Maulana Abul Kalam Azad University of Technology, West Bengal

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : BS-BIO-301

PUID : 03488 (To be mentioned in the main answer script)

BIOLOGY

Time Allotted : 3 Hours | *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) Name the type of pathway which is involved in the synthesis of compounds.

   a) Anabolic b) Catabolic

   c) Amphibolic d) Anapleurotic.

   ii) The diameter of each coil in the α-helix structure of protein is

   a) 5Å b) 15 Å

   c) 10 Å d) 20 Å.

   iii) An epimer of mannose is

   a) fructose b) tallose

   c) ribose d) glucose.

iv) The change in the activity of an enzyme with increasing pH is
   a) increasing
   b) decreasing
   c) exponentially decaying
   d) passing through a maxima.

v) Uracil is a
   a) pyrimidine base b) purine base
   c) hydroxyl base d) none of these.

vi) The cell wall of bacterium is made up of
   a) cellulose b) lignin
   c) glycogen d) peptidoglycan.

vii) The character which is expressed only in homozygote condition, is
   a) dominant character
   b) recessive character
   c) pure character
   d) multiple character.

viii) The phenotypic ratio of monohybrid experiment is
   a) 3 : 1 b) 9 : 3 : 3 : 1
   c) 9 : 7 d) 1 : 2 : 1.

ix) Four daughter cells are produced due to
   a) mitosis b) meiosis
   c) amitosis d) fission.

x) The most common growth media for microorganisms are
   a) agar plates b) protein powder
   c) lipid d) nucleic acid.

xi) The total number of histone protein present in the nucleosome is
   a) four b) five
   c) three d) six.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Write three laws of Mendel on heredity.
3. Define culture medium. What are the different types of culture media ? 2 + 3
4. Distinguish between sugar and polysaccharides.
5. Discuss the variation of enzyme activity with pH and temperature with the help of proper graphical plot. $2\frac{1}{2} + 2\frac{1}{2}$
6. Explain the following terms :
   (a) Species, (b) Genus, (c) Phylum, (d) Order, (e) Family.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Draw all possible ionic and neutral structures of an amino acid. Mention which structure is stable at what range of pH. 4
   b) Define glycogenesis, glycogenolysis and neoglucogenesis. 3
   c) Name the nucleotides and nucleosides available from the pyrimidine bases. 3
   d) Deduce an expression of the rate of enzyme action using Michaelis-Menten kinetic model. 5
8. a) Distinguish between bacteria and virus. Name one beneficial virus. 4 + 1
   b) Distinguish between mitosis and meiosis. 5
   c) Describe cancer biology. Define stem cells and their functions. What are antibiotics ? Who discovered antibiotics ? 1 + 2 + 1 + 1

9. a) Give the precise location where light and dark reactions of photosynthesis take place. Write down the final products of each of these reactions. Name the central element present in chlorophyll. 2 + 2 + 1

   b) A pea plant with brown coloured seed coat with smooth surface was crossed with a black coloured seed coat wrinkled surface pea plant. Show the possible genotypic and phenotypic generation in F2 with the help of checker board. 5

   c) Distinguish between exergogenic and endergogenic processes. 5

10. a) Define all possible nine modes of information transfer and classify them into three categories. 5

    b) Define and explain the term 'codon'. 3

    c) Define essential, partially essential and non-essential amino acids. 3

    d) Define recessive allele and dominant allele. 2 + 2

11. Write short notes on any *three* of the following : 3 × 5

    a) Denaturation of protein

    b) Inhibition of enzyme activity

    c) Heterotrophic nutrition

    d) Structure of nucleosome

    e) Structure of DNA.