24 AB CP 108

UG PROGRAM (4 YEARS HONOURS) WITH SINGLE MAJOR

AT THE END OF FIRST SEMESTER

INTRODUCTION TO APPLIED BIOLOGY

(COMMON FOR MICROBIOLOGY, FISHERIES)

(w.e.f. Admitted Batch 2024 - 25)

Time: 3Hours **Maximum: 70 Marks**

SECTION A (Multiple Choice Questions) **30 x 1 = 30 M**

1. Analyse the purpose of swan-necked flasks that Louis Pasteur designed to disprove spontaneous generation is to: [ ]

a) Allow the multiplication of microbes in the broth

b) Implicate the role of flies in the development of maggots on rotting meat

c) Prevent air from entering the flask d) Trap the microbes and prevent them from reaching the broth

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

a). Enhancing gene expression c) Cutting DNA at specific sites

b). Repairing damaged DNA d) Synthesizing new DNA strands

3. Interpret the answer from statement given below. [ ]

Vaccines are artificial active acquired immunity. Vaccines are made up of:

a) Chemicals b) Weak microorganisms

c) Viruses d) Drugs

4. Which of the following is NOT a Disaccharide? [ ]

a). Lactose b). Maltose

c). Sucrose d). Dextrose

5. Which of the following conveys long lasting immunity [ ]

a). Active immunity b). Passive immunity

c). Both d). None

6Which of the following is acellular? [ ]

a) Virus b) Bacterium

c) fungus d) protozoan

7. How is the secondary structure of a protein stabilized? [ ]

a) Van der wall forces b) Hydrogen bonding

c) Covalent bond d) Hydrophobic bond

8. 8. Identify the purine base of nucleic acids in the following [ ]

a) Cytosine b) Thymine

c) Uracil d) Adenine

9.Which of the following statements is true about metabolism? [ ]

a) It only involves the processes that build up the large molecules in the body

b) It only involves the processes that break down the small molecules in the body

c) It only involves the processes that break down the large molecules in the body.

d) It involves all of the processes that break down and build up molecules in the body.

10. The general structure of all amino acids are same except for __ [ ]

a) Lysine b) Glycine

c) Proline d) Alanine

11. How many amino acids make up a protein? [ ]

(a) 10 (b) 20 (c) 30 (d) 50

12. What is a bond between amino acids called? [ ]

(a) Ionic bon (b) Acidic bond

(c) Peptide bond (d) Hydrogen bond

13. How is biotechnology applied in animal sciences for improved live stock production ? [ ]

a) Virtual reality simulations c) Weather prediction models

b) Genetic modification for desirable traits. D) Soil composition analysis

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

a) Software development c) Animal cloning

b) Crop genetic engineering d) Water treatment

15. Which chemical Method is commonly used to introduce foreign DAA into bacterial cells by making them more permeable to DNA molecules ? [ ]

a) Lipofection c) Calcium Phosphate Transfection

b) Micro injection d) Restriction Digestion

16. In transgenic plants, What is the focus of salt- tolerance traits? [ ]

a) Resistance to fungal infections b) Enhanced photosynthesis

c) Increased tolerance to high salt levels in soil d) Improved flower color

17. What is the potential benefit of using Biofertilizers in agriculture [ ]

a) Increased water consumption in crops b) Improved soil fertility and structure

c) Enhanced resistance to pests d) Reduction in sunlight

18. Protozoa that eat other organisms are known as _____

a) parasitic b) mutualistic c) holozoic d) saprophytic

19 Which type of PCR is commonly used to amplify degraded DNA samples in forensic cases? [ ]

a) Real-Time PCR b) Nested PCR

c) Reverse Transcriptase PCR d) High-Fidelity PCR

20. In forensics, PCR amplification of mitochondrial DNA is often used when which type of DNA is not available? [ ]

A) Autosomal DNA B) Nuclear DNA

C) Bacterial DNA D) Viral DNA

21. Based on what, forensic PCR help distinguish between individuals? [ ]

A) RNA sequences B) STR profiles

C) Protein expression D) Chromosomal numbers

22. What is the main forensic application of DNA fingerprinting? [ ]

A) To study population genetics B) To diagnose hereditary diseases

C) To establish paternity or family relationships D) To identify individuals in criminal investigations

23. How does DNA fingerprinting help in paternity testing? [ ]

A) By comparing the entire genome between child and parents

B)By matching STR regions between child and potential father

C) By analyzing mitochondrial DNA

D) By determining the blood group

24. Why is DNA fingerprinting considered more reliable than traditional fingerprinting in criminal investigations? [ ]

A) DNA cannot be duplicated B) DNA sequences are unique to everyone (except identical twins)

C) DNA samples are easier to collect than fingerprints D) DNA testing is cheaper than traditional fingerprinting

25what does NCBI stand for in the context of biological databases? [ ]

a) National Cellular Biology Institute b) National center for Biotechnology Information

c) Nuclear Chromosome and Gene bank d) Nuclear Chemistry and Bioinformatics

26What is the NCBI Genome Workbench used for [ ]

a) Studying protein structures b) Analyzing metabolic data

c) Visualizing and analyzing genomic data d) Managing clinical trial information

27Which type of biological data involves the study of the structure & functions of Proteins? [ ]

a) Genomic data b) Proteomic data

c) Metabolomic data d) Transcriptomic data

28Which technique is commonly used in Genomics for sequencing DNA [ ]

a) PCR b) Southern Blot

c) Mass spectrometry d) Next – generation sequencing

29What is the main focus of Proteomics [ ]

a) Analysing DNA sequences b) Studying individual proteins and their functions

c) Investigating cellular structures d) Quantifying entire proteins in a cell

30Which measures of central tendency includes the magnitude of scores [ ]

a) Mean b) Mode

c) Median d) Range

SECTION B (Fill in the blanks) 10 x 1 = 10 M

Fill in the Blanks

31. The microorganism found in extreme environments that are devoid of a true peptidoglycan layer are called the _____

32. _____ is a unicellular fungus

33. Carbohydrates are composed of carbon, Hydrogen and _____

34. Lipids including fats are primarily composed of _____ and fatty acids

35. Transcriptic data primarily focuses on the sequences of _____

36. Mass spectrometry is a common technique in Proteomics for identifying and qualifying_____

37. _____technique is combined with PCR for generating a genetic profile from a forensic sample.

38 _____ are fused with myeloma cells to produce monoclonal antibodies

39Statistical results are true on an _____

40_____ is a systematic method of collecting information with respect to a variable

SECTION C (Very short answer questions) 10 x 1 = 10 M

Very short answer questions

41 Define Spontaneous generation theory?

42 Define virus?

43 List the RNA types and their functions?

44 What are the basic units of proteins?

45 What are Transgenic animals

46 Define Bioremediation

47. Which technique can be applied to solve cases of missing persons, where the identity of remains is uncertain?

48 What is the common application of ELISA in medical diagnostics?

49 What does NCBI stand for, and what is its role?

50 What type of information is stored in the Gene Bank database?

SECTION D (Matching) 2 x 5 = 10 M

(I)

51. Edward Jenner	( )	**A**. Creating identical copies of DNA fragments
52. Lipids	( )	**B**. Vaccination for Small pox
53. Cloning	( )	**C**. Triglycerides
54. PCR	( )	**D**. Kary B. Mullis
55. Median	( )	**E**. Positional Average

(II)

56. Joseph lister	( )	**A**. Database of protein structures
57. Nucleic acids	( )	**B**. gene-editing tool that allows for precise modifications in DNA sequences
58. Electroporation	( )	**C**. Delivery of DNA using electric shocks
59. CRISPR-Cas9	( )	**D**. Phospho Di ester bonds
60. Uniprot	( )	**E**. Developed aseptic techniques

SECTION- E (True or False) **10 x 1 = 10 M**

True or False

61. A simple sugar that is a building block of carbohydrates is called a polysaccharide. (True/ False)

62. A nucleotide is composed of sulfate, a sugar (pentose), and a nitrogenous base (True/ False)

63. Bacteria have 80S ribosomes each composed of a 60S large subunit and a 40S small subunit.(True/ False)

64. T cells originate in bone marrow and travel to the Thymus to mature and differentiate. (True/ False)

65. Bioremediation involves the use of chemicals to clean up environmental pollutants (True/ False)

66. The discovery of antibiotics is considered a significant milestone in the history of Biotechnology(True/ False)

67. Data collected by investigator is called secondary data (True/ False)

68. EBI is not part of the global Bioinformatics network (True/ False)

69. Blocking is an essential step in immunoblotting to prevent non-specific binding of antibodies. (True/ False)

70. Monoclonal antibodies can be used to treatHIV/AIDS, Tuberculosis, and Influenza. (True/ False)