

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 dosas
- (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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