

- a) Autotrophy
c) Saprophytic
- (viii) Select the type of plasmid known for carrying antibiotic resistance genes.
a) F-plasmids
c) R plasmids
- (ix) What does the size of the inhibition zone in a Kirby-Bauer disk diffusion test explain about the susceptibility of a bacterial pathogen to an antibiotic?
a) It directly correlates with the antibiotic's solubility.
c) It reflects the antibiotic's effectiveness against the pathogen.
- (x) Identify the domain of life includes microbes like bacteria, archaea, and cyanobacteria?
a) Eukarya
c) Archaea
- (xi) Write the purpose of the streak plate technique in microbiology?
a) To count bacterial colonies
c) To visualize bacterial endospores
- (xii) How do lactose-fermenting colonies develop on MacConkey agar?
a) Blue in color
c) Pink to red in color
- (xiii) Horizontal gene transfer (HGT) in bacteria is different from vertical gene transfer because it involves the transfer of genes:
a) Within the same chromosome
c) Between parent and offspring
- (xiv) Which bacterial genus is particularly targeted and detected using acid-fast staining?
a) Escherichia
c) Mycobacterium
- (xv) Identify which of the following mechanisms of horizontal gene transfer involves the transfer of genetic material via a virus.
a) Transformation
c) Conjugation
- b) Parasitism
d) Symbiosis
- b) Virulence plasmids
d) Degradative plasmids
- b) It measures the bacterial density in the culture.
d) It represents the antibiotic's concentration in the test.
- b) Bacteria
d) Prokarya
- b) To sterilize glassware
d) To isolate and separate individual bacterial colonies
- b) Yellow in color
d) Colorless
- b) Between unrelated species
d) During meiosis
- b) Salmonella
d) Streptococcus

Group-B

(Short Answer Type Questions)

3 x 5=15

(Answer any Five from the following)

2. Explain why Late Blight is Considered Among Epidemic Potato Diseases. (3)
3. Describe the purpose of DNA-DNA hybridization in microbial taxonomy? (3)
4. Illustrate the significance of endospore staining in microbiology. (3)
5. Describe the primary function of differential media in microbiology, and give an example of a differential medium. (3)
6. Differentiate latent TB infection (LTBI) and active TB disease, and what factors can cause LTBI to progress to active disease. (3)

OR

Explain the role of the Spike protein (S protein) of SARS-CoV-2, and how does it facilitate the virus's entry into host cells. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

(Answer any Six from the following)

7. Describe the principles behind physical dry heat and moist heat sterilization in bacterial culture (5)
8. Differentiate between F+ (donor) cells, F- (recipient) cells, and Hfr cells in bacterial conjugation. Explain the implications of the integration of the F-plasmid into the chromosomal DNA of Hfr cells. (5)
9. Describe the techniques used for determining microbial taxonomy and phylogeny. Explain how molecular characteristics and nucleic acid sequencing contribute to the understanding of microbial phylogeny. (5)
10. Describe the process by which antimicrobial activity is determined against specific pathogen. (5)
11. Explain the biology of TMV, including its viral structure and the key proteins involved in its replication. (5)
12. Explain the components of the SARS-CoV-2 S protein, including the S1 and S2 subunits, and their respective functions in the viral life cycle. How does the fusion of the viral membrane with the host cell membrane occur, and what are the key components of the S protein involved in this process? (5)

OR

Explain the mode of action of antibiotic penicillin that inhibit cell wall synthesis. Write the difference between narrow-spectrum and broad-spectrum antibiotics. (5)
