'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours Part-II Examination, 2022

ZOOLOGY

PAPER-IV

CELL BIOLOGY, MOLECULAR BIOLOGY, LABORATORY AND ANALYTICAL TECHNIQUES, BIOCHEMISTRY

NEW SYLLABUS (SYLLABUS 2015)

Time Allotted: 4 Hours   Full Marks: 90

The figures in the margin indicate full marks.

GROUP-A
CELL BIOLOGY

1.   Answer any *six* as directed: $1 \times 6 = 6$

(a) Lysosomes are known as _____. (Fill in the blank)

(b) The properties of integral membrane proteins can be studies by:

(i) Atomic force microscopy   (ii) Cryo-sectioning and E.M.

(iii) Freeze-fracture technique and E.M.   (iv) All of these

(Choose the correct answer)

(c) Which cell organelle is involved in apoptosis?

(i) Lysosome   (ii) E.R.

(iii) Golgi   (iv) Mitochondria

(Choose the correct answer)

(d) What is G_0?

(e) The O_2 and CO_2 cross the plasma membrane by the process of _____.

(Fill in the blank)

(f) Microfilaments are composed of proteins called:

(i) Tubulin   (ii) Actin   (iii) Myosin   (iv) Chitin

(Choose the correct answer)

(g) The longest stage in the cell cycle is _____. (Fill in the blank)

(h) The _____ stage implies the exit of cells from the cell cycle.

(Fill in the blank)

(i) Expand GERL.

(j) Nuclear pore usually presents _____ fold symmetry. (Fill in the blank)

2.   Answer any *three* questions: $3 \times 3 = 9$

(a) Differentiate between RER and SER.

(b) Why is Cytoskeleton called a Dynamic skeleton?

(c) Write a note on phagocytosis.

(d) "Co-enzymes play a central role in Mitochondria" — (Write True or False).

(e) Write brief note on FRAP technique.

3. Answer any *one* question: 10×1 = 10

(a) Describe different types of membrane proteins. Briefly elaborate single particle tracking technique. 5+5

(b) What is cell division cycle? Describe different stages of karyokinesis with proper illustration. 2+8

GROUP-B

MOLECULAR BIOLOGY

4. Answer any *four* as directed: 1×4 = 4

(a) Which enzyme is used in unwinding of DNA?

(i) Ligase (ii) Topoisomerase

(iii) Helicase (iv) Exonuclease

(Choose the correct answer)

(b) Which of the following process does not occur in Prokaryotes?

(i) Transcription (ii) Splicing

(iii) Translation (iv) Replication

(Choose the correct answer)

(c) Mode of DNA replication is semiconservative and bidirectional. (Write True/False)

(d) True replication of DNA is due to _____. (Fill in the blank)

(e) The mRNA codon of valine is _____. (Fill in the blank)

(f) What is Klenow fragment?

5. Answer any *two* questions: 3×2 = 6

(a) Compare DNA with RNA.

(b) Write the role of sigma factor in transcription.

(c) Describe Chargaff's rule.

(d) DNA replication is "bidirectional" — Prove it.

6. Answer any *one* question: 10×1 = 10

(a) Give the detailed structure of DNA. Write the properties of DNA. 6+4

(b) What is excision repair? Discuss DNA excision repair mechanism with proper illustration. 2+8

GROUP-C

LABORATORY AND ANALYTICAL TECHNIQUES

7.   Answer any *four* questions as directed: 1×4 = 4

   (a) Which of the following cannot be used for separation of Nucleic acids?

   (i) Northern Blotting   (ii) PAGE

   (iii) SDS-PAGE   (iv) None of all

(Choose the correct answer)

   (b) Which of the following is not a cloning vector?

   (i) Yeast   (ii) Agrobacterium

   (iii) Neurospora   (iv) Bacteriophage

(Choose the correct answer)

   (c) Define episome.

   (d) Transgenic animals can be produced by:

   (i) addition, deletion or modification of genes

   (ii) genetic transformation by bacteria

   (iii) chromosomal aberrations

   (iv) genetic mutations

(Choose the correct answer)

   (e) Gene bank stores _____. (Fill in the blank)

   (f) Restriction endonucleases are synthesized by bacteria. (Write True/False)

8.   Answer any *two* questions: 3×2 = 6

   (a) Write about primary tissue culture.

   (b) Write short note on restriction endonuclease.

   (c) Describe the advantage of transgenic animals.

   (d) Write the Principle of Colorimetry.

9.   Answer any *one* question: 10×1 = 10

   (a) State the principle of chromatography. Discuss the process of Thin Layer   2+8
       Chromatography with proper illustrations.

   (b) What do you mean by rDNA technology? Discuss various uses of this   2+8
       technology.

GROUP-D

BIOCHEMISTRY

10. Answer any *six* questions as directed: 1×6 = 6

   (a) Which is a linear polysaccharide?

   (i) Glycogen   (ii) Cellulose   (iii) Starch   (iv) Amylase

(Choose the correct answer)

(b) The most abundant monosaccharide is:

    (i) Lactose   (ii) Glucose   (iii) Maltose   (iv) Sucrose

                (Choose the correct answer)

(c) _____ is a derived lipid. (Fill in the blank)

(d) Purines are:

    (i) single ringed structure   (ii) two ringed structure

    (iii) three ringed structure   (iv) multiringed structure

                (Choose the correct answer)

(e) The DNA found in all organisms is:

    (i) Left handed DNA   (ii) Right handed DNA

    (iii) Z-DNA   (iv) Both (i) and (ii)

                (Choose the correct answer)

(f) K_m value indicates the affinity between:

    (i) enzyme and co-enzyme   (ii) enzyme and substrate

    (iii) co-enzyme and substrate   (iv) enzyme and co-factor

                (Choose the correct answer)

(g) Proteins are polymers of _____. (Fill in the blank)

(h) Give an example of reducing sugar.

11.   Answer any *three* questions: 3×3 = 9

  (a) Distinguish between alpha helix and beta pleated sheets.

  (b) Write a brief note on Van der Waals force.

  (c) Distinguish between saturated and unsaturated fatty acid.

  (d) Write and discuss briefly about Michaelis-Menten equation.

  (e) Describe clover leaf model of t-RNA.

12.   Answer any *one* question: 10×1 = 10

  (a) Write characteristic feature of an enzyme. Explain β-oxidation process of lipid metabolism.   3+7

  (b) Differentiate between metabolism and catabolism. Write briefly on the metabolism of glucose with diagrammatic representation.   3+7

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