Unit 6.2. MCQs Set 1

Results

#1. Q1. The term “Microbiology” historically is credited to have begun significantly with:

☐
(A). Louis Pasteur’s invention of the polio vaccine
☐
(B). Antonie van Leeuwenhoek’s observation of “animalcules” under a simple microscope
☐
(C). Robert Koch discovering penicillin
☐
(D). Joseph Lister developing smallpox vaccine

Antonie van Leeuwenhoek’s 17th-century observations of microscopic “animalcules” marked a foundational moment in microbiology.

#2. Q2. Historical success in vaccination famously began with:

☐
(A). Edward Jenner’s smallpox vaccine using cowpox
☐
(B). Jonas Salk’s polio injection
☐
(C). Louis Pasteur’s antiseptic spray
☐
(D). Alexander Fleming’s antibiotic

Edward Jenner’s demonstration in 1796 using cowpox to confer immunity to smallpox laid the foundation for modern immunization.

#3. Q3. Epidemics differ from pandemics in that an epidemic:

☐
(A). Is a global outbreak
☐
(B). Is confined to a smaller region or community
☐
(C). Affects only animals
☐
(D). Is never contagious

Epidemics are localized surges of disease, unlike pandemics which spread across continents or worldwide.

#4. Q4. Reasoning: Why is knowledge of historical pandemics (like the 1918 flu) important in microbiology?

☐
(A). They have no modern relevance
☐
(B). They provide insight into pathogen spread, mutation, and control measures essential for future outbreak preparedness
☐
(C). None
☐
(D). Strictly ancient curiosity

Studying past pandemics offers invaluable lessons on disease spread, mutation, and effective public health responses.

#5. Q5. “Antimicrobial resistance” arises mainly because

☐
(A). Microbes remain static
☐
(B). Overuse or misuse of antibiotics fosters resistant strains
☐
(C). Vaccines always cause resistance
☐
(D). None

Excessive and inappropriate use of antibiotics applies selective pressure that leads to the proliferation of resistant microbial strains.

#6. Q6. Which statement about immune responses by microorganisms is correct?

☐
(A). Microbes themselves do not produce immune responses
☐
(B). Certain bacteria can produce molecules to evade or modulate host immunity
☐
(C). Viruses develop allergic reactions in humans
☐
(D). None

Some bacteria secrete molecules (such as bacteriocins) that help them evade or modulate the host’s immune system.

#7. Q7. Sterilization is defined as:

☐
(A). Reducing microbial count to safe levels
☐
(B). Complete destruction or removal of all forms of microbial life, including spores
☐
(C). None
☐
(D). Basic cleaning with soap

Sterilization entails the total elimination of all microbial life forms, including spores.

#8. Q8. Disinfection differs from sterilization by:

☐
(A). Killing spores always

☐
(B). Achieving a significant reduction of pathogens but not necessarily eliminating spores
☐
(C). None
☐
(D). None of the above

Disinfection significantly reduces the number of pathogens but does not reliably kill all spores.

#9. Q9. Microbial diversity includes:

☐
(A). Only bacteria
☐
(B). Bacteria, archaea, fungi, protozoa, algae, viruses—varied forms with unique physiology
☐
(C). None
☐
(D). Exclusive eukaryotes

Microbiology encompasses diverse life forms including bacteria, archaea, fungi, protozoa, algae, and viruses.

#10. Q10. Microbial physiology studies:

☐
(A). The morphological classification only
☐
(B). Nutritional requirements, growth, metabolism, and environmental responses
☐
(C). None
☐
(D). Genetic doping

Microbial physiology investigates the growth, metabolism, and adaptive responses of microbes to their environment.

#11. Q11. The “Gut-Brain axis (GBA)” concept suggests:

☐
(A). Microbes have no role in mental health
☐
(B). The gut microbiome influences central nervous system function and vice versa
☐
(C). None
☐
(D). Strictly about infection in the brain

The gut-brain axis describes the bidirectional communication between gut microbes and the brain via neural and biochemical pathways.

#12. Q12. The term “Microbiome” specifically references:

☐
(A). Any single microbe
☐
(B). All microorganisms living in or on a host and their collective genetic material
☐
(C). None
☐
(D). Only pathogens in the gut

The microbiome comprises the entire community of microorganisms in a specific environment and their genetic material.

#13. Q13. Microorganism isolation typically starts with:

☐
(A). Observing synergy
☐
(B). Streak plating or dilution to obtain pure colonies
☐
(C). Genetic doping
☐
(D). None

Isolation of microbes is typically achieved by streak plating or dilution methods to secure pure colonies.

#14. Q14. Characterization of microbes often involves:

☐
(A). Gram staining, morphological observation, biochemical tests, and possibly molecular methods
☐
(B). None
☐
(C). A single universal test
☐
(D). Visual guess

Microbial characterization involves a combination of staining, morphology, biochemical testing, and molecular analyses.

#15. Q15. Culture media can be classified broadly as:

☐
(A). Only selective
☐
(B). Simple, complex, selective, differential, enriched, etc.
☐
(C). None
☐
(D). All sterile

Different types of culture media are used to meet various nutritional and selective requirements for microbial growth.

#16. Q16. Environmental microflora refers to:

☐
(A). Microbes found only in deep seas
☐
(B). The indigenous microbial population in habitats such as soil, water, and air
☐
(C). None
☐
(D). Strictly pathogens

Environmental microflora comprise the naturally occurring microbial communities in various ecosystems.

#17. Q17. Bio-remediation uses:

☐
(A). None of doṣas
☐
(B). Microorganisms to degrade or detoxify pollutants, cleaning up contaminated sites
☐
(C). Strict mechanical filtration
☐
(D). Infectious prions

Bio-remediation employs microorganisms to metabolize and detoxify environmental pollutants.

#18. Q18. Dairy microbiology focuses on:

☐
(A). Food safety, beneficial fermenting bacteria, and spoilage prevention in milk products
☐
(B). None
☐
(C). Infectious disease only
☐
(D). No microbes in dairy

Dairy microbiology involves both utilizing beneficial bacteria in fermentation and preventing spoilage by harmful microbes.

#19. Q19. Indicator organisms (like coliforms) are used to:

☐
(A). Identify synergy in doṣa
☐
(B). Indicate possible contamination or the presence of pathogens in water/food
☐
(C). Provide no information
☐
(D). None

The presence of indicator organisms such as coliforms signals possible contamination in water or food.

#20. Q20. Waterborne diseases typically involve pathogens such as:

☐
(A). Vibrio cholerae, Salmonella typhi, protozoa like Giardia
☐
(B). None
☐
(C). HIV virus
☐
(D). Only prions

Waterborne diseases are most commonly caused by pathogens like Vibrio cholerae, Salmonella typhi, and Giardia.

#21. Q21. Genetic recombination in microbes includes:

☐
(A). Transformation, conjugation, transduction
☐
(B). None
☐
(C). Infecting humans only
☐
(D). Passive illusions

Microbial genetic recombination occurs through transformation, conjugation, and transduction.

#22. Q22. Transformation means:

☐
(A). Virus-mediated gene transfer
☐
(B). Bacterial cells picking up free DNA from the environment and incorporating it
☐

(C). None
☐
(D). Direct cell-to-cell contact

Transformation involves the uptake of free (naked) DNA from the environment into a competent bacterial cell.

#23. Q23. Conjugation requires:

☐
(A). None
☐
(B). Direct contact via a sex pilus between donor (F+) and recipient (F−) bacteria
☐
(C). Free DNA in the environment
☐
(D). No plasmid involvement

Conjugation occurs when an F+ cell transfers genetic material to an F− cell through direct contact via a sex pilus.

#24. Q24. Transduction is:

☐
(A). Bacteriophage-mediated gene transfer from one bacterium to another
☐
(B). None
☐
(C). Taking up naked DNA from the environment
☐
(D). Pilus-based plasmid transfer

Transduction is the process by which a bacteriophage transfers bacterial DNA from one cell to another.

#25. Q25. Historical perspectives of Microbiology includes:

☐
(A). None
☐
(B). Development of germ theory by Pasteur, Koch’s postulates, and discovering specific microbes for diseases
☐
(C). Only vaccination
☐
(D). No interest in pathology

The historical advances by Pasteur and Koch are central to the development of modern microbiology.

#26. Q26. Immune response by microorganisms might mean:

☐
(A). The host’s reaction to microbes
☐
(B). Some microbes produce bacteriocins or immune-modulating molecules
☐
(C). None
☐
(D). No advanced effects

Certain microbes can produce compounds that interfere with or modulate the host immune response.

#27. Q27. Sterilization method example:

☐
(A). Washing with cold water
☐
(B). Autoclaving at 121°C, 15 psi for ~15 minutes
☐
(C). None
☐
(D). Light dusting

Autoclaving at 121°C under pressure for approximately 15 minutes is a standard method for sterilization.

#28. Q28. Disinfection example:

☐
(A). Bleach solution or phenolics to reduce microbes on surfaces
☐
(B). None
☐
(C). Incineration
☐
(D). Ionizing radiation

Bleach and phenolic solutions are widely used for disinfection to reduce microbial loads on surfaces.

#29. Q29. Microbial diversity: archaea differ from bacteria because

☐
(A). None
☐
(B). They have distinct cell membrane lipids, lack peptidoglycan in their cell walls, and often inhabit extreme environments
☐
(C). They’re always viruses
☐
(D). They are the same as fungi

Archaea possess unique membrane lipids and cell wall compositions and are frequently found in extreme environments.

#30. Q30. Microbial physiology example question: “Obligate anaerobes” are those that

☐
(A). Need oxygen
☐
(B). Cannot survive in the presence of oxygen
☐
(C). None
☐
(D). Are archaea only

Obligate anaerobes are unable to survive when exposed to oxygen.

#31. Q31. Gut-Brain Axis indicates communication via:

☐
(A). Vagus nerve, immune mediators, and microbial metabolites (e.g., short-chain fatty acids)
☐
(B). None
☐
(C). Only bloodstream RBCs
☐
(D). Strict mental illusions

Communication along the gut-brain axis involves the vagus nerve, immune signals, and metabolites produced by gut microbiota.

#32. Q32. The microbiome can modulate mental health by:

☐
(A). None
☐
(B). Producing neurotransmitter-like compounds (e.g., serotonin precursors) and influencing the stress response
☐
(C). Infecting the brain
☐
(D). Banning nerve signals

The microbiome can produce compounds that influence neurotransmitter levels and affect mood and anxiety.

#33. Q33. Isolation of microbes requires:

☐
(A). Inoculating everything in one dish
☐
(B). Using sterile techniques and appropriate culture media (e.g., streak plates) to obtain pure colonies
☐
(C). None
☐
(D). A non-sterile approach

Isolating microbes typically involves sterile techniques, allowing single colonies to be obtained via methods like streak plating.

#34. Q34. Culture media examples:

☐
(A). Nutrient agar, MacConkey agar, blood agar
☐
(B). None
☐
(C). Metallic bhasma
☐
(D). Only sugar solutions

Common culture media include nutrient agar for general growth, MacConkey agar for Gram-negative differentiation, and blood agar for detecting hemolysis.

#35. Q35. Environmental microflora significance:

☐
(A). Converting nutrients, recycling elements, and forming symbiotic relationships with plants
☐
(B). None
☐
(C). Only causing diseases in nature
☐
(D). Strict negativity

Environmental microflora play critical roles in nutrient cycling and establishing symbiotic relationships with plants.

#36. Q36. Bio-remediation example is:

☐

(A). Spilling more oil
☐
(B). Using specialized bacteria to degrade petroleum in oil spills
☐
(C). None
☐
(D). Restricting any microbe usage

Specialized bacteria can metabolize and detoxify pollutants, such as those found in oil spills.

#37. Q37. In dairy microbiology, starter cultures for yogurt typically are:

☐
(A). Salmonella, Shigella
☐
(B). Lactobacillus bulgaricus and Streptococcus thermophilus
☐
(C). None
☐
(D). Infectious viruses

Lactobacillus bulgaricus and Streptococcus thermophilus are the primary cultures used for fermenting milk into yogurt.

#38. Q38. Indicator organisms like coliforms are tested in water because:

☐
(A). They are always pathogens
☐
(B). Their presence suggests fecal contamination and a potential presence of pathogens
☐
(C). None
☐
(D). They are beneficial

Coliform bacteria serve as indicators of fecal contamination and possible pathogen presence in water.

#39. Q39. Waterborne disease includes:

☐
(A). Tetanus
☐
(B). Cholera
☐
(C). None
☐
(D). Anthrax by inhalation

Cholera, caused by Vibrio cholerae, is a classic waterborne disease.

#40. Q40. Genetic recombination in bacteria does not involve:

☐
(A). Transformation
☐
(B). Conjugation
☐
(C). Transduction
☐
(D). Mitosis

Unlike eukaryotic mitosis, bacteria reproduce by binary fission and exchange genes via transformation, conjugation, or transduction.

#41. Q41. Transformation requires:

☐
(A). Competent recipient cells that can take up naked DNA from the environment
☐
(B). None
☐
(C). Virus injection
☐
(D). Pilus-based contact

For transformation, bacteria must be in a state of competence to take up free DNA.

#42. Q42. Conjugation typically needs:

☐
(A). Bacteriophage
☐
(B). A plasmid (F plasmid) or direct cell-to-cell contact between F+ and F− bacteria
☐
(C). None
☐
(D). Naked DNA

Conjugation requires direct contact between bacterial cells, often mediated by an F plasmid.

#43. Q43. Transduction uses:

☐
(A). Free-floating plasmids
☐
(B). Bacteriophage packaging bacterial DNA
☐
(C). None
☐
(D). Pre-formed toxins

Transduction is facilitated by bacteriophages that package and transfer bacterial DNA.

#44. Q44. Reasoning: Why is genetic recombination key in microbes?

☐
(A). None
☐
(B). It fosters genetic diversity, helps spread antibiotic resistance, and enables the evolution of new strains
☐
(C). No effect on evolution
☐
(D). All random illusions

Genetic recombination provides genetic variability, which is crucial for adaptation and antibiotic resistance.

#45. Q45. Historical perspective: Koch’s postulates are:

☐
(A). None
☐
(B). Criteria used to link a specific microbe with a specific disease
☐
(C). Sterilization guidelines
☐
(D). Vaccine schedules

Koch’s postulates establish a causal relationship between a microorganism and a disease.

#46. Q46. Immunization approach advanced significantly after:

☐
(A). Edward Jenner’s smallpox vaccine demonstration
☐
(B). Jonas Salk’s polio injection
☐
(C). Fleming discovered prions
☐
(D). None

Jenner’s work with cowpox-based smallpox vaccination initiated modern immunization practices.

#47. Q47. Antimicrobial resistance example is:

☐
(A). None
☐
(B). MRSA (methicillin-resistant Staphylococcus aureus)
☐
(C). Shigella doping
☐
(D). RBC doping

MRSA is a prominent example of a bacterial strain resistant to multiple antibiotics.

#48. Q48. Immune evasion by microbes can include:

☐
(A). Capsule formation, producing toxins interfering with immune cells, antigenic variation
☐
(B). None
☐
(C). Overly sedation
☐
(D). Enhanced RBC binding

Microbes can use capsule formation and antigenic variation to avoid detection and elimination by the host immune system.

#49. Q49. Gut-Brain axis research suggests certain probiotic strains may:

☐
(A). Have no mental effect
☐
(B). Influence mood, anxiety, or cognitive functions by modulating neurotransmitters
☐
(C). None
☐
(D). Infect the central nervous system

Certain probiotic strains can modulate neurotransmitter production, thereby affecting mood and mental health.

#50. Q50. Water tests for coliform detection often use:

☐
(A). None
☐
(B). Multiple tube fermentation (MPN) or membrane filtration to detect E. coli presence

☐
(C). No standard method
☐
(D). Pure guesswork

Standard methods such as MPN and membrane filtration are used to detect coliforms, including E. coli, in water.

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