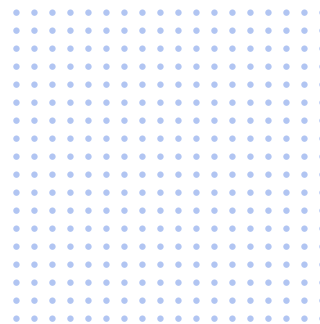




FOR KUET EXAM PREPARATION

KUET 2024

Question Paper · M.Sc. Biochemistry

EXAM
KUET

YEAR
2024

TYPE
Question Paper

SUBJECT
M.Sc. Biochemistry

Sr. No. **401**

ENTRANCE TEST-2024

SCHOOL OF BIOLOGICAL SCIENCES

BIOCHEMISTRY

Total Questions : 60
Time Allowed : 70 Minutes

Question Booklet Series

A

Roll No. :

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Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be '**Negative Marking**' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

SP-4494-A

1

[Turn over

SEAL

- From the following molecules which one is having least bond angle ?
 (A) NH_3
 (B) PH_3
 (C) CH_4
 (D) H_2O
- Which among the following molecules is more acidic ?
 (A) Ortho-nitrophenol
 (B) Para-nitrophenol
 (C) Phenol
 (D) None of the above
- Linking two cysteine molecules through a disulphide bond forms Cystine. This type of bond/link is called as the :
 (A) Covalent bond
 (B) Ionic interaction
 (C) Hydrophobic interaction
 (D) van der Waals force
- Epimers are those isomers of sugars where two structures/molecules differ in configuration with respect to one $-\text{OH}$ group around a chiral carbon, thereby D-Glucose has _____ Epimers.
 (A) 2
 (B) 4
 (C) 8
 (D) 16
- A gas is allowed to expand isothermally and reversibly from 20 m^3 to 40 m^3 at 27°C and the work obtained is 9.508 kJ , the number of moles of such a gas may be :
 (A) 2.75
 (B) 3.45
 (C) 5.5
 (D) 11.0
- Which among the following represents the correct order of units for ΔH° , ΔS° and ΔG° respectively ?
 (A) Joule/mole, Joule/sec/K, Joule/mole
 (B) Joule/K, Joule/K/mole, Joule/mole
 (C) Joule/mole, Joule/mole, Joule/K
 (D) Joule/mole, Joule/mole/K, Joule/mole
- Considering the following electrolytic cell;
 $\text{Zn(s)} | \text{ZnSO}_4(\text{aq}) || \text{CuSO}_4(\text{aq}) | \text{Cu(s)}$.
 The correct representation of the Nernst equation/s for this cell can be :
 (A) $E_{\text{cell}} = E_{\text{cell}}^\circ - 2.303 \text{ RT/nF} \log[\text{Zn}^{+2}(\text{aq})]/[\text{Cu}^{+2}(\text{aq})]$
 (B) $E_{\text{cell}} = E_{\text{cell}}^\circ + 2.303 \text{ RT/nF} \log[\text{Cu}^{+2}(\text{aq})]/[\text{Zn}^{+2}(\text{aq})]$
 (C) Both (A) & (B)
 (D) $E_{\text{cell}} = E_{\text{cell}}^\circ + 2.303 \text{ RT/nF} \log[\text{Zn}^{+2}(\text{aq})]/[\text{Cu}^{+2}(\text{aq})]$
- A buffer is having pK value 4.7, if $[\text{A}^-]/[\text{HA}]$ is equal to 1, then the pH of buffer solution will be :
 (A) 3.7
 (B) 5.7
 (C) 4.7
 (D) 4.3
- During photosynthesis, the photo oxidation of water takes place at the _____ catalytic site.
 (A) Zn_2CaO_5 cluster
 (B) Mn_4CaO_5 cluster
 (C) Mn_2CaO_5 cluster
 (D) Mg_2CaO_3 cluster
- Photo respiratory reactions occur in :
 (A) Chloroplast
 (B) Peroxisome
 (C) Mitochondrion
 (D) All of the above

11. In case of C_3 cycle, when CO_2 combines with Ribulose-1,5 bi-phosphate, the first stable product formed is :
 - (A) Glucose-6-phosphate
 - (B) Glucose
 - (C) 3-phosphoglycerate
 - (D) 1,3 bi-phosphoglycerate
12. Rate of transpiration can be seen least during :
 - (A) High atmospheric humidity
 - (B) Dry environment
 - (C) High wind velocity
 - (D) High soil moisture
13. The rate at which solar energy is fixed by autotrophs is called as the :
 - (A) Gross secondary productivity
 - (B) Net primary productivity
 - (C) Net secondary productivity
 - (D) Gross primary productivity
14. Water pollution can be quantified by B.O.D. and C.O.D. values, which statement from the following is correct ?
 - (A) C.O.D. is always equal to B.O.D.
 - (B) C.O.D. is always greater than B.O.D.
 - (C) C.O.D. is always less than B.O.D.
 - (D) None of the above
15. All the following steps of Nitrogen cycle are useful for plants except :
 - (A) Nitrification
 - (B) Nitrogen fixation
 - (C) Assimilation
 - (D) Denitrification
16. Itai- itai disease was the name given to mass _____ poisoning of Toyama Prefecture Japan, starting around 1912.
 - (A) Copper
 - (B) Mercury
 - (C) Cadmium
 - (D) Zinc
17. Which of the following statements is incorrect :
 - (A) Prions are protein particles capable of causing several human diseases
 - (B) Kuru and Creutzfeldt-Jakob diseases are caused as a result of Prions
 - (C) Prions contain a single stranded RNA
 - (D) Prions are made up of a single sialoglyco protein called PrP 27-30
18. The most widely used molecular marker for the identification of bacteria is :
 - (A) 18S rDNA
 - (B) Cox-I
 - (C) ISSII
 - (D) 16S rDNA
19. Which type of association exists between *Penicillium* and *Staphylococcus* ?
 - (A) Commensalism
 - (B) Mutualism
 - (C) Competition
 - (D) Amensalism
20. Microbial fermentation of milk is used to produce several dairy products such as buttermilk etc., the microbe used for the production of buttermilk is :
 - (A) *Streptococcus diacetylactis*
 - (B) *Lactobacillus plantarum*
 - (C) *Aspergillus niger*
 - (D) *Saccharomyces cerevisiae*
21. Which of the following polysaccharide gives red coloration when treated with Iodine solution ?
 - (A) Cellulose
 - (B) Amylose
 - (C) Glycogen
 - (D) None of the above

22. Which among the following bonds has about 40% double bond character ?
 (A) Glycosidic bond
 (B) Peptide bond
 (C) Phosphodiester bond
 (D) Disulphide bond
23. Saponification number of a fat is providing information about the :
 (A) Rancidity of a fat
 (B) Size of the fatty acid chain present in a fat
 (C) Presence of unsaturated fatty acids in a fat
 (D) All of the above
24. Nucleic acids are absorbing maximally in UV region at 260 nm, because of the presence of :
 (A) Purines and Pyrimidines
 (B) Ribose/De-oxy ribose sugar moieties
 (C) Phosphate group
 (D) All of the above
25. In case of Enzyme classification and Nomenclature, the E.C. code words are used for identifying an enzyme, the E.C. code word for Hexose kinase is :
 (A) EC : 2.1.1.7
 (B) EC : 1.2.3.7
 (C) EC : 3.1.1.27
 (D) EC : 2.7.1.1
26. The catalytic efficiency of an enzyme is determined by :
 (A) k_M only
 (B) k_{cat} only
 (C) k_{cat}/k_M ratio
 (D) k_M/k_{cat} ratio
27. Sulpha drugs considered one of the effective antibiotics that inhibit the synthesis of folic acid, are the example of _____ inhibitors.
 (A) Competitive
 (B) Non-competitive
 (C) Uncompetitive
 (D) Irreversible
28. Which among the following statement/s is/are true about regulatory enzymes ?
 (A) They produce sigmoidal curves
 (B) They generally reflect cooperativity
 (C) Both (A) & (B)
 (D) Neither (A) nor (B)
29. Glucagon and epinephrine increase the cellular concentration of cAMP, an event that leads to phosphorylation and inactivation of glycogen synthase, in this context which among the following statement/s is/are true ?
 (A) In liver both these hormones elevate cAMP
 (B) In muscles epinephrine is primarily responsible
 (C) Both (A) & (B)
 (D) Neither (A) nor (B)
30. Glutathione is responsible for protection of RBCs from oxidative damage; the concentration of glutathione is maintained by NADPH produced during :
 (A) Glycolysis
 (B) Pentose phosphate pathway
 (C) Krebs cycle
 (D) Glycogenolysis
31. The rate limiting step in fatty acid synthesis is the formation of malonyl- CoA catalyzed by acetyl-CoA carboxylase, which type of regulation/s this type of enzyme undergoes ?
 (A) Allosteric regulation
 (B) Covalent regulation/modification
 (C) Induction of enzyme synthesis
 (D) All of the above



32. Which of the following statement is not true about Maple syrup urine disease ?
- It results due to defects in catabolism of branched chain amino acids
 - It results due to defects in catabolism of aromatic amino acids
 - It is a genetic disorder
 - The symptoms appear early in infancy, death often occurs by 1 year of age
33. Which of the following statement is not true while differentiating plant cell from animal cell ?
- The presence of large vacuole
 - The presence of lysosomes
 - The absence of cellulosic cell wall
 - The absence of chloroplast
34. Consider two names used for describing a cell without cell wall :
- Protoplast
 - Symplast.
- Select the correct one from the following options :
- (1) only
 - (2) only
 - Both (1) & (2)
 - Neither (1) nor (2)
35. Presence of intact membrane system is must for synthesis of ATP for which organelle/s ?
- Mitochondria only
 - Endoplasmic reticulum only
 - Chloroplast only
 - Chloroplast and Mitochondria
36. Which among the following phases of the cell cycle/division is arrested by the treatment of an alkaloid colchicine ?
- G₀ phase
 - S phase
 - G₂ phase
 - M phase
37. DNA methylation is based on the methylation of cytosine base in the nuclear DNA by enzymes called as DNA methyl transferases, which among the following is active methyl group donor ?
- Methionine
 - S-adenosyl methionine
 - Methanol
 - Acetic anhydride
38. Consider the following statements about Telomeres :
- These are specialized structures that protect chromosome ends.
 - These ensure their faithful replication and prevent the shortening of chromosome during successive rounds of DNA synthesis.
 - In *Arabidopsis* telomeres are 4-6 kb in length.
- Select the correct one from the following options :
- (1) & (2) only
 - (1), (2) & (3)
 - (1) only
 - (2) & (3) only
39. DNA polymerization requires RNA primers for the process to continue, which among the following enzymes remove these primers during polymerization ?
- Polymerase II
 - Polymerase I
 - Topoisomerase
 - DNA helicase
40. A type of mutation that does not change the sequence of a polypeptide coded by that gene is called as the :
- Nonsense mutation
 - Deletion
 - Silent mutation
 - Frame shift mutation

41. In case of Gel filtration chromatography, void volume of a column is determined by blue dextran, which is _____ in nature.
- Protein
 - Polysaccharide
 - Ganglioside
 - Polynucleotide
42. Which type of gel electrophoresis is best suited for the separation and identification of nucleic acids ?
- Agarose gel electrophoresis
 - PAGE
 - SDS-PAGE
 - None of the above
43. Theodore Svedberg is considered as the pioneer of _____ Technique.
- Chromatography
 - Electrophoresis
 - Centrifugation
 - Radio immune assay
44. In case of I.R. spectroscopy, -OH group of alcohols absorbs strongly at :
- 3200–3600 cm^{-1}
 - 2200–2600 cm^{-1}
 - 1650–1710 cm^{-1}
 - 1250–1350 cm^{-1}
45. Tick odd one out in context to circulatory system :
- Villi
 - Capillaries
 - Veins
 - Arteries
46. Which cycle is involved in transport of amino acids ?
- Urea cycle
 - Krebs cycle
 - γ -glutamyl cycle
 - None of the above
47. Tick odd one out with regard to functions of small intestines :
- It is a site of carbohydrate, protein and fat digestion
 - It is a site of the majority of water absorption in the GI tract
 - It is a first site of protein hydrolysis
 - It carries most rapid absorption of galactose
48. Insulin acts through its receptor called as insulin receptor which is a :
- Protein with 4 subunits
 - Protein with 2 subunits
 - Glycolipid
 - Lipopolysaccharide
49. Which of the following foods is having low biological value proteins ?
- Meat
 - Fish
 - Eggs
 - Legumes
50. Normal reference values for serum CK-MB specific to myocardium is :
- 5 to 25 IU/L
 - 7 to 56 IU/L
 - 10 to 100 IU/L
 - 0.5 to 2 IU/L
51. The role of Clinical Biochemists is to :
- Carry out the complex analyses on specimens of body fluids and tissues
 - Assure the quality of clinical biochemistry investigations
 - Audit the diagnostic and clinical use and performance of investigations
 - All of the above



52. What is not correct about BMI (Body Mass Index) ?
- It provides information about the health status of an individual
 - It ranges between (18.5-25) kg/m² for normal adult
 - It is calculated as; BMI = (Mass in kg)²/ (height in m)
 - It is calculated as; BMI = (Mass in kg)/ (height in m)²
53. What is not true about a Hapten ?
- It is a molecule that reacts with specific antibody but is not immunogenic by itself
 - It can be made immunogenic by conjugation to a suitable carrier
 - Many drugs like penicillins are haptens
 - A hapten is essentially complete antigen
54. As phagocytes have receptors, called Fc receptors that bind the constant region and facilitate phagocytosis of the bacterium. The coating of pathogens and foreign particles in this way is known as :
- Opsonization
 - Complement activation
 - Neutralization
 - None of the above
55. _____ is/are Japanese molecular biologist/s who won the Nobel Prize for Physiology or Medicine in 1987 for his/their discovery of the genetic principle for generation of antibody diversity.
- Katalin Karikó
 - Drew Weissman
 - Susumu Tonegawa
 - All of the above
56. Which type of Hypersensitivity is mediated through IgE ?
- Type I hypersensitivity
 - Type II hypersensitivity
 - Type III hypersensitivity
 - Type IV hypersensitivity
57. Recombinant DNA technology was introduced with the first recombinant product released in market as :
- Bt cotton
 - Insulin produced from *E. coli*
 - Flavr savr
 - Pseudomonas putida*
58. On which sequence BamHI restriction enzyme acts ?
- 5'-GGATCC-3'
3'-CCTAGG-5'
 - 5'-GAATTC-3'
3'-CTTAAG-5'
 - 5'-CCCGGG-3'
3'-GGGCCC-5'
 - 5'-GCTAGC-3'
3'-CGATCG-5'
59. Tick odd one out as per the requirements that are necessary for maintaining cell growth during animal cell cultures :
- Temperature of 37°C ± 0.5°C
 - 5% carbon dioxide
 - 95% humidity
 - 20% nutrient agar medium
60. _____ vectors are designed to clone large fragments of DNA and to grow their DNA as a virus or as a plasmid.
- Plasmid
 - Cosmid
 - Yeast artificial chromosome
 - None of the above