1. Define the following terms:
    a. Pathogenicity the ability to cause disease
    b. Virulence the degree/extent of pathogenicity (how severe)
    c. Pathogenesis the manner in which a disease develops (how infection is acquired & what areas of the body the microbe infects)

2. How can microbes gain entrance into the host?
    1. Mucous membranes
    2. Skin
    3. Parenteral route

3. What are adhesins/ligands?
    Surface molecules that bind to complementary surface receptors on cells of certain host tissues

4. Where can adhesins be located?
    Flagella, pili

5. What are biofilms?
    Masses of microbes & their extracellular products; attach to surfaces

6. What does the severity of the disease depend on?
    The virulence of the pathogen

7. What is the virulence factor?
    A characteristic or structure that contributes to the ability of a microbe to cause disease

8. How is virulence expressed?
    ID_{50} → "**i**nfectious **d**ose" for **50%** of the test population (animals)
    LD_{50} → "**l**ethal **d**ose" for **50%** of the tested population (can be used to indicate how much toxin is required to cause symptoms (ie the potency of the toxin)

9. List the virulence factors that allow pathogens to evade or penetrate host defenses.
   - antiphagocytic factors
   - cell wall components
   - exoenzymes
   - antigenic variation
   - invasins

10. What are antiphagocytic factors?
    The ability to kill phagocytes (a type of white blood cell)... glycocalyces, capsules, m protein are
    all antiphagocytic factors

11. What does m protein and mycolic acid do in terms in virulence?
    M protein → heat, acid, & phagocytosis resistant, helps attach
    Mycolic acid → resists digestion by phagocytosis

12. List the exoenzymes produced by some pathogens and their functions.
    - coagulase → produced by some pathogens to form fibrin clots in blood (isolates & protects bacteria from host defenses)
    - kinase → breaks down blood clots that the body's defenses have formed to isolate the infection (releases pathogens to other areas)
    - collagenase → breaks down the collagen protein in connective tissues (allows gas gangrene to spread)

13. What is antigenic variation?
    The ability of some bacteria, viruses, or parasitic protozoans, to change their antigens by the time the body makes antibodies to fight it (keeps it from being recognized)

14. Explain antigenic drift.
    Mutation as pathogen replicates

15. What are invasins?
    Surface proteins microbes produce to penetrate the host cell's membrane

16. What do pathogens use in the host cell's cytoskeleton to propel themselves?

    Actin

17. How do pathogens damage host cells?

    a. Using host cell's nutrients
    b. Direct damage (disrupt function, produce waste, cause cell to lyse)
    c. Producing toxins

18. Define the following terms:

    a. Toxin substance that contributes to pathogenicity
    b. Toxigenicity ability to produce a toxin
    c. Toxemia presence of toxin in the host's blood
    d. Toxoid inactivated toxin used in a vaccine
    e. Antitoxin antibodies against a specific toxin

19. What are superantigens?

    Bacterial proteins (antigens) that provoke an intense immune response, resulting in excessive release of cytokines (substances that regulate immune responses) from host cells

20. List the portals of exit.

    1. Respiratory
    2. Skin scales
    3. Gastrointestinal tract
    4. Genitourinary (urogenital) tract
    5. Blood