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23BCPII4

UG PROGRAM (4 YEARS HONORS) WITH SINGLE MAJOR  
AT THE END OF FIRST SEMESTER

INTRODUCTION TO APPLIED BIOLOGY

(Common for B.Sc. (Human Genetics, Forensic Science, Cyber Forensics, Botany, Bio-Chemistry, Bio-Technology, Microbiology, Zoology, Aquaculture, Fisheries, Forestry, Horticulture, Agriculture and Rural Development), B.Voc (Agriculture, Horticulture, Industrial Aquaculture and Fisheries, Agriculture and Entrepreneurship, Fisheries))

(w.c.f. Admitted Batch 2023-24)

Time: 3Hours

Maximum: 70 marks

SECTION-A (Multiple Choice questions)

30x1=30

1. Who is known as the father of Microbiology? [ ]

- (a) Edwin John Butler (b) Ferdinand Cohn  
(c) Robert Koch (d) Antoni van Leeuwenhoek

2. Which of the following inhibits DNA replication? [ ]

- (a) X-rays (b) Gamma rays (c) UV light (d) Cathode rays

3. Acridine orange is which type of mutagen? [ ]

- (a) Chemical compounds (b) Transposons  
(c) Base analog (d) Intercalating agents

4. Which of the following protects our body against disease-causing pathogens? [ ]

- (a) Respiratory system (b) Immune system  
(c) Digestive system (d) Respiratory system

5. Which of the following term refers to a prokaryotic cell that is comma shaped? [ ]

- (a) Coccus (b) Coccobacilli (c) Vibrio (d) Spirillum

6. Which of the following conveys the longest-lasting immunity to an infectious agent? [ ]

- (a) Active immunity (b) Passive immunity  
(c) Both (a) and (b) (d) None of the above

7. Which carbohydrate is commonly known as blood sugar and serves as a primary energy source for cells? [ ]

- (a) Starch (b) Glucose (c) Cellulose (d) Sucrose

8. Phospholipids are essential components of cell membranes. What is their unique property that contributes to membrane structure? [ ]

- (a) Amphipathic nature (b) High solubility in water  
(c) Presence of double bonds (d) Isoprenoid structure

9. Enzymes are a type of protein that functions as: [ ]

- (a) Energy storage molecules (b) Structural components  
(c) Biological catalysts (d) Genetic material

10. How many different amino acids are commonly found in proteins? [ ]

- (a) 10 (b) 20 (c) 30 (d) 40

11. What type of RNA is involved in bringing amino acids to the ribosome during Protein Synthesis? [ ]

- (a) mRNA (b) tRNA (c) rRNA (d) snRNA

12. What is the term for the metabolic pathways that build complex molecules from simpler ones, requiring energy input? [ ]

- (a) Anabolism (b) Catabolism (c) Respiration (d) Fermentation

13. Which of the following is an example of agricultural biotechnology? [ ]

- (a) Software development (b) Cloning animals  
(c) Building construction (d) Crop genetic engineering

14. What is a common application of biotechnology in plant sciences? [ ]

- (a) Software development (b) Animal cloning  
(c) Crop genetic engineering (d) Water treatment

15. What is the primary purpose of bioremediation in environmental biotechnology? [ ]

- (a) Enhancing crop yields (b) Cleaning up pollutants in the environment  
(c) Developing new vaccines (d) Cloning animals for conservation

16. What is the role of restriction enzymes in genetic engineering? [ ]

- (a) Enhancing gene expression (b) Repairing damaged DNA  
(c) Cutting DNA at specific sites (d) Synthesizing new DNA strands

17. What is the main purpose of BT cotton, a transgenic plant? [ ]

- (a) Improved aroma and flavour (b) Resistance against pests (biotic stress)  
(c) Increased flower size (d) Enhanced tolerance to drought (abiotic stress)

18. What is a common application of transgenic animals in the field of medicine? [ ]

- (a) Faster reproduction (b) Resistance to extreme temperatures  
(c) Production of animal models for studying diseases  
(d) Improved camouflage abilities

19. What is the purpose of primers in the PCR process? [ ]

- (a) Separating DNA strands (b) Synthesizing new DNA strands  
(c) Identifying target DNA sequences (d) Amplifying RNA

20. Which DNA regions are commonly targeted in DNA fingerprinting? [ ]

- (a) Exons (b) Introns (c) Short tandem repeats (STRs) (d) Promoters

21. What is the primary purpose of blocking in immunoblotting? [ ]

- (a) Enhancing antibody binding (b) Preventing non-specific binding  
(c) Synthesizing new proteins (d) Amplifying DNA

22. How are monoclonal antibodies produced? [ ]

- (a) Extracted from human plasma (b) Synthesized by the body naturally  
(c) Cloned from a single B cell (d) Obtained from various animal species

23. Which of the following is an ethical concern associated with eugenics? [ ]
- (a) Promotion of genetic diversity (b) Violation of individual rights and autonomy  
(c) Access to healthcare for all (d) Encouragement of cultural exchange
24. What is the main challenge or concern associated with germline gene therapy? [ ]
- (a) Ethical considerations (b) Difficulty in targeting specific cells  
(c) High cost of treatment (d) Limited effectiveness
25. What does the term genome refer to in genomics? [ ]
- (a) A specific gene (b) The complete set of genes in an organism  
(c) The process of protein synthesis (d) The structure of a cell membrane
26. Which type of biological data involves the study of the structure and function of proteins? [ ]
- (a) Genomic data (b) Proteomic data  
(c) Metabolomic data (d) Transcriptomic data
27. What is the main role of NCBI in the scientific community? [ ]
- (a) Hosting protein databases  
(b) Providing resources for bioinformatics and molecular biology research  
(c) Managing clinical trial data  
(d) Focusing on structural biology research
28. What is the NCBI Genome Workbench used for? [ ]
- (a) Studying protein structures (b) Analyzing metabolomic data  
(c) Visualizing and analyzing genomic data (d) Managing clinical trial information
29. Mean of a set of values based on [ ]
- (a) All values (b) 50 percent values  
(c) First and last value (d) Maximum and minimum value
30. \_\_\_\_\_ gives an idea about the spread of the observations about a central value. [ ]
- (a) Correlation (b) Regression (c) Dispersion (d) None

**SECTION – B (Fill in the blanks)**

**10x1=10**

31. Vaccination was invented by ed
32. Bacterial cell grown on hydrocarbon wastes from the petroleum industry are a source of \_\_\_\_\_
33. Carbohydrates are composed of carbon, hydrogen and \_\_\_\_\_
34. Lipids including fats are primarily composed of \_\_\_\_\_ and fatty acids
35. Micro injection is one of the \_\_\_\_\_ methods used for gene transfer.
36. Monoclonal antibodies are used in diagnosis and \_\_\_\_\_ of cancer.
37. Biotechnology involves the manipulation of biological \_\_\_\_\_ for practical purposes.

38. PCR is used in the analysis of gene expression and gene \_\_\_\_\_
39. Second quartile is same as \_\_\_\_\_
40. Bioinformatics is a subject with combination of \_\_\_\_\_ and Technology.

**SECTION – C (Very short answer questions) 10x1=10**

41. What is the role microorganisms in the process for making alcoholic beverages?
42. What is the approximate size of the bacterial cell?
43. Mention the types of RNA
44. What is the basic building block of the proteins?
45. What are biofertilizers?
46. What is the main function of DNA ligases?
47. Expand ELISA
48. Write one application of gene therapy
49. What is the purpose of sequence alignment in bioinformatics.
50. How can researchers access nucleic acid and protein databases?

**SECTION – D (Matching) 2x5=10**

**A.**

51. Eosinophils

52. lipids

53. bioremediation

54. antigen

55. BLAST

**B.**

56. natural killer cells

57. steroids

58. BT cotton

59. SDS-PAGE

60. GenBank

[ B ] A) tool for comparing biological sequences

[ 2 ] B) killing parasites

[ 3 ] C) structural basis of cell membrane

[ 4 ] D) use of biological organisms to remove pollutants

[ 5 ] E) binding specifically to target molecules

[ 1 ] A) precursors for hormone synthesis

[ 10 ] B) resistance against pests

[ 10 ] C) separating protein based on size

[ 2 ] D) Data base of nucleotide sequence.

[ 2 ] E) lysis of infected cells

**SECTION – E (True/False) 10x1=10**

61. Denaturation of proteins involves the reversible alteration of their three-dimensional structure, preserving their function. (True/False)

62. A mast cell also called mastocyte contains numerous Histamine and heparin rich granules. (True/False)

63. Catabolism releases energy, while anabolism consumes energy in the form of ATP. (True/False)

64. Biopesticides are synthetic chemicals designed to control pests in agriculture. **(True/False)**

65. Modern genetic research has discredited eugenic ideas, emphasizing the importance of genetic diversity and ethics **(True/False)**

66. Arithmetic Mean is a positional value. **(True/False)**

67. Sequence alignment compares similarities in biological sequences. **(True/False)**

68. Paternity testing can be performed using DNA fingerprinting to determine biological relationships between individuals. **(True/False)**

69. Stress-tolerant transgenic plants are developed to cope with challenging environmental conditions, promoting agricultural resilience. **(True/False)**

70. A vector is an animal that can transfer infectious pathogens from one host to another. **(True/False)**