

**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.e.f. Admitted Batch 2023-24)

Time: 3Hours

Maximum: 70 marks

Section-A (Multiple Choice questions)

30x1=30

1. What is the primary focus of microbiology? []

- a) Study of large organisms b) Study of microorganisms
c) Study of geological formations d) Study of weather patterns

2. Which of the following is NOT considered a microorganism? []

- a) Bacteria b) Viruses
c) Insects d) Fungi

3. Microbiology plays a vital role in which industry? []

- a) Automotive industry b) Aerospace industry
c) Food and beverage industry d) Fashion industry

4. What is one of the key focuses of microbiology research mentioned in the description? []

- a) Understanding geological processes b) Developing new construction materials
c) Studying antibiotic resistance mechanisms d) Analyzing celestial bodies

5. Microbiology contributes to biotechnological advancements, including the production of valuable products like pharmaceuticals, enzymes, and..... []

- a) Clothing b) Computers
c) Biofuels d) Buildings

6. What is the primary focus of immunology? []

- a) Study of geological formations b) Study of immune system
c) Study of weather patterns d) Study of space exploration

7. What biomolecules are the focus of biochemistry studies? []

- a) Metals and minerals b) Vitamins and minerals
c) Proteins, carbohydrates, lipids, and nucleic acids d) Gases and liquids

8. Enzymes in biochemistry are primarily known for: []

- a) Storing genetic information b) Regulating cellular energy production
c) Facilitating biochemical reactions as catalysts d) Building cellular structures

9. Metabolic pathways in biochemistry refer to: []

- a) Physical exercises
- b) Chemical reactions that convert nutrients into energy and cellular components
- c) Brain functions
- d) Mechanical processes in cells

10. What is the genetic material responsible for storing and transmitting genetic information? []

- a) Proteins
- b) Carbohydrates
- c) DNA and RNA
- d) Lipids

11. Which field of science explores cell signaling pathways and how do cells communicate with each other? []

- a) Microbiology
- b) Physics
- c) Biochemistry
- d) Geology

12. What is the general formula of carbohydrates? []

- a) $(CH_3O)_n$
- b) $(CH_4O)_n$
- c) $(CH_2O)_n$
- d) $(CHO)_n$

13. What is the primary goal of biotechnology? []

- a) Preservation of wildlife
- b) Development of new computer technologies
- c) Application of biological principles for human benefit
- d) Exploration of outer space

14. Which biotechnological technique involves transferring genes from one organism to another to produce desired traits or products? []

- a) Genetic mutation
- b) Cloning
- c) Recombinant DNA technology
- d) Tissue engineering

15. Biotechnology plays a significant role in which of the following applications? []

- a) Exploration of marine ecosystems
- b) Space travel
- c) Crop improvement
- d) underwater archaeology

16. What is the primary purpose of gene therapy in biotechnology? []

- a) Producing genetically modified organisms
- b) Enhancing crop yield
- c) Treating genetic disorders by correcting or replacing defective genes
- d) Studying the behavior of wildlife

17. Bioremediation, a biotechnological application is used for: []

- a) Exploring outer space
- b) Cleaning up environmental pollutants using microorganisms
- c) Cloning animals
- d) Enhancing agricultural productivity

18. What ancient processes involving microorganisms are considered early examples of biotechnology?

- a) Cooking and baking
- b) Writing and record-keeping
- c) Woodworking and carpentry
- d) Metalworking and blacksmithing

19. What is the primary objective of forensic anthropology?

- a) DNA analysis
- b) Document examination
- c) Identifying and analyzing human remains
- d) Ballistics and firearms examination

20. Which forensic field focuses on studying insect activity to estimate the post-mortem interval?

- a) Digital forensics
- b) Forensic psychology
- c) Forensic entomology
- d) Toxicology

21. What type of evidence does forensic ballistics analyze?

- a) Digital data
- b) Human remains
- c) Bullets, cartridges and firearms
- d) Handwriting and signatures

22. What does forensic toxicology examine in biological samples?

- a) Drugs, alcohol and poisons
- b) DNA profiles
- c) Cybercrime evidence
- d) Fingerprint patterns

23. What is the main purpose of forensic profiling?

- a) Identifying forgeries
- b) Estimating post-mortem intervals
- c) Creating psychological profiles of criminals
- d) Analyzing digital evidence

24. What is the primary purpose of Polymerase Chain Reaction (PCR) in molecular biology?

- a) Analyzing proteins
- b) Amplifying specific DNA segments
- c) Measuring gene expression
- d) Identifying pathogens

25. What is the primary role of biostatistics in biological and health sciences?

- a) Data collection
- b) Data interpretation
- c) Data visualization
- d) Data storage

26. Which statistical branch of biostatistics involves drawing conclusions about a population based on a sample of data?

- a) Descriptive statistics
- b) Inferential statistics
- c) Hypothesis testing
- d) Data collection

27. In clinical research, what role does biostatistics play in clinical trials?

- a) Data collection
- b) Data interpretation
- c) Data storage
- d) Study design, analysis and interpretation

28. What specialized software is commonly used by biostatisticians for statistical analysis?

- a) Excel
- b) R
- c) Power Point
- d) Photoshop

29. What does biostatistics help researchers determine while testing hypotheses? []

- a) Data quality
- b) Data collection methods
- c) Statistical significance
- d) Data visualization techniques

30. What is the primary goal of bioinformatics? []

- a) Collection of biological specimens
- b) Analysis of biological data using computational tools
- c) Conduction of laboratory experiments
- d) Development of new laboratory equipment

Section-B (Fill in the blanks)

10x1=10

31. Edward Jenner is known for developing the first successful _____ against Small Pox.

32. The stem cells develop into blood cells through a process called _____.

33. The basic building block of carbohydrates is a _____.

34. Watson & Crick constructed a model of DNA double helix in the year _____.

35. Bio fertilizers contain beneficial _____ that enhance plant growth.

36. Animal cells do not have a _____, but have plasma membrane and nuclear envelope.

37. DNA polymerase used in PCR is thermo stable at _____.

38. Immuno electrophoresis is used to test proteins present in the Urine and _____.

39. DNA stands for _____.

40. NCBI stands for _____.

Section-C (Very short answer questions)

10x1=10

41. Who introduced pasteurization?

42. What is the primary structural feature lacking in viruses?

43. What is the basic building block of proteins?

44. Give an example for aromatic and hetero cyclic amino acids?

45. What does GMO stand for?

46. What is the death rate of target cells during gene transfer by Electroporation?

47. Expand ELISA.

48. Name the technology used for the production of monoclonal antibodies?

49. What is primary data?

50. Define genome.

Section-D(Matching)

2x5=10

A.

- | | | |
|---------------------|-------|-----------------------------|
| 51. Robert Koch | [] | A) Gene editing Technology |
| 52. Sucrose | [] | B) Monoclonal anti bodies |
| 53. Data collection | [] | C) Established bacteriology |
| 54. CRISPR-Cas9 | [] | D) Group of persons |
| 55. Hybridoma cell | [] | E) Table sugar |

B.

- | | | |
|------------------------------|-------|--------------------------------------|
| 56. Virus | [] | A) pUC18-19 |
| 57. Purine | [] | B) Data base of nucleotide sequence. |
| 58. University of California | [] | C) adenine |
| 59. PCR | [] | D) Obligatory intracellular parasite |
| 60. Gen Bank | [] | E) Parental identification |

Section-E(True Or False)

10x1=10

61. Bacteria have a membrane – bound nucleus.
62. Fermentation is a process commonly used in the production of antibodies.
63. Fructose is very common in fruits and honey.
64. Deoxyribose nucleic acid is absent in the plant viruses.
65. Biofuels are produced from non-biological sources.
66. Micro injection method is important for gene transfer to embryonic cells.
67. Widal test is used for the diagnosis of brain fever.
68. PCR involves temperature cycles.
69. Event is denoted by S.
70. The building block of nucleic acid is called nucleosides.