

**B.Sc. MICROBIOLOGY
SIXTH SEMESTER
ADVANCES IN MICROBIOLOGY
BMB – 603**

(Use Separate Answer Scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks: 70

PART-A: Objective

Time : 20 min.

Marks: 20

Choose the correct answer from the following:

1 × 20 = 20

- The first complete genome to be sequenced was that of the bacterium
 - Mycobacterium avium*
 - Corynebacterium diphtheriae*
 - Haemophilus influenzae*
 - Bacteroides fragilis*
- C-value in genome represents
 - Genetic disorders
 - Phenotypic variation
 - Amount of DNA present on genome
 - Qualitative traits
- The LD50 is best described as which of the following:
 - the dose at which 50 % of experimental hosts die
 - the dose at which 50 % of experimental hosts demonstrate a response to the chemical
 - the dose at which all of the experimental host die
 - the dose at which at least one of the experimental hosts die
- The majority of horizontally transferred DNA is a part of the
 - Core genome pool
 - Flexible genome pool
 - Both (a) & (b)
 - None of the above
- Local immune response occurs at the infection site comprises of
 - Inactivation of CDPKs
 - Influx of calcium ions
 - Defense gene activation
 - All of the above
- Which of the following is a type of T3SS protein?
 - Structural protein
 - Effector proteins
 - Chaperones
 - All of the above
- Enterococcal surface protein helps in adherence to the
 - Bladder wall of urinary tract
 - Renal cells
 - RBC
 - WBC
- The most researched T3SS are from species of
 - Shigella*
 - Salmonella*
 - Escherichia coli*
 - All of the above
- T3SS protein secretion can be artificially induced by adding
 - Methylene blue
 - Methyl orange
 - Congo red
 - Methyl red

10. Biofilms attached to stones are known as
- Epilithic biofilm
 - Episammic biofilm
 - Epixylic biofilm
 - Epiphytic biofilm
11. Which is a reason for antimicrobial resistance being higher in a biofilm than in free-floating bacterial cells?
- The EPS allows faster diffusion of chemicals in the biofilm.
 - Cells are more metabolically active at the base of a biofilm.
 - Cells are metabolically inactive at the base of a biofilm.
 - The structure of a biofilm favors the survival of antibiotic resistant cells.
12. Proteomics refers to the study of _____.
- The entire set of expressed proteins in the cell
 - Biomolecules
 - Set of proteins in a specific region of the cell
 - Set of proteins
13. Quorum sensing is used by bacterial cells to determine which of the following?
- the size of the population
 - the availability of nutrients
 - the speed of water flow
 - the density of the population
14. What is the chemical nature of endotoxins?
- lipopolysaccharide
 - polysaccharide
 - protein
 - lipoprotein
15. Biofilms can be found benefiting our bodies _____
- In the mouth
 - In replacement joints
 - On contact lenses
 - In the intestinal system
16. Translation of mRNA into proteins takes place in the _____
- host cell nucleus
 - host cell cytoplasm
 - viral nucleus
 - viral cytoplasm
17. The computer simulation refers to _____.
- Dry lab
 - In silico*
 - In vitro*
 - Wet lab
18. What is the deposition of cDNA into the inert structure called?
- DNA probes
 - DNA polymerase
 - DNA microarrays
 - DNA fingerprinting
19. Which of the following type of vaccines authorized by the FDA and WHO are proven to be effective and safe against the COVID-19?
- Live attenuated
 - Conjugated vaccine
 - Toxoid vaccine
 - mRNA vaccine
20. Subunit vaccine is all, Except
- A whole purified virus
 - A purified part or pieces of the antigen
 - An expensive type of vaccine
 - A Hepatitis-B vaccine

(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

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| 1. Define core genome pool. Mention four advantages of extracting the pangenome, Differentiate between open pangenome and closed pangenome with a graph. | 2+4+4
=10 |
| 2. Explain pathogenicity islands and their common sequence characteristics. State 4 differences between endotoxins and exotoxins. | 6+4=10 |
| 3. Explain systemic acquired resistance of a whole plant with a diagram. What is epiphytic fitness? Classify epiphytic bacteria. | 5+2 +3
=10 |
| 4. Describe the process of biofilm formation with a diagram. Explain the molecular aspects of biofilm formation. | 7+3=10 |
| 5. What is metagenomics? How does it help in understanding microbial diversity and gene prospecting? | 2+8=10 |
| 6. What is a virulence factor? Write a detailed account on microbial virulence factors. | 2+8=10 |
| 7. Write a thorough note on quorum sensing bacteria. | 10 |
| 8. Write a detailed note on synthesis of poliovirus vaccine in laboratory. | 10 |

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