

Q.1 Read the following statements (A–E) and choose the correct only

- A. Yeasts, particularly *Saccharomyces cerevisiae*, are used for producing alcoholic beverages such as wine, beer, whisky, brandy, and rum.
- B. *Saccharomyces cerevisiae* used in brewing is the same species commonly called brewer's yeast, which is also used in bread-making.
- C. The yeast ferments malted cereals and fruit juices to produce ethanol.
- D. Wine and beer are obtained through the process of distillation, whereas whisky and rum are produced without distillation.
- E. The difference between various alcoholic drinks arises from the raw materials used and whether the fermentation product is distilled or not.

Options:

- (1) A, B and C only
- (2) A, B, C and E only
- (3) A, C, D and E only
- (4) C and D only

Q.2. Choose correct statement wrt streptokinase

- A. Streptokinase is an enzyme obtained from the bacterium *Streptococcus* and is used to dissolve blood clots in patients suffering from myocardial infarction.
- B. Streptokinase functions as a “clot buster” by activating plasminogen to form plasmin, which breaks down fibrin clots.
- C. Streptokinase produced through genetic engineering has improved specificity and fewer side effects compared to the native bacterial enzyme.
- D. Streptokinase helps in blood coagulation during surgical procedures to prevent excessive bleeding.
- E. The use of Streptokinase has revolutionised emergency management of heart attack patients.

- (1) A, B and C only
- (2) A, B, C and E only
- (3) A, C, D and E only
- (4) B and C only

Q.3. Read the following statements (A–E) carefully and choose the correct statements only

- A. *Aspergillus niger* is a fungus used for the industrial production of citric acid.
- B. *Acetobacter aceti* converts ethanol into acetic acid and is therefore employed in vinegar production.
- C. *Clostridium butylicum* produces lactic acid, which is widely used in curd formation.
- D. *Lactobacillus* is used for the production of lactic acid through fermentation.
- E. Lipases are microbial enzymes added to detergents for breaking down oily stains, while pectinases and proteases are used to clarify fruit juices.

- (1) A, B and D only
- (2) A, B, D and E only
- (3) A, C, D and E only
- (4) A and C only

Q.4. Read the following statements (A–E) carefully and choose the incorrect statement only

- A. Municipal wastewater, also called sewage, contains large amounts of organic matter and microbes, many of which are pathogenic.
- B. Sewage can be directly released into rivers and streams after filtration since it is mostly harmless.
- C. Sewage treatment involves the use of heterotrophic microbes that help reduce organic load and make wastewater less polluting.
- D. The first stage of sewage treatment, known as primary treatment, involves physical removal of large and small particles through filtration and sedimentation.
- E. The solid material that settles during primary treatment is called primary sludge, while the supernatant liquid is taken forward for secondary (biological) treatment.

Options:

- (1) A, C, D and E only
- (2) C and D only
- (3) B only
- (4) A, B, D and E only

- Q.5.** Read the following statements (A–E) carefully and choose the correct statements only
- A.** Cyclosporin A is a bioactive compound produced by the fungus *Trichoderma polysporum* and is used as an immunosuppressant in organ-transplant patients.
 - B.** Cyclosporin A acts by stimulating the immune system to enhance graft acceptance.
 - C.** Statins, obtained from the yeast *Monascus purpureus*, are used to lower blood cholesterol levels.
 - D.** Statins inhibit the enzyme HMG-CoA reductase, which is responsible for cholesterol biosynthesis in the body.
 - E.** Both Cyclosporin A and Statins are examples of microbial secondary metabolites with important therapeutic applications.

Options:

- (1) A, C and D only (2) A, B, C and D only
 (3) A, C, D and E only (4) B and D only

- Q.6.** Read the following statements (A–E) carefully and choose the incorrect statements only
- A.** Biogas is composed of methane and carbon dioxide only, produced through anaerobic microbial activity.
 - B.** Methanogens such as *Methanobacterium* grow aerobically on cellulosic material to produce methane.
 - C.** Methanogens are found in aerobic sludge and in the rumen of cattle, where they help digest cellulose.
 - D.** Human beings can digest cellulose efficiently because of methanogenic bacteria present in the intestine.
 - E.** The Indian Agricultural Research Institute (IARI) and the Khadi and Village Industries Commission (KVIC) played major roles in developing biogas technology in America.

Options:

- (1) A, B and D only
 (2) A, C and E only
 (3) A, C, D and E only
 (4) All statements are incorrect

- Q.7.** Read the following statements (A–E) carefully and select correct one only :
- A.** After the discovery of Penicillin, several other antibiotics such as Streptomycin, Tetracycline, and Erythromycin were isolated from different microbial sources.
 - B.** Antibiotics have been effective in controlling diseases like plague, diphtheria (*gal ghotu*), whooping cough (*kali khansi*), and leprosy (*kusht rog*) that once caused millions of deaths.
 - C.** Antibiotics can be synthesised only through chemical means and not by microbial fermentation.
 - D.** Industrial production of microbial products such as antibiotics and beverages requires the use of large vessels called fermentors.
 - E.** Fermentors are used to maintain controlled conditions for temperature, aeration, and nutrient supply during large-scale microbial growth.

- (1) A, B and D only (2) A, B, D and E only
 (3) A, C, D and E only (4) B and C only

- Q.8.** Read the following statements (A–E) carefully and choose the correct statements only
- A.** Not all microbes are harmful; many are beneficial and play vital roles in food processing, medicine, and environmental management.
 - B.** *Lactobacillus* converts milk into curd and improves its nutritional value by increasing vitamin B₁₂ content.
 - C.** *Saccharomyces cerevisiae* is used in fermentation of dough for idli, dosa, and bread due to its ability to release carbon dioxide.
 - D.** Methanogens degrade plant waste to produce methane-rich biogas, which is used as an eco-friendly fuel source.
 - E.** Antibiotics such as penicillin are produced by harmful microbes and used to destroy useful microbes in sewage treatment.

- (1) A, B, C and D only
 (2) A, C, D and E only
 (3) A, B, D and E only
 (4) C and D only

Q.9. Read the following statements (A–E) given for secondary or biological treatment in STP. Choose correct statements only

- A.** In secondary sewage treatment, primary effluent is aerated to promote growth of aerobic microbes that form flocs—mesh-like masses of bacteria and fungal filaments.
- B.** During aeration, these microbes oxidise most of the organic matter, thereby lowering the Biochemical Oxygen Demand (BOD) of the effluent.
- C.** The higher the BOD of wastewater, the lower is its polluting potential.
- D.** The sediment formed after secondary treatment is called activated sludge, part of which is recycled as inoculum.
- E.** The anaerobic digestion of activated sludge produces a mixture of gases such as methane, H₂S, and CO₂ that can be used as biogas.

Options:

- (1) A, B and D only
- (2) A, B, D and E only
- (3) A, C, D and E only
- (4) All statements are correct

Q.10. Read the following statements (A–E) carefully and choose the correct statements only

- A.** Ladybird beetles and dragonflies act as natural biocontrol agents against aphids and mosquitoes, respectively.
- B.** *Bacillus thuringiensis* spores, when ingested by insect larvae, release toxins in the larval gut that kill them without harming other insects.
- C.** Bt toxin genes have been introduced into crop plants using genetic engineering, making them resistant to specific insect pests such as cotton bollworms.
- D.** *Trichoderma* species are free-living bacteria found in the root ecosystem that act as biocontrol agents against insect pests.
- E.** Baculoviruses, particularly those belonging to the genus *Nucleopolyhedrovirus*, are used as species-specific biocontrol agents with minimal environmental impact.

- (1) A, B and C only
- (2) A, B, C and E only
- (3) A, C, D and E only
- (4) A and B only

Q.11. Read the following statements (A–E) and choose the incorrect option wrt to fermented food

- A.** The dough used for preparing dosa and idli is fermented by bacteria, and its puffed-up appearance is due to the production of carbon dioxide.
- B.** The fermentation of bread dough is carried out by the fungus *Saccharomyces cerevisiae*, commonly known as baker's yeast.
- C.** The traditional drink 'toddy' of southern India is prepared by fermenting palm sap with the help of microbes.
- D.** The large holes in Swiss cheese are formed due to the production of sulphur dioxide by the bacterium *Propionibacterium sharmanii*.
- E.** The distinct flavour of Roquefort cheese develops due to bacterial fermentation in the absence of any fungal involvement.

- (1) A, B, C and D only
- (2) A, B and C only
- (3) A, B, D and E only
- (4) D and E only

Q.12. Read the following statements (A–E) carefully and choose the correct statements only

- A.** Excessive use of chemical fertilisers contributes to environmental pollution and soil degradation.
- B.** Biofertilisers are living organisms that improve soil fertility by enriching it with essential nutrients.
- C.** *Rhizobium* forms a symbiotic association with roots of leguminous plants and helps in fixing atmospheric nitrogen into usable organic forms.
- D.** *Azospirillum* and *Azotobacter* are examples of symbiotic bacteria that fix atmospheric nitrogen inside root nodules of legumes.
- E.** Biofertilisers help reduce dependence on chemical fertilisers and promote sustainable organic farming.

- (1) A, B and C only
- (2) C and E only
- (3) A, C, D and E only
- (4) A, B, C and E only

Q.13. Read the following statements (A–E) carefully and choose the correct statements only

- A.** Members of the fungal genus *Glomus* form mycorrhizal associations with plant roots and help in phosphorus absorption from the soil.
- B.** Mycorrhizal associations enhance a plant's resistance to root-borne pathogens and increase tolerance to salinity and drought.
- C.** The fungus in a mycorrhizal association provides minerals and water to the plant but receives no benefit in return.
- D.** Cyanobacteria such as *Anabaena*, *Nostoc*, and *Oscillatoria* are autotrophic microbes capable of fixing atmospheric nitrogen.
- E.** Blue-green algae enrich soil fertility in paddy fields by adding both nitrogen and organic matter to the soil.

- (1) A, B and D only
- (2) A, C, D and E only
- (3) A, B, D and E only
- (4) All statements are incorrect

Q.14. Read the following statements (A–E) and choose the correct statement only

- A.** Lactic acid bacteria (LAB), such as *Lactobacillus*, convert milk into curd by producing acids that coagulate milk proteins.
- B.** The process of curd formation requires the use of an inoculum or starter that already contains millions of LAB.
- C.** The growth of LAB in milk decreases its nutritional quality by destroying vitamins.
- D.** Curd formation improves the nutritional value of milk by increasing the content of Vitamin B₁₂.
- E.** LAB present in the human stomach also help suppress disease-causing microbes.

- (1) A, B and D only
- (2) A, B, D and E only
- (3) A, C, D and E only
- (4) B and D only

Q.15. Read the following statements (A–E) carefully and choose the incorrect statements from the following

- A.** Biocontrol refers to the use of chemical methods to manage plant pests and diseases instead of toxic chemicals.
- B.** The organic farming approach believes that biodiversity enhances sustainability and ecosystem imbalance.
- C.** Conventional chemical farming methods often destroy both harmful pests and beneficial organisms indiscriminately.
- D.** The organic farmer aims for complete eradication of pests to protect crops and ensure high yield.
- E.** Biocontrol methods rely on natural predators, parasites, and ecological balance to maintain pest populations at manageable levels.

- (1) A, B and D only
- (2) A, B, C and E only
- (3) A, C, D and E only
- (4) C and D only

Q.16. Choose correct statements wrt to BOD

- A.** BOD refers to the amount of oxygen required by microorganisms to oxidize all the organic matter present in one litre of water.
- B.** A higher BOD value of a water sample indicates greater organic pollution.
- C.** BOD is an indirect measure of the organic matter present in the water sample.
- D.** The sewage water is considered completely treated when the BOD becomes very high.
- E.** The BOD test measures the rate of oxygen uptake by microorganisms in the sample.

- (1) A, B and C only
- (2) A, B, C and E only
- (3) A, C, D and E only
- (4) C and D only

- Q.17.** Choose correct statements regarding Cyclosporin A
- A. Cyclosporin A is a bioactive molecule produced by the fungus *Trichoderma polysporum*.
 - B. Cyclosporin A acts as an immunosuppressant used in organ-transplant patients to prevent graft rejection.
 - C. Cyclosporin A enhances immune-cell activation to accelerate graft acceptance.
 - D. Cyclosporin A is widely used to suppress the immune response by inhibiting T-cell activation.
 - E. Cyclosporin A is an example of a microbial secondary metabolite with important therapeutic application.

- (1) A, B and D only
- (2) A, C, D and E only
- (3) A, B, D and E only
- (4) C and D only

- Q.18.** Read the following statements (A–E) carefully about antibiotics and choose the incorrect statements only

- A. The term *antibiotic* literally means “against life,” yet for humans they act as *pro-life* agents by destroying harmful microbes.
- B. Alexander Fleming discovered Penicillin while working with *Staphylococcus* bacteria when he observed inhibition caused by a mould on his culture plate.
- C. The bacterium that produced Penicillin was identified as *Penicillium notatum*.
- D. The large-scale therapeutic use of Penicillin was developed and established by Ernest Chain and Howard Florey.
- E. The trio—Fleming, Chain and Florey—were jointly awarded the Nobel Prize for Medicine in 1954 for the discovery and development of Penicillin.

- (1) A, B, D and E only
- (2) A, B, C and D only
- (3) A, C, D and E only
- (4) C and E only

- Q.19.** Choose the correct statements wrt to mycorrhiza

- A. Members of the genus *Glomus* form mycorrhizal associations with plant roots.
- B. The fungal partner helps the plant by absorbing phosphorus from the soil and transferring it to the host plant.
- C. Plants having mycorrhizal associations show improved tolerance to drought and salinity, and better resistance to root-borne pathogens.
- D. The fungus receives organic food material (carbohydrates) from the plant as a reward for its services.
- E. Mycorrhizal fungi are harmful parasites that decrease plant growth by absorbing nutrients from the roots.

- (1) A, B and D only
- (2) A, B, C and D only
- (3) A, C, D and E only
- (4) All statements are correct

- Q.20.** Read the following statements (A–E) and choose the correct one only

- A. Microbes are important components of biological systems and are found almost everywhere on Earth.
- B. Micro-organisms are present only in moderate environments such as soil and water but cannot survive in extreme conditions.
- C. Some microbes can live in hot springs (thermal vents) where temperatures reach about 100°C.
- D. Microbes belong to various groups such as protozoa, bacteria, fungi, and microscopic algae.
- E. Some microbes can even survive under thick layers of snow and in highly acidic conditions.

Options:

- (1) A, C and D only
- (2) A, B and E only
- (3) A, C, D and E only
- (4) C and D only

ANWERS - KEY

Q	1	2	3	4	5	6	7	8	9	10
Ans.	(2)	(2)	(2)	(3)	(3)	(4)	(2)	(1)	(2)	(2)
Q	11	12	13	14	15	16	17	18	19	20
Ans.	(4)	(4)	(3)	(2)	(1)	(2)	(3)	(4)	(2)	(3)

