Roll No. .....

Question Booklet Number

O. M. R. Serial No.

M. Sc. (Industrial Chemistry) (Fourth Semester)

EXAMINATION, July, 2022

CHEMISTRY OF LIFE

Paper Code			
MSIC	4	0	3

Questions Booklet Series
C

Time : 1:30 Hours] [*Maximum Marks : 100*

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 any 75 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 75 questions are attempted by student, then the first attempted 75 questions will be considered for evaluation. 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 किन्हीं 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 75 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 75 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा। 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. An enzyme that joins the ends of two strands of nucleic acid is :

(A) Polymerase

(B) Synthetase

(C) Transferase

(D) Ligase

2. Diastase takes part in digestion of .....

(A) Starch

(B) Protein

(C) Fat

(D) Amino acids

3. Enzyme catalysing rearrangement of functional groups or atomic grouping without altering molecular weight or number of atom is :

(A) Oxidoreductase

(B) Ligase

(C) Isomerase

(D) Hydrolase

4. Enzyme activity is highest when the substrate concentration is :

(A) Small

(B) High

(C) Unlimited

(D) All of the above

5. If the enzymeg amount is kept constant and the substrate is then gradually ....., the reaction will increase until it reaches a maximum.

(A) decreased

(B) increased

(C) kept constant

(D) None of the above

6. The rate determining step of Michaelis-Menten kinetics is .....

(A) The complex formation step

(B) Complex dissociation step to produce products

(C) Product formation step

(D) All of the above

7. The molecule which acts directly on an enzyme to lower its catalytic rate is .....

(A) Modulator

(B) Inhibitor

(C) Accelerator

(D) None of the above

8. The inhibitor molecule structurally and chemically similar to the substrate is .....

(A) non-competitive inhibitor

(B) competitive inhibitor

(C) Both (A) and (B)

(D) None of the above

9. The catalytic efficiency of two distinct enzymes can be compared based on which of following factors ?

(A) Size of the enzyme

(B) K_m

(C) pH of optimum value

(D) Product formation

10. Types of inhibition pattern based on Michaelis-Menten equation are :

(A) Competitive

(B) Non-competitive

(C) Reversible

(D) All of the above

11. Which of the following steps is assumed to be the slowest step in the Michaelis-Menten equation ?

(A) The substrate consuming step

(B) Formation of enzyme substrate complex

(C) The product releasing step

(D) None of the above

12. Lock and key theory is based on the compatibility of :

(A) enzyme and product

(B) enzyme and substrate

(C) enzyme substrate complex and product

(D) enzyme and enzyme substrate complex

13. Treatment of influenza via the neuro-aminidase inhibitor (Relenza) is an example of :

(A) Competitive inhibitor

(B) Non-competitive inhibitor

(C) Reversible enzyme inhibitor

(D) Irreversible enzyme inhibitor

14. Irreversible enzyme inhibitors bind ..... to the enzyme, thus they dissociate very closely from the enzyme.

(A) losely

(B) tightly

(C) normally

(D) All of the above

15. Nucleosides contain :

(A) base-phosphate

(B) base-sugar

(C) sugar-phosphate

(D) base-sugar phosphate

16. The sugar molecule present in nucleotide is :

(A) hexose

(B) pentose

(C) tetrose

(D) glucose

17. Purine base found in RNA is :

(A) Thymine

(B) Uracil

(C) Guanine

(D) Cytocine

18. What is the composition of nucleotide ?

(A) base-sugar

(B) base-phosphate

(C) base-sugar-phosphate

(D) sugar-phosphate

19. Group of adjacent nucleotides are joined at ..... position.

(A) 3, 5

(B) 1, 4

(C) 2, 4

(D) 2, 3

20. Which of the following base contains two keto groups ?

(A) adenine

(B) thymine

(C) gaunine

(D) cytocine

21. Michaelis constant K_m is the substrate concentration at which rate of reaction is ..... the maximal velocity attainable at a particular concentration of enzyme.

(A) equal

(B) half

(C) double

(D) triple

22. Identify the complementary strand of the DNA primary structure ATGCCGATC :

(A) AUGCCGUAC

(B) UACGGCUAG

(C) TACGGCTAG

(D) GATCGGCAT

23. Which part of the nucleotide is responsible for the formation of bonds in DNA double helix ?

(A) base

(B) sugar

(C) phosphate group

(D) –OH group

24. The number of hydrogen bond present between cytocine and guanine are :

(A) five

(B) four

(C) three

(D) two

25. The backbone sugar of DNA is :

(A) ribose

(B) deoxyribose

(C) fructose

(D) oxyribose

26. Nucleic acids combine with which biomolecule ?

(A) Carbohydrates

(B) Lipids

(C) Proteins

(D) Amino acids

27. Which of the following is pyramidine nucleotide ?

(A) Uracil

(B) Cytocine

(C) Thymine

(D) All of the above

28. Phosphate group is attached to which carbon of sugar molecule ?

(A) C-5

(B) C-4

(C) C-3

(D) C-1

29. Which ratio is constant for DNA ?

(A) A + U/G + C

(B) A + G/T + C

(C) A + T/G = C

(D) A = C/U + G

30. ATP is a :

(A) nucleic acid

(B) vitamin

(C) nucleotide

(D) nucleoside

31. An increase melting temperature for a ds-DNA may be due to high content of :

(A) A + G

(B) A + T

(C) G + C

(D) None of the above

32. Which of the following does not yield on hydrolysis of RNA ?

(A) pentose sugar

(B) nitrogen base

(C) amino acid

(D) phosphoric acid

33. Identify the purine base of nucleic acids in the following :

(A) adenine

(B) uracil

(C) thymine

(D) cytocine

34. Which among the following bonds stabilizes the DNA double strand structure ?

(A) phosphodiester

(B) H-bond

(C) peptide

(D) oxo-linkage of sugar

35. ..... is a spherical vesicle having at least one lipid bilayer.

(A) Liposomes

(B) Micelles

(C) Both (A) and (B)

(D) None of the above

36. Only the ends or edges of bilayer sheet are exposed to :

(A) an unfavourable environment

(B) favourable environment

(C) favourable and unfavourable environment

(D) All of the above

37. ..... is the surface active agent and help in emulsification of fat.

(A) Lecithin

(B) Cephalin

(C) Phosphatidyl inositol

(D) All of the above

38. Sphingolipids or Shingophospholipids are derivatives of :

(A) Phophatidyl glycerol

(B) Cardiolipin

(C) Sphingosine

(D) None of the above

39. Fatty acids are linked to ..... before they are oxidised in lipid metabolism.

(A) enzyme

(B) cofactor

(C) coenzyme-A

(D) All of the above

40. The activation reaction of fatty acid occurs on the :

(A) Mitochondrial membrane

(B) Cell membrane

(C) Nuclear membrane

(D) Golgi complex

41. Oxidation of fatty acid produces large quantity of :

(A) ADP (Adenosine diphosphate)

(B) Adensosine triphosphate (ATP)

(C) Adenosine monophosphate (AMP)

(D) None of the above

42. In which part of the cell the enzymes for β -oxidation is present ?

(A) Golgi apparatus

(B) Nucleus

(C) Cytosol

(D) Mitochondria

43. Which one the following is an essential fatty acid ?

(A) Linolenic acid

(B) Palmitic acid

(C) Linoleic acid

(D) Both (A) and (B)

44. Which of the following undergoes β-oxidation ?

(A) Saturated fatty acids

(B) Monounsaturated fatty acids

(C) Polyunsaturated fatty acids

(D) All of the above

45. The long-chain fatty acids get transported through the inner mitochondrial membrane :

(A) freely

(B) as cornitine derivative

(C) as acyl-CoA derivative

(D) require sodium-dependent carrier

46. Which of the following product is released in α-oxidation of fatty acids ?

(A) CoA

(B) H_2O

(C) CO_2

(D) Acetyl CoA

47. Which of the following factors is not responsible for the denaturation of proteins ?

(A) pH change

(B) Heat

(C) Charge

(D) Organic solvents

48. What type of bond is present between the amino acid ?

(A) Acidic bond

(B) Ionic bond

(C) Peptide bond

(D) Coordinate bond

49. Which of the following cell organelles is involved in the process of protein synthesis ?

(A) Vesicles

(B) Mitochondria

(C) Ribosomes

(D) Vacuoles

50. Which of the following is false about fibrous proteins ?

(A) Keratin and collagen are the best examples.

(B) It is in rod or wire like shape.

(C) Hemoglobin is the best example.

(D) It provides structural support for cells and tissues.

51. Smooth endoplasmic reticulum :

(A) actively participate in protein synthesis

(B) does not actively participate in protein synthesis

(C) participate in protein and lipid synthesis

(D) does not participate in lipid and protein synthesis

52. Which one of the following is formed when cell feeds on the intracellular organelles such as mitochondria ?

(A) Autophagie vacuoles

(B) Residual bodies

(C) Secondary lysosomes

(D) All of the above

53. Which one is the fundamental and structural unit of all living organisms ?

(A) tissue

(B) organs

(C) cell

(D) organ system

54. ..... are directly involved in normal growth, development and reproduction of living organism.

(A) Secondary metabolites

(B) Primary metabolites

(C) Both (A) and (B)

(D) None of the above

55. Cell biology is the .....

(A) Study of metaphase of a cell

(B) Study of cell division only

(C) Study of cancereous cell

(D) Study of cell structure and functions

56. Which of the following is known as power house of the cell ?

(A) Cytoplasm

(B) Lysosome

(C) Mitochondria

(D) Nuclei

57. Which of the following is known as the suicide bag of a cell ?

(A) Golgi complex

(B) Lysosome

(C) Endoplasmic reticulum

(D) Ribosome

58. Which of the following cell organelle is responsible for transporting modifying and packaging proteins and lipids ?

(A) Endoplasmic reticulum

(B) Golgi complex

(C) Ribosome

(D) Basal granules

59. ..... is a semi-rigid, laminated, external and non-living covering of cell.

(A) Plasma membrane

(B) Cell wall

(C) Cytoplasm

(D) Nucleoplasm

60. Membrane of endoplasmic reticulum is rough due to :

(A) absence of ribosomes

(B) presence of ribosomes

(C) Both (A) and (B)

(D) None of the above

61. Smooth endoplasmic reticulum is found in :

(A) Liver cells

(B) Pancreatic cells

(C) Adipose cells

(D) Plasma cells

62. Glyoxysome present in plant cells contains enzymes for :

(A) Fatty acid metabolism

(B) Glyconeogenesis

(C) Both (A) and (B)

(D) None of the above

63. The actual respiratory organs of the cells where the food stuffs i. e. carbohydrates and fats are completely oxidised into CO_2 and H_2O is :

(A) Golgi bodies

(B) Mitochondria

(C) Vacuoles

(D) Ribosomes

64. ..... ribosomes occur in eukaryotic cells of plants and animals.

(A) 80S

(B) 70S

(C) 65S

(D) 90S

65. Nuclear membrane is :

(A) bounded by 2 membranes of lipoprotein

(B) bounded by 2 membranes of lipid only

(C) bounded by 2 membranes of carbohydrate

(D) bounded by 2 membranes of lipid and protein

66. Space between nuclear envelope and nuclear membrane is filled by :

(A) Cytoplasm

(B) Cytoplasmic matrix

(C) Nucleoplasm

(D) Nucleolus

67. The proteins which take basic strain are :

(A) Nucleoprotamines and Nucleohistones

(B) Histones with rich lysine

(C) Histone with rich arginine

(D) Non-histone protein

68. Basic unit of protein is :

(A) Peptides

(B) Amino acids

(C) Enzymes

(D) All of the above

69. Which one of the following on hydrolysis yield non-proteineous substances and amino acid ?

(A) Conjugated protein

(B) Derived protein

(C) Simple protein

(D) Secondary protein

70. Denatured proteins are :

(A) Insoluble proteins formed by action of heat on protein

(B) Soluble proteins formed by action of a heat on protein

(C) Soluble proteins formed by action of chemicals on protein

(D) Insoluble proteins formed by action of heat and chemicals on protein

71. Which one of the following is the linear condensation product of neutral amino acid ?

(A) Globular protein

(B) Fibrous protein

(C) Intermediate protein

(D) None of the above

72. Serum albumin comes under the category of :

(A) Storage protein

(B) Contractite protein

(C) Transport protein

(D) Respiratory protein

73. The α-helix secondary structure of protein is stabilized by :

(A) Intermolecular Hydrogen bonding

(B) Intramolecular Hydrogen bonding

(C) Inter and intramolecular Hydrogen bonding

(D) Covalent bonding

74. Myoglobin carries ..... in muscles.

(A) water

(B) carbon dioxide

(C) oxygen

(D) All of the above

75. Bonds responsible for the 3-dimensional structure of proteins are :

(A) Hydrogen, ionic and hydrophobic

(B) Hydrogen bond only

(C) Hydrogen and ionic

(D) Hydrogen and hydrophobic

76. Hydrophobic interaction generally contribute to the :

(A) folding and shaping of a protein

(B) defolding and shaping of a protein

(C) folding and non-shaping of a protein

(D) defolding and non-shaping of a protein

77. Heamoglobin has :

(A) Secondary structure of protein

(B) Tertiary structure of protein

(C) Quaternary structure of protein

(D) Both Secondary structure and tertiary structure

78. Which one of the following is responsible for metabolism of carbohydrate ?

(A) Insulin

(B) Myoglobin

(C) Hormones

(D) Fats

79. 1-fluoro-2, 4-dinitrobenzene (FDNB) is used for amino-end degradation in :

(A) Edman's method

(B) Dansyl method

(C) Sanger's method

(D) Enzymatic method

80. Which one of the following is used amino-end degradation in Dansyl method ?

(A) 1-dimethylamino naphthalene-5-sulphonyl chloride

(B) 1-fluoro-2, 4-dinitrobenzene

(C) Phenyl isothiocyanate

(D) Lithium aluminium hydrie

81. Leucine amino peptidase enzyme attacks proteins only at :

(A) the end which contains free amino group

(B) the end which contains free carboxyl group

(C) the end which contain free amino group or carboxyl group

(D) the middle of the protein

82. In hydrazinolysis the peptide or protein is heated with :

(A) anhydrous hydrazine

(B) hydrous hydrazine

(C) Both (A) and (B)

(D) Aminoacid hydrazides

83. Pepsin attacks peptides having :

(A) NH part of leucine, aspartic acid and CO part of glysine, arginine

(B) CO part of leucine, aspartic acid and NH part of glycine, arginine

(C) Both (A) and (B)

(D) None of the above

84. Cyanogen bromide in aqueous formic acid attacks only those peptides in which :

(A) CO group of methionine residues

(B) CO group of non-methionine residue

(C) NH group of methionine residue

(D) NH group of non-methionine residue

85. Saponifiable lipids are hydrolysed by :

(A) heat, alkali or acid solution

(B) only by heat

(C) heat and alkali solution

(D) heat and acid solution

86. The proteins help to protect from any diseases in the body is :

(A) Enzymes

(B) Storage proteins

(C) Transport proteins

(D) Antibodies

87. Which protein is called transport protein ?

(A) Haemoglobin

(B) Keratin

(C) Enzymes

(D) Oval bumin

88. In hair which protein is found ?

(A) Myosin

(B) Elastin

(C) Keratin

(D) Tropocollage

89. Disulphide bonds are formed between :

(A) Cysteine residues that are close together.

(B) Histidine residue that are close together.

(C) Protein residue that are close together.

(D) Phenylalanine residue that are close together.

90. Primary structure of protein represents :

(A) Linear sequence of amino acids joined by peptide bond

(B) 3-dimensional structure of protein

(C) Helical structure of protein

(D) Subunit structure of protein

91. The structure in which all peptide chains are stritched out to full extension and laid side by through intermolecular hydrogen bond is called :

(A) Tertiary structure

(B) β -pleated sheet

(C) Quaternary structure

(D) α -helix

92. Fibrous and globular proteins are classified on the basis of :

(A) Primary structure

(B) Tertiary structure

(C) Secondary structure

(D) Quaternary structure

93. ..... perform external protective function.

(A) Waxes

(B) Alcohols

(C) Phosphoglycerides

(D) All of the above

94. The action of certain ..... is mediated through phosphatidyl inositol.

(A) enzymes

(B) hormones

(C) proteins

(D) carbohydrate

95. Which one of the following is responsible for deterioration of food (rancidity) as well as for damage to tissues ?

(A) Oxidation of lipid exposed to oxygen

(B) Peroxidation of lipid exposed to oxygen

(C) Peroxidation of lipid exposed to CO_2

(D) Oxidation of lipid exposed to CO_2

96. Basic structure in biological membrane consists of :

(A) bilayer of amphiphatic lipid

(B) single layer of amphiphatic lipid

(C) bilayer of protein

(D) a layer of carbohydrate

97. ..... enzyme catlayze oxidation-reduction reaction where electron(s) is/ are transferred.

(A) Transferase

(B) Oxidoreduatase

(C) Hydrolase

(D) Isomerase

98. Pepsin hydrolyzes ..... in proteins.

(A) Hydrogen bonds

(B) Peptide bonds

(C) Sulphide bonds

(D) Carbon-carbon double bond (C = C)

99. The nature of enzyme is :

(A) Vitamin

(B) Lipid

(C) Carbohydrate

(D) Protein

100. The statement about enzymes is true :

(A) enzymes increases reactions by lowering the activation energy.

(B) enzymes do not alter the overall change in free energy for a reaction

(C) enzymes are protein whose three-dimensional structure is key to their function.

(D) All of the above

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the most correct/appropriate 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 ny 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 एक सबसे सही अथवा सबसे उपयुक्त 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।