

Q1. Which of the following microbes is commonly used in the production of ethanol?

- A. *Penicillium notatum*
- B. *Saccharomyces cerevisiae*
- C. *Streptococcus lactis*
- D. *Aspergillus niger*

Answer: B

Explanation: *Saccharomyces cerevisiae* (commonly known as yeast) is used in fermenting molasses to produce ethanol.

Q2. Which of the following microbes is used in the production of Swiss cheese?

- A. *Lactobacillus*
- B. *Penicillium roqueforti*
- C. *Propionibacterium shermanii*
- D. *Rhizobium leguminosarum*

Answer: C

Explanation: *Propionibacterium shermanii* is responsible for the formation of large holes in Swiss cheese due to CO<sub>2</sub> release.

Q3. Match the microbes in Column I with their industrial use in Column II:

Column I

Column II

- |                                    |                           |
|------------------------------------|---------------------------|
| A. <i>Aspergillus niger</i>        | 1. Ethanol production     |
| B. <i>Lactobacillus</i>            | 2. Lactic acid production |
| C. <i>Saccharomyces cerevisiae</i> | 3. Citric acid production |
| D. <i>Acetobacter aceti</i>        | 4. Acetic acid production |

- A. A-3, B-2, C-1, D-4
- B. A-2, B-1, C-4, D-3
- C. A-1, B-3, C-2, D-4
- D. A-4, B-2, C-3, D-1

Answer: A

Explanation:

*Aspergillus niger* → Citric acid

*Lactobacillus* → Lactic acid

*Saccharomyces cerevisiae* → Ethanol

*Acetobacter aceti* → Acetic acid

Q4. Which of the following is used as a clot buster in heart attack patients?

- A. Cyclosporin A
- B. Streptokinase
- C. Statins
- D. Erythropoietin

Answer: B

Explanation: Streptokinase, produced by *Streptococcus* species, is used to dissolve blood clots in myocardial infarction patients.

Q5. Identify the correctly matched pair:

- A. Statins – Antibiotic
- B. Cyclosporin A – Antifungal
- C. Penicillin – Immunosuppressive
- D. Cyclosporin A – Immunosuppressive

Answer: D

Explanation: Cyclosporin A, obtained from *Trichoderma polysporum*, is used to suppress immune response in organ transplant patients.

Q6. Assertion (A): *Trichoderma polysporum* is a fungal source of immunosuppressive drugs.

Reason (R): Cyclosporin A is used to boost immunity during infections.

- A. Both A and R are true, and R is the correct explanation.
- B. Both A and R are true, but R is not the correct explanation.
- C. A is true but R is false.
- D. A is false but R is true.

Answer: C

Explanation: Assertion is true; however, Reason is false — Cyclosporin A suppresses, not boosts, immune responses.

Q7. Which organism is used in the production of bio-gas in gobar gas plants?

- A. Methanobacterium
- B. Lactobacillus acidophilus
- C. Penicillium chrysogenum
- D. Rhizobium

Answer: A

Explanation: Methanobacterium, a methanogen, helps in anaerobic digestion of biomass to produce methane-rich bio-gas.

Q8. Which of the following statements is NOT true regarding microbes in sewage treatment?

- A. They help in removing organic matter.
- B. Activated sludge contains aerobic bacteria.
- C. Methanogens help in aerobic digestion.
- D. Biogas is produced during anaerobic sludge digestion.

Answer: C

Explanation: Methanogens are anaerobic, not aerobic. They function in anaerobic digestion.

Q9. Which of the following microbes is used to produce cyclosporin A?

- A. Monascus purpureus
- B. Aspergillus niger
- C. Trichoderma polysporum
- D. Clostridium butylicum

Answer: C

Explanation: Trichoderma polysporum is a fungus that produces the immunosuppressive drug cyclosporin A.

Q10. What is the primary function of lactic acid bacteria (LAB) in curd formation?

- A. Inhibit spoilage of milk by decreasing pH
- B. Convert lactose to methane
- C. Prevent ethanol production
- D. Aid in digestion of proteins

Answer: A

Explanation: LAB ferment lactose to lactic acid, reducing pH and inhibiting spoilage microbes — essential for curd formation.

Q11. Which microorganism is used for the production of statins that lower blood cholesterol?

- A. Streptococcus
- B. Monascus purpureus
- C. Trichoderma polysporum
- D. Penicillium chrysogenum

Answer: B

Explanation: Monascus purpureus is a yeast used in making statins, which inhibit cholesterol synthesis.

Q12. Match the following microbes with their use:

Microbe	Use
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- |                           |                                |
|---------------------------|--------------------------------|
| A. Clostridium butylicum  | 1. Acetic acid production      |
| B. Acetobacter aceti      | 2. Butyric acid production     |
| C. Streptococcus          | 3. Production of streptokinase |
| D. Trichoderma polysporum | 4. Cyclosporin A production    |

- A. A-2, B-1, C-3, D-4
- B. A-1, B-2, C-3, D-4
- C. A-2, B-3, C-1, D-4
- D. A-3, B-1, C-4, D-2

Answer: A

Explanation: Each microbe is matched with its correct metabolic product or drug use.

Q13. Which of the following microbes is correctly matched with its product?

- A. Streptococcus – Penicillin
- B. Penicillium notatum – Citric acid
- C. Aspergillus niger – Citric acid
- D. Monascus purpureus – Alcohol

Answer: C

Explanation: Aspergillus niger is used for large-scale production of citric acid.

Q14. Assertion (A): Activated sludge is a rich source of aerobic bacteria.

Reason (R): It is used in anaerobic digesters for methane production.

- A. Both A and R are true, and R is the correct explanation.
- B. Both A and R are true, but R is not the correct explanation.
- C. A is true but R is false.
- D. A is false but R is true.

Answer: C

Explanation: Activated sludge is aerobic, but anaerobic digestion and methane production happen separately in digesters.

Q15. In the sewage treatment plant, the role of anaerobic sludge digesters is to:

- A. Remove pathogens from water
- B. Oxidize organic matter
- C. Produce methane and biogas
- D. Aerate the sewage

Answer: C

Explanation: Anaerobic digesters decompose organic sludge anaerobically, producing methane-rich biogas.

Q16. Select the incorrect statement:

- A. Lactobacillus is used in curd production.
- B. Methanobacterium is aerobic and produces methane.
- C. Penicillium notatum produces penicillin.
- D. Trichoderma polysporum is a source of cyclosporin A.

Answer: B

Explanation: Methanobacterium is anaerobic, not aerobic.

Q17. Which of the following microbes is involved in retting of flax?

- A. Clostridium species
- B. Streptococcus species
- C. Rhizobium species
- D. Pseudomonas species

Answer: A

Explanation: Retting is the process of removing fiber from plant stems, aided by anaerobic bacteria like Clostridium.

Q18. Match the following microbial products with their applications:

ProductApplication

- |                      |                         |
|----------------------|-------------------------|
| A. Statin            | 1. Cheese ripening      |
| B. Lactic acid       | 2. Blood clot removal   |
| C. Streptokinase     | 3. Cholesterol lowering |
| D. Propionibacterium | 4. Curd production      |

- A. A-3, B-4, C-2, D-1
- B. A-4, B-3, C-1, D-2
- C. A-2, B-3, C-4, D-1
- D. A-1, B-2, C-3, D-4

Answer: A

Explanation:

Statin → cholesterol

Lactic acid → curd

Streptokinase → clot buster

Propionibacterium → cheese ripening

Q19. Which of the following pairs is correctly matched?

- A. Rhizobium – Production of antibiotics
- B. Lactobacillus – Ethanol production
- C. Methanobacterium – Biogas production
- D. Penicillium – Swiss cheese manufacture

Answer: C

Explanation: Methanobacterium is a methanogen that produces methane during anaerobic decomposition.

Q20. Assertion (A): Antibiotics are always produced by bacteria.

Reason (R): All bacteria produce useful metabolites.

- A. Both A and R are true, and R is the correct explanation.
- B. Both A and R are true, but R is not the correct explanation.
- C. A is false but R is true.
- D. Both A and R are false.

Answer: C

Explanation: Antibiotics can also be produced by fungi (e.g., Penicillium), and not all bacterial metabolites are useful.

Q21. Which microbe is used in the commercial production of ethanol?

- A. Aspergillus niger
- B. Saccharomyces cerevisiae
- C. Lactobacillus bulgaricus
- D. Clostridium butylicum

Answer: B

Explanation: Saccharomyces cerevisiae (yeast) is commonly used in the fermentation industry for ethanol production.

Q22. Identify the pair where both microbes are used in alcohol production:

- A. *Aspergillus* and *Penicillium*
- B. *Saccharomyces* and *Zymomonas*
- C. *Lactobacillus* and *Acetobacter*
- D. *Rhizobium* and *Azospirillum*

Answer: B

Explanation: Both *Saccharomyces cerevisiae* (yeast) and *Zymomonas mobilis* are used in ethanol fermentation.

Q23. Match the microbe with its respective industrial product:

Microbe	Product
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- |                              |                    |
|------------------------------|--------------------|
| A. <i>Acetobacter aceti</i>  | 1. Cheese ripening |
| B. <i>Propionibacterium</i>  | 2. Citric acid     |
| C. <i>Aspergillus niger</i>  | 3. Acetic acid     |
| D. <i>Monascus purpureus</i> | 4. Statins         |

- A. A-3, B-1, C-2, D-4
- B. A-1, B-2, C-3, D-4
- C. A-2, B-3, C-1, D-4
- D. A-3, B-4, C-2, D-1

Answer: A

Explanation:

*Acetobacter aceti* → acetic acid

*Propionibacterium* → Swiss cheese ripening

*Aspergillus niger* → citric acid

*Monascus purpureus* → statins

Q24. Assertion (A): Microbes can be used as biofertilizers in sustainable agriculture.

Reason (R): Cyanobacteria like *Anabaena* and *Nostoc* fix atmospheric nitrogen.

- A. Both A and R are true, and R is the correct explanation.
- B. Both A and R are true, but R is not the correct explanation.



- C. A is true but R is false.
- D. Both A and R are false.

Answer: A

Explanation: Anabaena and Nostoc fix nitrogen, enriching the soil naturally without chemical fertilizers.

Q25. Which of the following is used to ferment dough in dosa and idli batter?

- A. Lactobacillus
- B. Penicillium
- C. Acetobacter
- D. Aspergillus

Answer: A

Explanation: Lactobacillus helps ferment the dough, producing lactic acid and carbon dioxide.

Q26. Select the incorrect statement:

- A. Biogas is a mixture of methane, carbon dioxide, and hydrogen.
- B. Biocontrol agents reduce the need for chemical pesticides.
- C. Cyclosporin A is produced by *Trichoderma polysporum*.
- D. Antibiotics are effective against viruses.

Answer: D

Explanation: Antibiotics act against bacteria, not viruses.

Q27. Which of the following microbes helps in partial digestion of cellulose in the cow's stomach?

- A. Methanobacterium
- B. Rhizobium
- C. Lactobacillus
- D. *Clostridium butylicum*

Answer: A

Explanation: Methanobacterium, an anaerobic methanogen, aids in digestion and methane production in ruminants.

Q28. Match the following with respect to the role of microbes in sewage treatment:

Step      Microbial Role

- |                        |                                    |
|------------------------|------------------------------------|
| A. Primary treatment   | 1. Anaerobic digestion of sludge   |
| B. Secondary treatment | 2. Aerobic degradation of organics |
| C. Sludge digestion    | 3. Removal of physical particles   |

- A. A-3, B-2, C-1
- B. A-2, B-3, C-1
- C. A-1, B-2, C-3
- D. A-3, B-1, C-2

Answer: A

Explanation:

Primary → physical removal

Secondary → aerobic microbial activity

Sludge digestion → anaerobic digestion

Q29. Assertion (A): Biocontrol refers to using natural organisms to suppress pest populations.

Reason (R): *Bacillus thuringiensis* is sprayed directly on plants to eliminate nematodes.

- A. Both A and R are true, and R is the correct explanation.
- B. A is true but R is false.
- C. Both A and R are false.
- D. Both A and R are true, but R is not the correct explanation.

Answer: B

Explanation: *Bacillus thuringiensis* produces insecticidal toxins, but mainly targets insects, not nematodes.

Q30. Which of the following is not an example of microbial biofertilizer?

- A. *Anabaena*
- B. *Azotobacter*
- C. *Rhizobium*

D. *Penicillium*

Answer: D

Explanation: *Penicillium* is a fungus used in antibiotic production, not as a biofertilizer.

Q31. Which of the following is used to produce the bioactive molecule cyclosporin A?

A. *Trichoderma polysporum*

B. *Monascus purpureus*

C. *Clostridium butylicum*

D. *Penicillium notatum*

Answer: A

Explanation: *Trichoderma polysporum*, a fungus, produces cyclosporin A, used as an immunosuppressant in organ transplant patients.

Q32. *Monascus purpureus* is a yeast used commercially for producing:

A. Ethanol

B. Antibiotics

C. Statins

D. Biogas

Answer: C

Explanation: *Monascus purpureus* produces statins, which inhibit cholesterol synthesis in humans.

Q33. Match the following microbes with their industrial products:

Microbe	Product
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A. <i>Lactobacillus</i>	1. Curd production
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B. <i>Penicillium notatum</i>	2. Antibiotic
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C. <i>Methanobacterium</i>	3. Biogas
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D. <i>Aspergillus niger</i>	4. Citric acid
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A. A-1, B-2, C-3, D-4

B. A-2, B-3, C-1, D-4

C. A-3, B-1, C-4, D-2

D. A-1, B-3, C-2, D-4

Answer: A

Explanation:

Lactobacillus → curd

Penicillium notatum → penicillin

Methanobacterium → biogas

Aspergillus niger → citric acid

Q34. Assertion (A): Biogas production requires anaerobic digestion of biomass.

Reason (R): Anaerobic methanogens like Methanobacterium help in this process.

A. Both A and R are true, and R is the correct explanation.

B. Both A and R are true, but R is not the correct explanation.

C. A is true but R is false.

D. Both A and R are false.

Answer: A

Explanation: Methanogens like Methanobacterium convert organic matter into biogas anaerobically.

Q35. Which of the following is incorrectly matched?

A. Streptococcus – Lactic acid

B. Penicillium – Cheese ripening

C. Aspergillus – Citric acid

D. Clostridium – Antibiotic

Answer: D

Explanation: Clostridium is used in industrial fermentation, but not for antibiotic production.

Q36. Identify the microbe used as a single-cell protein (SCP):

A. Rhizobium

- B. Spirulina
- C. Lactobacillus
- D. Monascus purpureus

Answer: B

Explanation: Spirulina, a cyanobacterium, is rich in protein and used as SCP.

Q37. Biocontrol refers to:

- A. Use of chemical pesticides
- B. Use of herbicides to kill weeds
- C. Use of microbes to improve yield
- D. Use of natural predators and microbes to control pests

Answer: D

Explanation: Biocontrol uses living organisms (predators, parasites, microbes) to manage pest populations.

Q38. Match the following biocontrol agents with their use:

Organism	Use
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- |                           |                                     |
|---------------------------|-------------------------------------|
| A. Trichoderma            | 1. Control of plant pathogens       |
| B. Bacillus thuringiensis | 2. Insect pest control              |
| C. Ladybird beetle        | 3. Aphid predator                   |
| D. Nucleopolyhedrovirus   | 4. Insect-specific biocontrol agent |

- A. A-1, B-2, C-3, D-4
- B. A-2, B-1, C-3, D-4
- C. A-1, B-3, C-2, D-4
- D. A-3, B-2, C-1, D-4

Answer: A

Explanation:

Trichoderma → fungi that protect plants

Bt → kills insect larvae

Ladybird → feeds on aphids

NPV → virus used to control insect pests

Q39. Statement I: *Bacillus thuringiensis* produces protein crystals toxic to certain insects.

Statement II: The Bt toxin is active in the alkaline gut of insects.

- A. Both statements are true
- B. Only Statement I is true
- C. Only Statement II is true
- D. Both statements are false

Answer: A

Explanation: Bt toxin is ingested by insect larvae and becomes active in their alkaline midgut, leading to cell lysis.

Q40. Which of the following is a free-living nitrogen-fixing bacterium?

- A. *Rhizobium*
- B. *Azospirillum*
- C. *Anabaena*
- D. *Frankia*

Answer: B

Explanation: *Azospirillum* fixes nitrogen freely in the rhizosphere of grasses.

Q41. Assertion (A): Cyanobacteria are used as biofertilizers in rice fields.

Reason (R): They fix atmospheric nitrogen aerobically using heterocysts.

- A. Both A and R are true, and R is the correct explanation.
- B. Both A and R are true, but R is not the correct explanation.
- C. A is true but R is false.
- D. Both A and R are false.

Answer: A

Explanation: Cyanobacteria like *Anabaena* have heterocysts where nitrogen is fixed anaerobically, though overall growth may be aerobic.

Q42. Which one of the following microbes helps in the ripening of Swiss cheese and gives it a characteristic flavor?

- A. *Penicillium camemberti*
- B. *Lactobacillus bulgaricus*
- C. *Propionibacterium shermanii*
- D. *Streptococcus thermophilus*

Answer: C

Explanation: *Propionibacterium shermanii* releases CO<sub>2</sub>, forming characteristic holes and flavor in Swiss cheese.

Q43. Which of the following statements is incorrect regarding sewage treatment?

- A. Primary treatment involves physical removal of large particles.
- B. Secondary treatment uses aerobic microbes in aeration tanks.
- C. Activated sludge is used as fertilizer.
- D. Anaerobic sludge digestion releases CO and NH<sub>3</sub>.

Answer: D

Explanation: Anaerobic digestion of sludge primarily releases methane, CO<sub>2</sub>, and hydrogen sulfide—not CO or ammonia.

Q44. Which of the following microbe is a fungus used to produce a bioactive molecule?

- A. *Monascus purpureus* – Statins
- B. *Trichoderma viride* – Ethanol
- C. *Aspergillus niger* – Cheese ripening
- D. Yeast – Cyclosporin A

Answer: A

Explanation: *Monascus purpureus* produces statins, lowering cholesterol.

Q45. Which of the following cannot fix atmospheric nitrogen?

- A. *Azotobacter*
- B. *Nostoc*
- C. *Clostridium*
- D. *Pseudomonas*

Answer: D

Explanation: Pseudomonas is not a nitrogen fixer; others are nitrogen-fixing bacteria or cyanobacteria.