Roll. No. .....

O.M.R. Serial No. | | | | | | | | |

Question Booklet Number

M.Sc. (SEM.-III) (NEP) (SUPPLE.)EXAMINATION, 2024-25

CHEMISTRY

(Bioinorganic, Bio-organic, Bio-Physical Chemistry)

Paper Code							
B	0	2	0	9	0	1	T

Question Booklet Series

A

Time : 1 : 30 Hours **Max. 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.
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 :

(Remaining instructions on last page)

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, उसे तुरन्त बदल लें।
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 उत्तर-पत्रक में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

(शेष निर्देश अन्तिम पृष्ठ पर)

1. When iron stores are exhausted from body the disease which occurs in human is :

(A) Renal failure

(B) Heart attack

(C) Anemia

(D) Eye disease

2. In place of Zn body may use :

(A) Fe

(B) Cu

(C) Mg

(D) Co

3. For sense of smell and taste which metal is responsible ?

(A) Ag

(B) Zn

(C) Cr

(D) Cu

4. Which state of chromium is Carcinogenic?

(A) 0

(B) +1

(C) +3

(D) +6

5. Which metal works as a catalyst for nitrogen fixing bacteria?

(A) Cr

(B) Zn

(C) Mo

(D) Mg

6. Hyponatremia is caused by low levels of which metal?

(A) Na

(B) K

(C) Zn

(D) Cu

7. Excess of which metal causes Wilson's disease?

(A) Zn

(B) Cu

(C) V

(D) Na

8. Which metal causes Minamata disease?

(A) Hg

(B) Cu

(C) Zn

(D) Al

9. Light harvesting complex is subunit of:

(A) Carbohydrate complex

(B) Fat complex

(C) Protein complex

(D) None of these

10. Red and yellow colour if fruits and flowers is due to :

(A) Carotenoids

(B) Alkaloids

(C) Terpens

(D) None of these

11. Calmodulin contains :

(A) Ca

(B) Si

(C) Both Ca and Si

(D) None of these

12. Which of the following metal helps to transmit nerve signals?

(A) Hydrogen

(B) Potassium

(C) Sodium

(D) Lithium

13. How much ATP does Sodium-Potassium pump consume?

(A) Three fourth

(B) One fourth

(C) One third

(D) Half

14. Which elements compounds are used for treating disorders?

(A) Nitrogen

(B) Lithium

(C) Sodium

(D) Potassium

15. Which of the following is not treated using higher levels of Potassium?

(A) Cold

(B) Hypokalemia

(C) Muscle contraction

(D) Respiratory paralysis

16. Can Potassium bicarbonate be used as an antacid?

(A) Yes

(B) No

(C) May be

(D) May not be

17. Which of the following metal readily reacts with skin moisture to form rubidium hydroxide?

(A) Lithium

(B) Rubidium

(C) Sodium

(D) Potassium

18. Potassium ions act as cofactors for certain enzymes such as :

(A) Pyruvate kinase

(B) Photosynthesis

(C) Proteins kinase

(D) None of these

19. Chlorophylls are soluble in :

(A) Organic solvents

(B) Inorganic solvents

(C) Organic solutes

(D) Inorganic solutes

20. A compound which is found in all living cells and play a key role in energy transformation is :

(A) ADP

(B) ATP

(C) Chlorophyll

(D) Granum

21. Photosynthesis is process in which inorganic compounds are reduced to organic compounds using :

(A) Heat energy

(B) Light energy

(C) Chemical energy

(D) Electrical energy

22. Summarized details of dark reactions are also known as :

(A) Daniel cycle

(B) Ernst cycle

(C) Calvin cycle

(D) Karl cycle

23. Rate of photosynthesis increase with the :

(A) Increase in hydrogen

(B) Increase in nitrogen

(C) Increase in CO_2

(D) Increase in O_2

24. In anaerobic respiration, Pyruvic acid is not oxidised completely and turns into:

(A) Ethane

(B) Methyl Alcohol

(C) Mathane

(D) Ethyl Alcohol

25. Cellular respiration is a/an..... process.

(A) Oxidation

(B) Reduction

(C) Redox

(D) None of these

26. ATP are consumed during :

(A) Glycolysis

(B) Kreb's cycle

(C) Light dependent phase

(D) None of these

27. From one Pyruvated passing through Kreb's cycle, how many NADH are formed?

(A) 1

(B) 2

(C) 3

(D) 4

28. Final acceptor of electrons in respiratory chains is :

(A) NADH

(B) Cytochrome a^3

(C) Water

(D) Oxygen

29. If enthalpy change for a reaction is zero the ΔG^o equals to :

(A) $-T\Delta S^o$

(B) $T\Delta S^o$

(C) $-\Delta H^o$

(D) ℓn K eq.

30. What is the heating value of 10 kg of coal with heat of combustion 10 J/Kg?

(A) –10J

(B) 10J

(C) –100J

(D) 100J

31. A nucleoside is composed of :

(A) A base + sugar

(B) A base + a phosphate

(C) A base + a sugar + phosphate

(D) None of these

32. Genetic mutation occurs in :

(A) Protein

(B) RNA

(C) DNA

(D) Nucleus

33. DNA is present in :

(A) Nucleus only

(B) Nucleus mitochondria and RER

(C) Nucleus mitochondria and Er

(D) Nucleus mitochondria and Chloroplast

34. DNA is genetic meterial in :

(A) Viruses, Prokaryote and Eukaryote

(B) Prokaryote and Eukaryote

(C) Only in Eukaryote

(D) In same viruses, Prokaryotes and eukaryotes

35. Chromatin is composed of :

(A) Nucleic acid and protein

(B) Nucleic acid only

(C) Proteins only

(D) None of these

36. Adjacent nucleotides are joined by :

(A) Covalent bond

(B) Phosphodiester bond

(C) Ionic bond

(D) Peptide bond

37. Function of nucleotide includes :

(A) Information storage and transmission

(B) Storage of chemical energy

(C) Cell signalling

(D) All of the above

38. Choose the best option :

(A) Protein has catalytic activity

(B) Proteins and RNA have catalytic activity

(C) Proteins, RNA and antibodies have catalytic activity

(D) Proteins, RNA antibodies and phospholipids have catalytic activity

39. The back bone of DNA is :

(A) Hydrophilic

(B) Hydrophobic

(C) Neutral

(D) Both (A) and (B)

40. Which is the most stable from of DNA under normal physiological conditions?

(A) A-DNA

(B) B-DNA

(C) Z-DNA

(D) H-DNA

41. RNA-DNA hybrides are :

(A) More stable than DNA-DNA hybrid

(B) More stable than RNA-RNA hybrid

(C) Less stable than RNA-RNA hybrid

(D) Less stable than RNA-RNA hybrid and DNA-DNA hybrid

42. Protein makes nearly :

(A) 40% of RBC dry content

(B) 10% of total content

(C) 80% of RBC dry content

(D) 96% of RBC dry content

43. With increase in H^+ ion concentration the binding of oxygen to haemoglobin:

(A) Decreases

(B) Increases

(C) Remains same

(D) None of these

44. In leguminous plants red colour inside the nodules is due to :

(A) Leghaemoglobin

(B) Myoglobin

(C) Hemocyanin

(D) Vasks complex

45. The structure of myoglobin is :

(A) Tetrahedral

(B) Octahedral

(C) Globular

(D) None of these

46. Myoglobin is :

(A) Blue protein

(B) Red protein

(C) Green protein

(D) None of these

47. Strongest antigens is :

(A) Rubredoxin

(B) Ferridoxin

(C) Hemocynin

(D) Hemercythrin

48. An oxyhemerythrin the oxidation state of Fe is :

(A) 0

(B) +1

(C) +2

(D) +3

49. Enzymes are :

(A) Carbohydrate

(B) RNA

(C) Proteins

(D) Fats

50. The term Enzymes is coined by :

(A) Pasteur

(B) Buchner

(C) Urey Miller

(D) Kuhne

51. The fastest enzyme is :

(A) Pepsin

(B) Carbonic unhydrase

(C) DNA gyrase

(D) DNA polymers

52. Catalysts are different from enzymes in :

(A) Functional at high temperature

(B) Not used up in reaction

(C) Being proteinaceous

(D) Having high rate diffusion

53. The enzymes involved in feedback inhibition are called :

(A) Allosteric enzymes

(B) Holoenzymes

(C) Apoenzymes

(D) Co-enzymes

54. Which of the following is not a catalytic strategy for an enzyme to perform specific reaction?

(A) Covalent catalysis

(B) Metal ion catalysis

(C) Michaelis constant

(D) Acid-Base catalysis

55. Who proposed "lock and key" model to study enzyme substrate interaction?

(A) Koshland

(B) Wilhelm Kuhne

(C) Fischer

(D) None of these

56. An inhibitor that changes the over all shape and chemistry of an enzyme is known as :

(A) Autosteric inhibitor

(B) Comptitive inhibitor

(C) Steric inhibitor

(D) Non comptitive inhibitor

57. Which one is not attribute of enzyme?

(A) Specific in nature

(B) Protein in chemistry

(C) Consumed in reaction

(D) Increase rate of reaction

58. The covalent catalysis is aided by one of the following method :

(A) General acid-base catalysis

(B) Specific acid-base catalysis

(C) Nucleophilic catalysis

(D) Substrate collision theory

59. Trypsin are active in :

(A) Acidic

(B) Alkaline

(C) Neutral

(D) None of these

60. Shape of active sites are determined by :

(A) Naturation of enzymes

(B) Specificity of enzymes

(C) Viscosity of enzymes

(D) Saturation of enzymes

61. The covalent bond formed during covalent catalysis is usually :

(A) A peptide bond

(B) A disulphide bond

(C) A phosphodiester bond

(D) An ester bond

62. Which of the following metal ion is commonly involved in the catalytic activity of ribonucleate?

(A) Ca^{++}

(B) Mg^{++}

(C) Na^{+}

(D) K^{+}

63. Chymotrypsin belongs to which class of enzymes?

(A) Oxidoreductases

(B) Transferases

(C) Hydrolases

(D) Lyases

64. Acid-Base catalysis can be influenced by changes in the :

(A) pH of the reaction medium

(B) Temperature of the reaction

(C) Concentration of the enzymes

(D) Size of substrate molecule

65. The term Apoenzyme is applicable to:

(A) Simple enzyme

(B) Protein part of conjugate enzyme

(C) Organic co-factor of a conjugate enzyme

(D) Lowest requirement of activation energy

66. The Coenzyme is :

(A) Often a metal

(B) Always a protein

(C) Often a vitamin

(D) Always a inorganic compound

67. Which of the following is produced with the combination of apoenzyme and coenzyme?

(A) Haloenzyme

(B) Enzyme substrate complex

(C) Prosthetic group

(D) Enzyme product complex

68. Zymogen or Proenzyme is a :

(A) Modulator

(B) Vitamin

(C) Enzyme precursor

(D) Hormone

69. Vitamin B12 functions as a coenzyme for enzymes involved in :

(A) Synthesis of DNA

(B) Breakdown of carbohydrates

(C) Methionine synthase

(D) Alpha-Amylase

70. Vitamin B12 acts as a cofactor for the enzyme called :

(A) Pyruvate dehydragenase

(B) Citrate synthase

(C) Production of ATP

(D) Metabolism of fatty acids

71. NAD^+ (Nicotinamide Adenine Dinucleotide) functions as a coenzyme in reaction involved in :

(A) Oxidation-reduction reactions

(B) Carboxylation reactions

(C) Phosphorylation reactions

(D) Acetylation reactions

72. NAD^+ reduced to NADH by accepting:

(A) An electron

(B) A proton

(C) A phosphate group

(D) A methyl group

73. FMN (Flavin Mononucleotide) and FAD (Flavin Adenine Dinucleotide) are coenzymes that contains :
(A) Ribose sugar
(B) Adenine base
(C) Flavin mononucleotide
(D) Flavin adenine phosphate

74. The oxidised form of FMN is called :
(A) $FMNH_2$
(B) $FADH_2$
(C) FMN^+
(D) FAD^+

75. NADH and $FADH_2$ generated during cellular respiration serve as electron carriers in :
(A) Glycolysis
(B) Citric acid cycle
(C) Electron trasport chain
(D) Photosynthesis

76. Which of the following is not a coenzyme?
(A) NAD^+
(B) ATP
(C) Coenzyme A
(D) FAD

77. Cofactors can be divided into two major groups : Metal ions and .....
(A) Coenzymes
(B) Inhibitors
(C) Substrates
(D) Activators

78. Which of the following is not a requirement for protein synthesis?
(A) Ribosomes
(B) Peptidyl transfrase
(C) Spliceosome
(D) Amino acetyl tRNA synthetase

79. The amino acids are assembled into polypeptide chains on :
(A) m-RNA
(B) Nucleus
(C) Ribosome
(D) DNA template

80. Fat is hydrolysed by the enzyme known as :
(A) Trypsin
(B) Lipase
(C) Pepsin
(D) Amylase

81. Enzyme :
(A) do not require activation energy
(B) do not change requirement of a activation enzyme
(C) Increase requirement of activation energy
(D) Lowest requirement of activation energy

82. Enzymes are basically made up of :
(A) Fats
(B) Proteins
(C) Nucleic acids
(D) Vitamins

83. Breaking of terminal phosphate of ATP releases about ..... K cal energy.
(A) 6.1
(B) 6.3
(C) 7.1
(D) 7.3

84. ATP are consumed during :
(A) Glycolysis
(B) Kreb's cycle
(C) Light dependent phase
(D) None of these

85. From one pyruvated passing through Kreb's cycle, how many NADH are formed?
(A) 1
(B) 2
(C) 3
(D) 4

86. Final acceptor of electrons in respiratory chain is :
(A) NADH
(B) Cytochrome
(C) Water
(D) Oxygen

87. Unfolding of regular secondry protein structure causes :
(A) Large decrease in the entropy of the protein
(B) Little increase in the entropy of the protein
(C) No change in the entropy of protein
(D) Large increase in the entropy of protein

88. Exergonic reaction in bioenergetics:
(A) Require energy input
(B) Release energy
(C) Convert energy input
(D) Convert energy from work to heat

89. The coupling of exergonic and endergonic reactions in bioenergetics is mediated by :
(A) Enzymes
(B) Coenzymes
(C) ATP
(D) Water molecules

90. In biopolymers solutions, entropy is typically related to :
(A) Polymer chain flexibility
(B) Polymer chain rigidity
(C) Polymer chain length
(D) Polymer chain branching

91. Osmotic pressure is a measure of :
(A) The concentration of solute molecules in a solution
(B) The rate of diffusion of solute molecules
(C) The pressure required to stop Osmosis
(D) The temperature of the solutions

92. In the context of bipolymer solutions Osmotic pressure is influenced by :
(A) Polymer chain length
(B) Polymer concentration
(C) Solvent properties
(D) All of the above

93. The Osmotic pressure of a biopolymer solution can be used to determine :
(A) The molar mass of the biopolymer
(B) The molecular structure of the biopolymer
(C) The degree of polymerization of biopolymer
(D) The solubility of biopolymer

94. Osmotic pressure is important parameter in studing :
(A) Protein folding
(B) Polymerization reactions
(C) Membrane transport
(D) Enzyme kinetics

95. The driving force for biopolymer transport across a membrane is typically :
(A) Thermal energy
(B) Osmotic pressure
(C) Concentration gradient
(D) Hydrostatic pressure

96. The rate of biopolymer diffusion across the membrane is influenced by:
(A) Temperature
(B) Membrane viscosity
(C) Molecular weight of biopolymer
(D) All of the above

97. Membrane equilibrium in biopolymer solutions can be disrupted by :
(A) Temperature change
(B) pH change
(C) Alterations in ionic strength
(D) All of the above

98. Mechaho chemical systems are useful in :
(A) Modification of biopolymer properties
(B) Biopolymer synthesis
(C) Biopolymer degradation
(D) All of the above

99. The energy input in mechaho chemical systems in biopolymer solutions primarily comes from :
(A) Thermal energy
(B) Mechanical energy
(C) Chemical energy
(D) Electrochemical energy

100. Acid-Base catalysis is an example of :
(A) Covalent catalysis
(B) Metal ion catalysis
(C) Electrostatic catalysis
(D) None of these

Rough Work

Example :

Question :

Q.1 Ⓐ ● Ⓒ Ⓓ

Q.2 Ⓐ Ⓑ ● Ⓓ

Q.3 Ⓐ ● Ⓒ Ⓓ

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 & 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.

उदाहरण :

प्रश्न :

प्रश्न 1 Ⓐ ● Ⓒ Ⓓ

प्रश्न 2 Ⓐ Ⓑ ● Ⓓ

प्रश्न 3 Ⓐ ● Ⓒ Ⓓ

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।

6. सभी उत्तर केवल ओ०एम०आर० 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. ओ०एम०आर० 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 में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।

11. परीक्षा-कक्ष में लॉग-बुक, कैल्कुलेटर, 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।

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