

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

D

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. Nucleic acids combine with which biomolecule ?
 - (A) Carbohydrates
 - (B) Lipids
 - (C) Proteins
 - (D) Amino acids
2. Which of the following is pyrimidine nucleotide ?
 - (A) Uracil
 - (B) Cytocine
 - (C) Thymine
 - (D) All of the above
3. Phosphate group is attached to which carbon of sugar molecule ?
 - (A) C-5
 - (B) C-4
 - (C) C-3
 - (D) C-1
4. Which ratio is constant for DNA ?
 - (A) $A + U/G + C$
 - (B) $A + G/T + C$
 - (C) $A + T/G = C$
 - (D) $A = C/U + G$
5. ATP is a :
 - (A) nucleic acid
 - (B) vitamin
 - (C) nucleotide
 - (D) nucleoside
6. 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
7. Which of the following does not yield on hydrolysis of RNA ?
 - (A) pentose sugar
 - (B) nitrogen base
 - (C) amino acid
 - (D) phosphoric acid
8. Identify the purine base of nucleic acids in the following :
 - (A) adenine
 - (B) uracil
 - (C) thymine
 - (D) cytocine

9. Which among the following bonds stabilizes the DNA double strand structure ?
 - (A) phosphodiester
 - (B) H-bond
 - (C) peptide
 - (D) oxo-linkage of sugar
10. is a spherical vesicle having at least one lipid bilayer.
 - (A) Liposomes
 - (B) Micelles
 - (C) Both (A) and (B)
 - (D) None of the above
11. 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
12. is the surface active agent and help in emulsification of fat.
 - (A) Lecithin
 - (B) Cephalin
 - (C) Phosphatidyl inositol
 - (D) All of the above
13. Sphingolipids or Shingophospholipids are derivatives of :
 - (A) Phosphatidyl glycerol
 - (B) Cardiolipin
 - (C) Sphingosine
 - (D) None of the above
14. Fatty acids are linked to before they are oxidised in lipid metabolism.
 - (A) enzyme
 - (B) cofactor
 - (C) coenzyme-A
 - (D) All of the above
15. The activation reaction of fatty acid occurs on the :
 - (A) Mitochondrial membrane
 - (B) Cell membrane
 - (C) Nuclear membrane
 - (D) Golgi complex
16. Oxidation of fatty acid produces large quantity of :
 - (A) ADP (Adenosine diphosphate)
 - (B) Adenosine triphosphate (ATP)
 - (C) Adenosine monophosphate (AMP)
 - (D) None of the above
17. In which part of the cell the enzymes for β -oxidation is present ?
 - (A) Golgi apparatus
 - (B) Nucleus
 - (C) Cytosol
 - (D) Mitochondria

18. Which one the following is an essential fatty acid ?
- (A) Linolenic acid
 - (B) Palmitic acid
 - (C) Linoleic acid
 - (D) Both (A) and (B)
19. Which of the following undergoes β -oxidation ?
- (A) Saturated fatty acids
 - (B) Monounsaturated fatty acids
 - (C) Polyunsaturated fatty acids
 - (D) All of the above
20. The long-chain fatty acids get transported through the inner mitochondrial membrane :
- (A) freely
 - (B) as carnitine derivative
 - (C) as acyl-CoA derivative
 - (D) require sodium-dependent carrier
21. Which of the following product is released in α -oxidation of fatty acids ?
- (A) CoA
 - (B) H_2O
 - (C) CO_2
 - (D) Acetyl CoA
22. Which of the following factors is not responsible for the denaturation of proteins ?
- (A) pH change
 - (B) Heat
 - (C) Charge
 - (D) Organic solvents
23. What type of bond is present between the amino acid ?
- (A) Acidic bond
 - (B) Ionic bond
 - (C) Peptide bond
 - (D) Coordinate bond
24. Which of the following cell organelles is involved in the process of protein synthesis ?
- (A) Vesicles
 - (B) Mitochondria
 - (C) Ribosomes
 - (D) Vacuoles
25. 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.

26. 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
27. Which one of the following is formed when cell feeds on the intracellular organelles such as mitochondria ?
- (A) Autophagic vacuoles
 - (B) Residual bodies
 - (C) Secondary lysosomes
 - (D) All of the above
28. Which one is the fundamental and structural unit of all living organisms ?
- (A) tissue
 - (B) organs
 - (C) cell
 - (D) organ system
29. 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
30. Cell biology is the
- (A) Study of metaphase of a cell
 - (B) Study of cell division only
 - (C) Study of cancerous cell
 - (D) Study of cell structure and functions
31. Which of the following is known as power house of the cell ?
- (A) Cytoplasm
 - (B) Lysosome
 - (C) Mitochondria
 - (D) Nuclei
32. Which of the following is known as the suicide bag of a cell ?
- (A) Golgi complex
 - (B) Lysosome
 - (C) Endoplasmic reticulum
 - (D) Ribosome

33. 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
34. is a semi-rigid, laminated, external and non-living covering of cell.
- (A) Plasma membrane
 - (B) Cell wall
 - (C) Cytoplasm
 - (D) Nucleoplasm
35. 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
36. Smooth endoplasmic reticulum is found in :
- (A) Liver cells
 - (B) Pancreatic cells
 - (C) Adipose cells
 - (D) Plasma cells
37. Glyoxysome present in plant cells contains enzymes for :
- (A) Fatty acid metabolism
 - (B) Glyconeogenesis
 - (C) Both (A) and (B)
 - (D) None of the above
38. 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
39. ribosomes occur in eukaryotic cells of plants and animals.
- (A) 80S
 - (B) 70S
 - (C) 65S
 - (D) 90S
40. 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

41. Space between nuclear envelope and nuclear membrane is filled by :
- (A) Cytoplasm
 - (B) Cytoplasmic matrix
 - (C) Nucleoplasm
 - (D) Nucleolus
42. 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
43. Basic unit of protein is :
- (A) Peptides
 - (B) Amino acids
 - (C) Enzymes
 - (D) All of the above
44. 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
45. 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
46. 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
47. Serum albumin comes under the category of :
- (A) Storage protein
 - (B) Contractite protein
 - (C) Transport protein
 - (D) Respiratory protein

48. 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
49. Myoglobin carries in muscles.
- (A) water
 - (B) carbon dioxide
 - (C) oxygen
 - (D) All of the above
50. 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
51. 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
52. Hemoglobin has :
- (A) Secondary structure of protein
 - (B) Tertiary structure of protein
 - (C) Quaternary structure of protein
 - (D) Both Secondary structure and tertiary structure
53. Which one of the following is responsible for metabolism of carbohydrate ?
- (A) Insulin
 - (B) Myoglobin
 - (C) Hormones
 - (D) Fats
54. 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

55. 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 hydride
56. 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
57. In hydrazinolysis the peptide or protein is heated with :
- (A) anhydrous hydrazine
 - (B) hydrous hydrazine
 - (C) Both (A) and (B)
 - (D) Aminoacid hydrazides
58. Pepsin attacks peptides having :
- (A) NH part of leucine, aspartic acid and CO part of glycine, arginine
 - (B) CO part of leucine, aspartic acid and NH part of glycine, arginine
 - (C) Both (A) and (B)
 - (D) None of the above
59. 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
60. 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
61. The proteins help to protect from any diseases in the body is :
- (A) Enzymes
 - (B) Storage proteins
 - (C) Transport proteins
 - (D) Antibodies

62. Which protein is called transport protein ?
- (A) Haemoglobin
 - (B) Keratin
 - (C) Enzymes
 - (D) Ovalbumin
63. In hair which protein is found ?
- (A) Myosin
 - (B) Elastin
 - (C) Keratin
 - (D) Tropocollagen
64. 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.
65. 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
66. The structure in which all peptide chains are stretched out to full extension and laid side by side through intermolecular hydrogen bond is called :
- (A) Tertiary structure
 - (B) β -pleated sheet
 - (C) Quaternary structure
 - (D) α -helix
67. Fibrous and globular proteins are classified on the basis of :
- (A) Primary structure
 - (B) Tertiary structure
 - (C) Secondary structure
 - (D) Quaternary structure
68. perform external protective function.
- (A) Waxes
 - (B) Alcohols
 - (C) Phosphoglycerides
 - (D) All of the above

69. The action of certain is mediated through phosphatidyl inositol.
- (A) enzymes
 - (B) hormones
 - (C) proteins
 - (D) carbohydrate
70. 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 CO₂
 - (D) Oxidation of lipid exposed to CO₂
71. 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
72. enzyme catalyze oxidation-reduction reaction where electron(s) is/are transferred.
- (A) Transferase
 - (B) Oxidoreduatase
 - (C) Hydrolase
 - (D) Isomerase
73. Pepsin hydrolyzes in proteins.
- (A) Hydrogen bonds
 - (B) Peptide bonds
 - (C) Sulphide bonds
 - (D) Carbon-carbon double bond (C = C)
74. The nature of enzyme is :
- (A) Vitamin
 - (B) Lipid
 - (C) Carbohydrate
 - (D) Protein
75. 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

76. An enzyme that joins the ends of two strands of nucleic acid is :
- (A) Polymerase
 - (B) Synthetase
 - (C) Transferase
 - (D) Ligase
77. Diastase takes part in digestion of
- (A) Starch
 - (B) Protein
 - (C) Fat
 - (D) Amino acids
78. 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
79. Enzyme activity is highest when the substrate concentration is :
- (A) Small
 - (B) High
 - (C) Unlimited
 - (D) All of the above
80. If the enzyme 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
81. 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
82. 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
83. 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

84. 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
85. Types of inhibition pattern based on Michaelis-Menten equation are :
- (A) Competitive
 - (B) Non-competitive
 - (C) Reversible
 - (D) All of the above
86. 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
87. 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
88. 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
89. Irreversible enzyme inhibitors bind to the enzyme, thus they dissociate very closely from the enzyme.
- (A) loosely
 - (B) tightly
 - (C) normally
 - (D) All of the above
90. Nucleosides contain :
- (A) base-phosphate
 - (B) base-sugar
 - (C) sugar-phosphate
 - (D) base-sugar phosphate
91. The sugar molecule present in nucleotide is :
- (A) hexose
 - (B) pentose
 - (C) tetrose
 - (D) glucose

92. Purine base found in RNA is :
- Thymine
 - Uracil
 - Guanine
 - Cytocine
93. What is the composition of nucleotide ?
- base-sugar
 - base-phosphate
 - base-sugar-phosphate
 - sugar-phosphate
94. Group of adjacent nucleotides are joined at position.
- 3, 5
 - 1, 4
 - 2, 4
 - 2, 3
95. Which of the following base contains two keto groups ?
- adenine
 - thymine
 - gaunine
 - cytocine
96. Michaelis constant K_m is the substrate concentration at which rate of reaction is the maximal velocity attainable at a particular concentration of enzyme.
- equal
 - half
 - double
 - triple
97. Identify the complementary strand of the DNA primary structure ATGCCGATC :
- AUGCCGUAC
 - UACGGCUAG
 - TACGGCTAG
 - GATCGGCAT
98. Which part of the nucleotide is responsible for the formation of bonds in DNA double helix ?
- base
 - sugar
 - phosphate group
 - OH group
99. The number of hydrogen bond present between cytocine and guanine are :
- five
 - four
 - three
 - two
100. The backbone sugar of DNA is :
- ribose
 - deoxyribose
 - fructose
 - oxyribose

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) ☒ (B) (C) (D)

Q. 2 (A) (B) ☒ (C) (D)

Q. 3 (A) ☒ (B) (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 एक सबसे सही अथवा सबसे उपयुक्त उत्तर छोटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ☒ (B) (C) (D)

प्रश्न 2 (A) (B) ☒ (C) (D)

प्रश्न 3 (A) ☒ (B) (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।