

Microbe Mission Test Answer Key

Question 1: Cocci (e.g., *Staphylococcus aureus*), Bacilli (e.g., *Escherichia coli*), Spirochetes (e.g., *Treponema pallidum*).

Question 2: Fixation, crystal violet stain, iodine treatment, decolorization, safranin counterstain. Gram-positive bacteria retain purple color, Gram-negative appear pink.

Question 3: Lag phase, log phase (exponential growth), stationary phase, death phase.

Question 4: Lytic: Virus replicates immediately, lysing the host cell. Lysogenic: Virus integrates into the host genome, remaining dormant before activation.

Question 5: a) Bread/beer fermentation, b) Algal biofuels, c) Bioremediation.

Question 6: Generates a proton gradient across the membrane, driving ATP synthesis via ATP synthase.

Question 7: Liquid culture (growth in broth) vs. agar plates (solid medium for colony formation).

Question 8: Attachment, penetration, biosynthesis, maturation, release.

Question 9: Observation that microscopic counts of bacteria exceed colony counts on plates due to non-culturable organisms.

Question 10: Misfolded proteins that induce abnormal folding in normal proteins, leading to neurodegenerative diseases.

Question 11: Contribute to cell wall structure and function, aid in ion transport, and provide rigidity.

Question 12: Organisms thriving in extreme conditions: Halophiles (high salt), thermophiles (high heat), psychrophiles (cold).

Question 13: Bacteria: No nucleus, circular DNA, no organelles. Eukaryotes: Nucleus, linear DNA, organelles.

Question 14: Catalase breaks down H_2O_2 into water and oxygen, preventing oxidative damage to cells.

Question 15: Selective media inhibit certain microbes while allowing others to grow; differential media distinguish microbes based on biochemical reactions.

Question 16: Malaria and cerebral malaria, transmitted by *Anopheles* mosquitoes.

Question 17: Sterilization eliminates all microbes; disinfection reduces microbial load but may not eliminate all.

Question 18: Brightfield microscopy (general observation) and SEM (detailed surface structures).

Question 19: Use of microbes to degrade pollutants, e.g., *Pseudomonas* degrading oil spills.

Question 20: Endospores protect genetic material, enabling bacteria to withstand extreme conditions like heat and

desiccation.