

Key for Lecture Exam #1

1. Define:

Microbiology – The science or study of organisms too small to be observed with the naked eye or without the aid of a microscope. The organisms involved are called microorganisms or microbes and include archaea, bacteria, protozoa, microscopic algae and fungi, a variety of multicellular parasites and non-cellular entities such as viruses, viroids and prions.

Osmosis – Osmosis is the movement of solvent (usually water) from an area of low solute concentration to an area of higher solute concentration through a membrane that is permeable to the solvent but not to the solute.

Nucleoid– The nucleoid is a prokaryotic cell structure similar to the eukaryotic nucleus, but without a membranous envelope. The nucleoid contains a very dense accumulation of circular DNA and is the control center of the cell in that it determines what proteins the cell can make and therefore what metabolic activities it can engage in.

2. Food processing and preservation, e.g., the making of cheese, bread, wine, beer, yogurt, sauerkraut, etc.
3. Matching letter sequence is: F, E, B, A, D and C.
4. Robert Koch/ Louis Pasteur
5. Reproduce/ respond (fast response = irritability or behavior, slow response = adaptation)
6. Dehydration synthesis or condensation
7. Matching letter sequence is: H, I, A, B, D, J, E, G, F and C.
8. Phospholipids/ amphipathic or amphiphilic
9. Water will exit the cells and they will shrivel up or possibly implode.
10. Simple diffusion
11. Concentration and electrical gradients/ symporter (or symport)
12. Pinocytosis
13. Positive phototaxis
14. Kinesin and dynein/ Golgi body (complex, apparatus)
15. Matching letter sequence is: I, L, F, H, J, C, A, E, D, G, K and B
16. Structures associated with eukaryotic cells = A, E, F, H, J and K
Structures associated with prokaryotic cells = A, B, C, D, G, I, J, K and L.
17. Chromatin/ histones

18. Mitochondria and chloroplasts/ These organelles have 70S ribosomes and ccc-DNA
19. Sporulation/ Endospores contain more DNA and less RNA than vegetative cells, they also contain much less water and are metabolically inactive. They have high levels of calcium and dipicolinic acid and are surrounded by two layers of cell membrane and two layers of wall like material. Endospores are more resistant to damage caused by heat, drying, pressure, radiation and toxic chemicals than are vegetative cells, and they can remain potentially viable (but dormant) for longer periods of time.
20. Taxonomy
21. Order
22. Matching letter sequence is: D, C, B, E, F and A.
23. Photoautotrophs/ hypotrophs
24. Obligate aerobes/ respiratory or oxidative
25. pH indicators
26. Matching letter sequence is: F, A, H, G, D, E, B and C.
27. Archaea/ Archaea never have peptidoglycan in their cell walls, and their membrane lipids are unlike those of bacteria or eukaryotic cells. They have glycerol molecules that are mirror images of those found within other cell types, and connect to their lipid “tails” with ether linkages instead of ester linkages. Archaeal membranes often have isoprenoid sidechains and sometimes carry cyclopropane or cyclohexane rings. In some species the lipid “tails” are fused within the membrane, thus changing the lipid bilayer into a monolayer with two polar “heads”.
28. Define:

Luciferase – Luciferase is a type of enzyme encoded by lux genes and involved in bioluminescence. Luciferase enzymes act upon luciferins, causing them to emit light. In this sense, luciferase enzymes catalyze reactions converting chemical energy into light energy. The term luciferase is derived from Lucifer = the angle of light, and luciferase enzymes occur in a wide variety of organisms including *Photobacterium* and *Noctiluca*.

Mycorrhizae – Mycorrhizae are specialized hyphae of fungi that form mutualistic relationships with plants by interacting with their roots. The mycorrhizae help the plants obtain minerals (primarily phosphorous) and water from soil, so improve their survival. The fungi are able to obtain nutrients from the plant roots they interact with.

Trichocysts – Trichocysts are tiny, dart-like structures that shoot out of certain protozoa in the phylum Ciliophora, e.g., *Paramecium*. Trichocysts attach to the cells releasing them by slender threads, so can be used for attachment or for capturing prey. They are also used as a defense mechanism, and are often released in response to chemical signals.
29. Leghemoglobin/ bacteriorhodopsin

30. Matching letter sequence is: B, C, J, A, F, E, I, D, H and G
31. Mycology/ phycology
32. Cell walls
33. Conidiospores
34. Plasmogamy/ meiosis/ sporophyte
35. Fungus products include alcohol (ethyl, butyl, etc.), acids and other organic solvents, recombinant proteins (enzymes, etc.), jet fuel equivalent substances, and antibiotics (Penicillin and Cephalosporin).
36. Matching letter sequence is: F, I, D, E, H, J, B, G, A and C
37. Algae are respiratory organisms, so use oxygen as a final electron acceptor during their metabolic processes. Algae make more oxygen than they use during daylight hours, but at night when no light is available, they cannot make oxygen at all. During the night algae can use up so much oxygen that they cause fish and other organisms living in the water to suffocate and die.
38. Phycobilin
39. Pseudopodia/ cirri
40. Cytostome/ lysosomes
41. Contractile vacuoles
42. Trophozoite
43. Schizogony or multiple fission/ syngamy
44. Definitive/ intermediate
45. When adults and offspring are in different locations, there is less competition for nutrient supplies and living space, each host organism suffers less damage, the parasite population is spread out, so if a few hosts die, the parasite population is not severely impacted. This increases their potential for survival.
46. Matching letter sequence is: F, G, D, A, H, E, I, B, J and C
47. *Fasciola hepatica* (sheep liver flukes), *Ascaris lumbricoides*, *Enterobius vermicularis* (pinworm, threadworm or seat worm), and *Dracunculus medinensis* (Guinea worm)
48. Ectoparasites are of interest to microbiologists because many of them are vectors involved in the transmission of etiological agents including viruses, bacteria, protozoa and some other multicellular parasites.