



BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Sc.(BT)-Hons-2023
Course Name – Microbiology
Course Code - BBT10101
(Semester I)

Full Marks : 60 Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

- (i) Recognize the type of cell contain a true nuclear membrane
 a) Prokaryotic
 b) Eukaryotic
 c) Bacteria
 d) Monerea
- (ii) Identify the primary function of dipicolinic acid in bacterial endospores.
 - a) It serves as a structural component in the spore coat.

1. Choose the correct alternative from the following:

- b) It acts as a potent toxin to deter predation.
- c) It is involved in the process of sporulation.
- d) It plays a crucial role in the heat resistance and dehydration of the spore.
- (iii) Name the bacterial structure that is responsible for movement?
 - a) Capsule

b) Flagellum

c) Pili

- d) Nucleoid
- (iv) Write the bacterium that primarily affects herbivores, especially ruminants, and causes symptoms such as fever and chest discomfort.
 - a) Bacillus anthracis

b) Mycobacterium tuberculosis

c) Pseudomonas syringae

- d) Xanthomonas campestris
- (v) Select which bacterial disease affects beans and is characterized by yellowish green spots on leaves.
 - a) Wildfire of Tobacco

b) Blight of Beans

c) Crown Gall

- d) Late Blight of Potato
- (vi) Predict how the degree of selective toxicity of a chemotherapeutic agent is expressed.
 - a) By the highest drug concentration killing the pathogen
- b) By the ratio of the therapeutic dose to the toxic dose
- c) By the lowest drug concentration inhibiting bacterial growth
- d) By the ratio of the toxic dose to the therapeutic dose
- (vii) Select the type of fungi that involves obtaining nutrients from dead organic matter or non living components

The second secon	b) Parasitism
a) Autotrophy	d) Symbiosis
c) Saprophytic (viii) Select the type of plasmid known for carrying antibiotic resistance genes. b) Virulence plasmids	
(viii) Select the type of plasmid known for carrying	b) Virulence plasmids
a) F-plasmids	J) Dogradative plasmids
c) R plasmids	irby-Bauer disk diffusion test explain
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?	
about the susceptibility of a bacterial patriogen	b) It measures the bacterial density in the
a) It directly correlates with the antibiotic's	14a
solubility.	d) It represents the antibiotic's concentration
c) It reflects the antibiotic's effectiveness	in the test.
against the pathogen. (x) Identify the domain of life includes microbes lik	e bacteria, archaea, and cyanobacteria?
	b) Bacteria
a) Eukarya	d) Prokarya
c) Archaea	
(xi) Write the purpose of the streak plate technique	b) To sterilize glassware
 a) To count bacterial colonies 	d) To isolate and separate individual bacterial
c) To visualize bacterial endospores	colonies
	7.7
(xii) How do lactose-fermenting colonies develop or	b) Yellow in color
a) Blue in color	d) Colorless
c) Pink to red in color (xiii) Horizontal gene transfer (HGT) in bacteria is diff	forent from vertical gene transfer
because it involves the transfer of genes:	igitali ilom vertissi gene a
	b) Between unrelated species
a) Within the same chromosome	d) During meiosis
c) Between parent and offspring d) During meiosis (xiv) Which bacterial genus is particularly targeted and detected using acid-fast staining?	
	b) Salmonella
a) Escherichia	d) Streptococcus
c) Mycobacterium(xv) Identify which of the following mechanisms of I	
transfer of genetic material via a virus.	
a) Transformation	b) Transduction
c) Conjugation	d) Replication
c) conjugation	
Group-B	
(Short Answer Ty	
(Answer any Five fi	
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2. Explain why Late Blight is Considered Among Epide	emic 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	a in microbiology, and give an example of (3)
a differential medium.	
6. Differentiate latent TB infection (LTBI) and active TB disease, and what factors can cause LTBI (3)	
to progress to active disease. OR	
Explain the role of the Spike protein (S protein) of SARS-CoV-2, and how does it facilitate the (3) virus's entry into host cells.	
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Grou	p-C
(Long Answer Ty	Una Ouastiana)
(Answer any Six from the following) 5 x 6=30	

7. Describe the principles behind physical dry heat and moist heat sterilization in bacterial (5) culture 8. Differentiate between F+ (donor) cells, F- (recipient) cells, and Hfr cells in bacterial (5) conjugation. Explain the implications of the integration of the F-plasmid into the chromosomal DNA of Hfr cells. 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. 10. Describe the process by which antimicrobial activity is determined against specific (5) pathogen. 11. Explain the biology of TMV, including its viral structure and the key proteins involved in its (5) replication. 12. Explain the components of the SARS-CoV-2 S protein, including the S1 and S2 subunits, and (5) 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? Explain the mode of action of antibiotic penicillin that inhibit cell wall synthesis. Write the (5) difference between narrow-spectrum and broad-spectrum antibiotics.