Sr. No. 1003

ENTRANCE TEST-2024

PG Diploma Programme in Bio-Informatics

Total Questions : 60
Time Allowed : 70 Minutes

Roll No. | | | | | | |

1. Write your 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 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 answers sheet including answers to questions are to be recorded in the original/Carbon copy.
4. 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.
5. **Do not darken more the one circle of option for any question. A question with more than one darkened response shall be considered wrong.**
6. **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.**
7. Only those candidates who would obtain positive score in entrance test examination shall be eligible for admission.
8. Do not make any stray mark on the OMR sheet.
9. Calculators and mobiles shall not be permitted inside the examination hall.
10. Rough work, if any, should be done on the blank sheets provided with the question booklet.
11. OMR answer sheet must be handled carefully and it should not be folded or mutilated in such case it will not be evaluated.
12. Ensure that your OMR Answer sheet has been signed by the invigilator and the candidate himself/herself.
13. 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.
14. If any of the information in the response Sheet/Question Paper has been found missing or not mentioned as stated above the candidate is solely responsible for that lapse.

SEAL

Unit-I Basic chemistry

Q1.What is the pH of a neutral solution?

a) 0
b) 7
c) 14
d) 1

Q2. Entropy is a measure of

a) Energy
b) Temperature
c) Disorder
d) Pressure

Q3. Hydrogen bonding is a type of

a) Covalent bond
b) Ionic bond
c) Intermolecular force
d) Metallic bond

Q4. Which of the following is an example of a buffer solution?

a) $NaCl+H_2O$
b) $HCl+NaOH$
c) $CH_3COOH+CH_3COONa$
d) $KOH+H_2SO_4$

Unit-II Basic Mathematics and Biostatistics

Q5. What does standard deviation measure?

a) The average value of a dataset
b) The spread of data around the mean
c) The median value of a dataset
d) The mode of a dataset

Q6.A small p-value indicates:

a) Strong evidence in favor of the null hypothesis.
b) Strong evidence against the null hypothesis.
c) Weak evidence in favor of the null hypothesis.
d) Weak evidence against the null hypothesis.

Q7.The slope-intercept form of a linear equation is:

a) $y = mx + c$
b) $1/y^2 = x^2 + 1/c$
c) $y^2 = x^2/m + c^2$
d) $m^2/x + y^3 = c$

Q8. The mode of a data set is the:

a) Most frequent value
b) Middle value
c) Average of the values
d) Sum of the values

Unit-III Basic Biochemistry

Q9. Which of the following is a disaccharide?

a) Glucose
b) Fructose
c) Sucrose
d) Starch

Q10. Phospholipids are essential components of:

a) Cell membranes
b) Muscle tissue
c) Blood plasma
d) Bone tissue

Q11. What are the building blocks of proteins?

a) Sugars
b) Amino acids
c) Fatty acids
d) Nucleotides

Q12. The sugar present in DNA is:

a) Ribose
b) Deoxyribose
c) Fructose
d) Glucose

Unit-IV Enzyme and Drugs

Q13. Zinc is a cofactor for

a) Alcohol dehydrogenase
b) Carbonic anhydrase
c) DNA polymerase
d) All of the above

Q14. The Michaelis-Menten constant (K_m) is the substrate concentration at which the reaction velocity is

a) V_{max}
b) $V_{max}/2$
c) $(V_{max})^2$
d) $1/ V_{max}$

Q15. Which of the following enzyme is involed in the metabolism of xenobiotics?

a) Glutathione S-transferase
b) Cytochrome P450 oxidase
c) NADPH dehydrogenase
d) All of the above

Q16. Which of the following techniques is employed in drug discovery?

a) Molecular docking
b) Molecular dynamics simulations
c) QSAR
d) All of the above

Unit-V Cell structure and function

Q17. The smooth endoplasmic reticulum is involved in:

(a) Protein synthesis
(b) Lipid synthesis
(c) Detoxification
(d) All of the above

Q18. Lysosomes play a crucial role in:

(a) Cell signaling
(b) Autophagy
(c) Protein synthesis
(d) DNA replication

Q19. Facilitated diffusion is a type of passive transport that requires the assistance of:

a) ATP
b) Membrane transport proteins
c) A concentration gradient
d) Both B and C

Q20. The dark reaction of photosynthesis is also known as:

a) Calvin Cycle
b) Kreb's Cycle
c) Glycolysis
d) Electron Transport Chain

Unit-VI Intermediary metabolism

Q21. Which of the following is not a product of glycolysis?

a) Pyruvate
b) NADH
c) ATP
d) Acetyl-CoA

Q22. What is the final electron acceptor in the electron transport chain?

a) NAD+
b) FAD
c) Oxygen
d) Coenzyme Q

Q23. Where does the Krebs cycle take place?

a) Cytoplasm
b) Mitochondrial matrix
c) Mitochondrial outer membrane
d) Mitochondrial inner membrane

Q24. The primary organ where the urea cycle takes place is:

a) Liver
b) Kidney
c) Small intestine
d) Lungs

Unit-VII Molecular Biology

Q25. The enzyme responsible for unwinding the double helix during DNA replication is:

a) DNA polymerase
b) Helicase
c) Ligase
d) Primase

Q26. What type of RNA molecule is produced during transcription?

a) mRNA
b) tRNA
c) rRNA
d) All of the above

Q27. Ubiquitination is a type of post-translational modification that targets proteins for:

a) Degradation
b) Activation
c) Localization
d) Stability

Q28. The start codon for protein synthesis is:

(a) UAA
(b) UAG
(c) UGA
(d) AUG

Unit-VIII Genomics, transcriptomics and Proteomics

Q29. The non-coding sequences within genes are called:

a) Exons
b) Introns
c) Codons
d) Both A and C

Q30. What is the approximate number of genes in the human genome?

a) 10,000
b) 20,000
c) 50,000
d) 100,000

Q31. Which of the following is the first dimension of 2D-PAGE?

a) SDS-PAGE
b) Isoelectric focusing
c) Western blotting
d) Mass spectrometry

Q32. What is the term for the complete set of RNA molecules produced in a cell?

a) Genome
b) Proteome
c) Transcriptome
d) Epigenome

Unit-IX Recombinant DNA technology

Q33. Which of the following features should be present in a good cloning vector?

a) Origin of replication
b) Restriction site
c) High copy number
d) All of the above

Q34. Restriction enzymes are isolated from:

a) Plants
b) Animals
c) Bacteria
d) Fungi

Q35. Which of the following enzymes is used as a selectable marker?

a) Beta-lactamase
b) Hexokinase
c) Exonuclease
d) All of the above

Q36. Which of the following strategies can be employed to improve protein yield in heterologous expression systems?

(a) Increasing the copy number of the expression plasmid
(b) Codon Optimization
(c) Using strong promoters
(d) All of the above

Unit-X Immune-biology

Q37. Type I hypersensitivity reactions are mediated by which class of antibody?

a) IgG
b) IgM
c) IgA
d) IgE

Q38. Which cells are primarily responsible for humoral immunity?

a) T cells
b) B cells
c) Natural killer cells
d) Mast cells

Q39. The primary function of MHC class I molecules is to:

a) Present exogenous antigens to CD4 T cells
b) Present endogenous antigens to CD8 T cells
c) Present antigens to B cells
d) Act as co-stimulatory molecules

Q40. The most abundant immunoglobulin in the blood is:

a) IgG
b) IgM
c) IgA
d) IgE

Unit-XI Biochemical Techniques

Q41. Which of the following is not used for the separation of nucleic acids?

a) SDS-PAGE
b) Northern blotting
c) Agarose gel electrophoresis
d) None of the above

Q42. Sedimentation principle is involved in

a) Chromatography
b) Crystallisation
c) Centrifugation
d) Electrophoresis

Q43. Southern blot method is used for the detection of

a) Lipids
b) Proteins
c) Carbohydrates
d) DNA

Q44. The polymerase used for PCR is extracted from

a) *Homo sapiens*
b) *Thermus aquaticus*
c) *Escherichia coli*
d) *Saccharomyces cerevisiae*

Unit-XII Animal cell science and technology:

Q45. Which of the following is a cancer cell line?

a) HeLa
b) HEP-G2
c) A549
d) All of the above

Q46. What is the primary function of agitation in a stirred tank bioreactor?

a) To prevent cell clumping
b) To ensure uniform distribution of nutrients
c) To facilitate gas exchange
d) All of the above

Q47. What is the primary application of cellulase enzymes in the food industry?

a) To improve the texture of baked goods
b) To clarify fruit juices
c) To tenderize meat
d) To enhance the flavor of dairy products

Q48. Which of the following methods is not used for immobilizing enzymes?

a) Adsorption
b) Covalent bonding
c) Cross-linking
d) Denaturation

Unit-XIII Basics of Bioinformatics

Q49. Which command should you use in Linux to change file permissions?

a) chown
b) chmod
c) chgrp
d) perm

Q50. Which of the following is an example of Homology and similarity tool?

a) BLAST
b) RasMol
c) EMBOSS
d) PROSPECT

Q51. Which of the following is a protein structure database?

a) Expasy
b) GenBank
c) PDB
d) DDBJ

Q52.The Ensembl project provides information regarding

a) Genomes
b) Protein domains
c) Regulatory elements
d) All of the above

Unit-XIV Microbiology

Q53. Penicillin works by inhibiting the synthesis of:

a) Peptidoglycan
b) Lipopolysaccharides
c) Teichoic acids
d) Outer membrane

Q54. COVID-19 is caused by a virus called:

a) HIV
b) SARS-CoV-2
c) Influenza
d) Ebola

Q55. The growth phase of a bacterial culture where cells are actively dividing and increasing in number at a constant rate is known as:

a) Lag phase
b) Exponential phase
c) Stationary phase
d) Death phase

Q56. Which of the following is not a method of genetic recombination in bacteria?

a) Transformation
b) Transduction
c) Conjugation
d) Mitosis

Unit-XV Animal physiology

Q57. The enzyme responsible for breaking down carbohydrates in the mouth is:

a) Pepsin
b) Lipase
c) Amylase
d) Trypsin

Q58. The main function of the circulatory system is to:

a) Transport oxygen and nutrients to cells.
b) Remove waste products from cells.
c) Maintain body temperature.
d) All of the above.

Q59. Which of the following disorder is caused by smoking?

a) Lung Cancer
b) Heart Disease
c) Chronic Obstructive Pulmonary Disease (COPD)
d) All of the above

Q60. The hormone responsible for regulating blood sugar levels is:

a) Adrenaline
b) Insulin
c) Testosterone
d) Estrogen