agent

(B) Anti-infective agents

(C) Both (A) and (B)

(D) Antidepressant

91. Alkylating agents, an anticancer drug regimen remains functional through which types of bonding ?

(A) Hydrogen bond

(B) Dipole interactions

(C) Covalent bond

(D) All of the above

92. Mitotic inhibitors caused inhibition of cancer cells by what virtues ?

(A) Blocking cell division

(B) Enhancing cell division

(C) Both (A) and (B)

(D) None of the above

93. Which phase of the cell cycle gets targeted by mitotic inhibitors ?

(A) G1 Phase

(B) S Phase

(C) G2 Phase

(D) M Phase

94. An ultimate consequence of the action of mitotic inhibitors on cancerous cells is best described as :

(A) Accelerated cell division

(B) Cell apoptosis (programmed cell death)

(C) Differentiation into normal cells

(D) Increased cell mobility

95. Which of the following statement best describes the role of diuretics in hypertension ?

(A) Inhibit the adrenergic transmission

(B) reduce blood volume and amount of Na+ ions in the vessel's endothelium

(C) Inhibit the rennin-angiotensin-aldosterone system

(D) None of the above

96. How many hydroxyl groups are present in sorbitol chemical structure ?

(A) 5

(B) 6

(C) 4

(D) 3

97. What is an absolute configuration of C-3 of glucose molecule ?

(A) R

(B) S

(C) D

(D) L

98. Dissolution of sorbitol in water is simply effectuated by virtue what types of bonding ?

(A) Hydrogen bonding

(B) Vanderwall bonding

(C) Covalent bonding

(D) None of the above

99. Amyl Nitrite, an antihypertensive medicine that relieves heart disease, angina by which means of action ?

(A) Vasodilation

(B) Vasocontraction

(C) Have anti-anginal action

(D) Both (A) and (C)

100. Which functional group holds pharmacological properties in Amyl Nitrite ?

(A) Nitrite

(B) Nitrate

(C) Sulphadoxime

(D) Hydroxyl

(Only for Rough Work)

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the correct answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :

Q. 1 (A) ● (C) (D)
Q. 2 (A) (B) ● (D)
Q. 3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer Sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर—A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छाँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)
प्रश्न 2 (A) (B) ● (D)
प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।