School Connect Online

SCO INTERNATIONAL BIOLOGY OLYMPIAD

CLASS 8 QUESTION PAPER

Official Paper | Set H | 2025-26

A professional question paper with answers and explanations

Designed from Class 8 Biology Olympiad pathways and aligned with SCO's professional question-paper format, guided preparation, reporting, and future-ready academic growth.

- compact question-number tags and clean academic question blocks
- answers, explanations, and section-wise paper structure for school/student review
- necessary diagrams placed inside question blocks only, with no unnecessary decorative visuals

Biology	Microbes	Cells	Genetics	Health
Agriculture	Conservation	Pollution	Achievers	Research Skills

SCO International Biology Olympiad- Class 8

Official Rebranded Question Paper | Set H | 2025-26

Exam Name	SCO International Biology Olympiad
Class / Grade	Class 8 / Grade 8
Duration	60 minutes
Type of Exam	Objective Type Multiple Choice Questions
Number of Questions	50 questions
Sections	General Biology, Case Study, Reason and Assertion, Achievers Section
Marking Note	Achievers Section carries higher-order application focus; no negative marking unless separately notified.

Candidate Guidelines

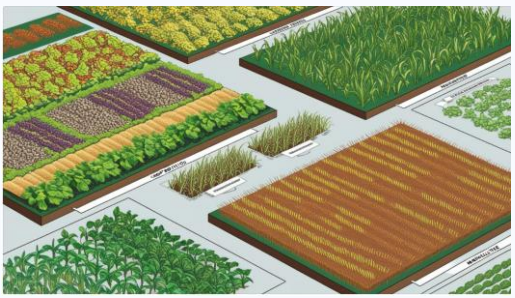
- Read each question carefully and select only one correct option.
- Use an HB pencil or a blue/black ballpoint pen for marking the OMR sheet, as instructed by the invigilator.
- Calculators and electronic devices are not allowed unless specifically permitted by the examination authority.
- All passages, data tables, images, and diagrams required for a question are placed inside that question block.
- Achievers Section questions assess higher-order scientific reasoning and application-based thinking.

Section A - General Biology

Concepts, principles, observations, and core application questions

Q.1 Which practice in the diagram is most effective at maintaining soil fertility and reducing pest buildup?

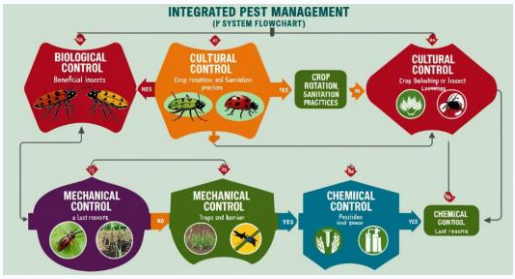
A) Monoculture
B) Crop rotation
C) Continuous cropping without fallow
D) Over-irrigation



Answer: B
Explanation: Crop rotation alternates crops so soil nutrients are replenished and pest life cycles are disrupted.

Q.2 Which component of IPM minimizes pesticide use by harnessing natural enemies of pests?

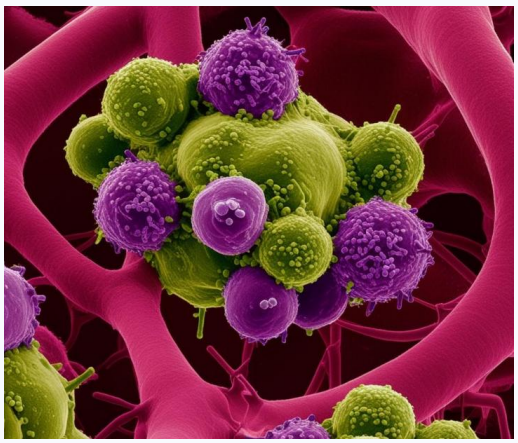
A) Mechanical control
B) Chemical control
C) Cultural control
D) Biological control



Answer: D
Explanation: Biological control uses natural enemies of pests, so it can reduce pesticide dependence within IPM.

Q.3 Which microorganism, as depicted in the image, forms a symbiotic relationship with legumes for nitrogen fixation?

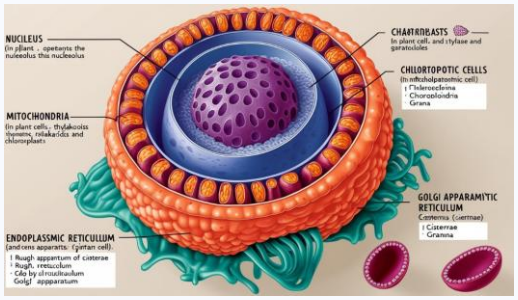
A) Escherichia coli
B) Bacillus subtilis
C) Rhizobium
D) Staphylococcus aureus



Answer: C
Explanation: Rhizobium lives in root nodules of legumes and fixes atmospheric nitrogen into usable compounds.

Q.4 Which organelle, highlighted in the diagram, is primarily responsible for producing ATP through cellular respiration?

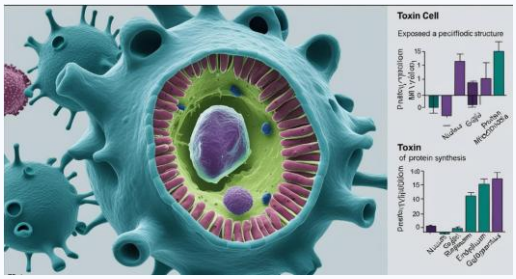
A) Nucleus
B) Mitochondrion
C) Chloroplast
D) Endoplasmic reticulum



Answer: B
Explanation: Mitochondria produce ATP through cellular respiration and are often called the powerhouses of the cell.

Q.5 Which cell structure is most likely directly affected by a toxin that inhibits protein synthesis?

A) Ribosomes
B) Golgi apparatus
C) Lysosomes
D) Mitochondria



Answer: A
Explanation: Ribosomes are the cell structures that directly synthesize proteins, so a protein-synthesis toxin would affect them.

Q.6 In sustainable agriculture, which practice is most effective in reducing pest resistance development while improving soil fertility?

A) Monoculture
B) Continuous cropping
C) Crop rotation
D) Over-irrigation

Answer: C
Explanation: Crop rotation improves soil fertility and reduces pest resistance by changing host crops across seasons.

Q.7 Which type of fertilizer is considered more sustainable and beneficial for long-term soil health?

A) Chemical fertilizers (e.g., urea)
B) Organic manure
C) Synthetic nitrogen fixers
D) High-dose phosphorus supplements

Answer: B
Explanation: Organic manure supports long-term soil structure, microbial activity, and nutrient cycling.

Q.8 Which microorganism is commonly employed as a biocontrol agent to suppress plant pathogens and promote plant health?

A) Escherichia coli
B) Bacillus anthracis
C) Pseudomonas fluorescens
D) Staphylococcus aureus

Answer: C
Explanation: Pseudomonas fluorescens is widely used as a plant-growth-promoting and biocontrol microorganism.

Q.9 What is the most significant ecological consequence of losing a keystone species from an ecosystem?

A) An increase in overall biodiversity
B) Enhanced nutrient cycling
C) Loss of ecosystem stability
D) Expansion of habitat for all species

Answer: C
Explanation: Keystone species help maintain food-web balance; removing them can destabilize the ecosystem.

Q.10 Which cellular organelle is primarily responsible for detoxification and breakdown of reactive oxygen species in eukaryotic cells?

A) Mitochondria
B) Peroxisomes
C) Ribosomes
D) Golgi apparatus

Answer: B
Explanation: Peroxisomes contain enzymes such as catalase that break down hydrogen peroxide and other reactive molecules.

Q.11 What is the main function of the smooth endoplasmic reticulum (SER) in eukaryotic cells?

A) Protein synthesis
B) Lipid synthesis and detoxification
C) ATP production
D) DNA replication

Answer: B
Explanation: The smooth ER is involved in lipid synthesis and detoxification, especially in liver-like cells.

Q.12 In the context of animal reproduction, which hormone is primarily responsible for the development of secondary sexual characteristics in males?

A) Follicle-Stimulating Hormone (FSH)
B) Luteinizing Hormone (LH)
C) Testosterone
D) Estrogen

Answer: C
Explanation: Testosterone is the primary hormone responsible for male secondary sexual characteristics.

Q.13 During puberty, which physiological change is most directly associated with the increased production of sex hormones?

A) Slowing of metabolic rate
B) Growth spurts
C) Decrease in bone density
D) Reduction in cognitive function

Answer: B
Explanation: Sex hormones during puberty are associated with growth spurts and reproductive maturation.

Q.14 Which gas, when released into the atmosphere from industrial processes, is primarily responsible for the formation of acid rain?

A) Carbon dioxide
B) Methane

C) Sulfur dioxide

D) Nitrogen

Answer: C
Explanation: Sulfur dioxide from industrial processes reacts in the atmosphere to form acids that contribute to acid rain.

Q.15 Which water treatment process is most effective at removing heavy metal contaminants from polluted water?

A) Bioremediation

B) Ion exchange

C) Sedimentation

D) Chlorination

Answer: B
Explanation: Ion exchange can remove dissolved metal ions effectively by replacing them with less harmful ions.

Q.16 A tomato farm experiences widespread wilting of plants accompanied by yellowing leaves and brown discoloration of the vascular tissue in the stem. Laboratory tests isolate a fungus from the affected tissue.

Which pathogen is most likely responsible for this disease?

A) Phytophthora infestans

B) Fusarium oxysporum f. sp. lycopersici

C) Pseudomonas syringae

D) Botrytis cinerea

Answer: B
Explanation: Fusarium oxysporum f. sp. lycopersici causes Fusarium wilt in tomato, including vascular browning and wilting.

Q.17 A rose garden is suffering from extensive leaf spotting and defoliation. The lesions appear as black spots with yellow margins. A microscopic examination reveals fungal spores typical of a specific pathogen.

Which fungus is most likely causing the black spot disease in roses?

A) Botrytis cinerea

B) Sclerotinia sclerotiorum

C) Diplocarpon rosae

D) Alternaria alternata

Answer: C
Explanation: Diplocarpon rosae is the fungal pathogen commonly associated with black spot disease of roses.

Q.18 A forest reserve has experienced significant fragmentation due to urban development. Genetic studies on an isolated population of a native bird species reveal a marked decrease in genetic diversity over the past decade.

What is the primary consequence of habitat fragmentation observed in this case?

A) Increased overall biodiversity

B) Enhanced ecosystem productivity
C) Reduced genetic diversity
D) Expanded habitat range for the species

Answer: C
Explanation: Habitat fragmentation isolates populations, reducing gene flow and therefore genetic diversity.

Q.19 A researcher treats cultured eukaryotic cells with a toxin that results in rapid cell death. Further analysis shows a significant decrease in protein production, with ribosomes appearing aggregated and dysfunctional.

Which cellular structure is directly targeted by this toxin?
A) Mitochondria
B) Ribosomes
C) Lysosomes
D) Endoplasmic reticulum

Answer: B
Explanation: Ribosomal dysfunction directly reduces protein production and can lead to rapid cell failure.

Q.20 A dairy herd is examined after several cows develop inflammation in the udder. Bacterial cultures reveal the presence of Staphylococcus aureus. The affected cows show signs of reduced milk production and discomfort.

What is the most appropriate treatment strategy for this condition?
A) Antifungal therapy
B) Antibiotic therapy
C) Antiviral therapy
D) Immunosuppressive therapy

Answer: B
Explanation: Staphylococcus aureus is bacterial, so antibiotic therapy is the appropriate treatment category after veterinary guidance.

Section B - Case Study and Contemporary Biology

Applied biology, sustainability, health, pollution, and research scenarios

Q.21 A series of clinical observations in adolescent boys reveal a rapid increase in muscle mass, deepening of the voice, and growth of facial hair. Hormonal assays show a significant increase in the concentration of a particular hormone.

Which hormone is primarily responsible for these changes during puberty?
A) Luteinizing Hormone (LH)
B) Follicle-Stimulating Hormone (FSH)
C) Testosterone
D) Growth Hormone

Answer: C
Explanation: Testosterone drives facial hair growth, voice deepening, and increased muscle mass in adolescent boys.

Q.22 An industrial area discharges pollutants into a nearby river. Subsequent water analysis reveals elevated levels of heavy metals. Local authorities implement a treatment system designed to remove these contaminants effectively.

Which water treatment process is most effective for removing heavy metal pollutants?

A) Bioremediation
B) Sedimentation
C) Ion exchange
D) Chlorination

Answer: C
Explanation: Ion exchange is a targeted treatment for dissolved heavy metal ions in polluted water.

Q.23 A research study on amphibians shows that a population of frogs exhibits severe limb malformations. The investigation reveals that a parasitic trematode is infecting the tadpoles during their development.

What is the most likely explanation for the limb deformities in these frogs?

A) Viral infection
B) Nutritional deficiency
C) Parasitic trematode infection
D) Exposure to pesticides

Answer: C
Explanation: Parasitic trematode infection during tadpole development can disrupt limb formation and cause deformities.

Q.24 A potato crop shows symptoms of soft rot, where the tubers become mushy and emit a foul odor. Simultaneously, a group of pigs on a nearby farm exhibits signs of respiratory distress. Laboratory tests identify a bacterial species in both cases.

Which bacterial genus is most likely responsible for causing soft rot in potatoes and may also contribute to respiratory infections in animals?

A) Pectobacterium
B) Salmonella
C) Clostridium
D) Listeria

Answer: A
Explanation: Pectobacterium species are well known for causing soft rot in potatoes by degrading plant tissues.

Q.25 In a rural farming community, several reports emerge of chronic poisoning among livestock and human residents. Additionally, local corn crops are showing signs of stunted growth and leaf chlorosis. Laboratory tests on soil and water samples reveal the presence of compounds that inhibit cholinesterase activity. This inhibition is linked to severe neurological symptoms in animals and humans, as well as reduced crop vigor.

Which class of pesticides is most likely responsible for these observations?

A) Organochlorines

B) Neonicotinoids

C) Organophosphates

D) Synthetic Pyrethroids

Answer: C
Explanation: Organophosphates inhibit cholinesterase, causing neurological toxicity in humans and animals.

Q.26 A tomato farm adopts precision agriculture by using soil sensors and remote sensing data to monitor nitrogen levels. Recent research demonstrates that variable rate fertilizer application—where nutrient doses are adjusted based on real-time data—can significantly enhance yield while reducing environmental impacts.

Which practice is most effective in addressing nitrogen deficiency as indicated by the latest research?

A) Uniform fertilizer application

B) Variable rate fertilizer application

C) Over-irrigation

D) Monoculture planting

Answer: B
Explanation: Variable-rate fertilizer application adjusts nutrient doses using sensor data, improving efficiency and reducing environmental loss.

Q.27 Researchers have recently isolated a strain of Bacillus amyloliquefaciens from rice field soils. This bacterium produces natural antifungal compounds and promotes plant growth by suppressing soilborne pathogens—a finding that has significant implications for sustainable agriculture.

What role does Bacillus amyloliquefaciens play in crop health according to the latest research?

A) Plant pathogen

B) Biocontrol agent

C) Insecticide

D) Nitrogen fixer

Answer: B
Explanation: Bacillus amyloliquefaciens can suppress soilborne pathogens and support plant growth, making it a biocontrol agent.

Q.28 A recent genomic study on the endangered Iberian lynx has revealed that habitat fragmentation is causing a significant reduction in genetic diversity. Reduced genetic diversity limits the population's ability to adapt to changing environments and increases vulnerability to diseases.

What is the primary ecological consequence of the reduced genetic diversity observed in this study?

A) Increased population growth

B) Enhanced disease resistance

C) Reduced adaptability to environmental changes

D) Expanded habitat range

Answer: C
Explanation: Reduced genetic diversity lowers a population's ability to adapt to environmental changes and disease pressures.

Q.29 A recent publication in Cell describes how a novel microtubule inhibitor disrupts vesicular transport in eukaryotic cells. When cells were treated with this inhibitor, researchers observed a marked reduction in the movement of vesicles, leading to impaired cell function.

Which cellular structure is directly affected by this inhibitor?

A) Endoplasmic reticulum

B) Ribosomes

C) Microtubules

D) Golgi apparatus

Answer: C
Explanation: Microtubules are cytoskeletal tracks for vesicular transport, so a microtubule inhibitor disrupts this movement.

Q.30 A study published in the Journal of Endocrinology found that fish exposed to low concentrations of endocrine-disrupting chemicals (EDCs) in contaminated water exhibited reduced fertility and abnormal sex hormone levels. This research highlights the impact of environmental pollutants on aquatic reproductive health.

What is the primary reproductive effect of endocrine-disrupting chemicals on fish as described in the study?

A) Increased growth rate

B) Reduced fertility and altered hormone levels

C) Enhanced immune response

D) Improved oxygen consumption

Answer: B
Explanation: Endocrine-disrupting chemicals can interfere with hormone signaling and reduce fertility in aquatic organisms.

Q.31 Recent epidemiological research has linked exposure to plasticizers (such as phthalates) with the early onset of puberty in children. These chemicals interfere with hormone regulation, potentially triggering an earlier release of sex hormones.

What developmental change is most directly associated with exposure to plasticizers?

A) Delayed puberty

B) No change in puberty timing

C) Earlier onset of puberty

D) Increased adult height

Answer: C
Explanation: Plasticizers such as phthalates are associated in studies with changes in hormone regulation and earlier puberty timing.

Q.32 Multiple recent studies have documented the presence of microplastics in global drinking water sources. These tiny particles accumulate in the food chain and pose potential health risks to aquatic organisms and humans.

What is the main concern regarding microplastics in water, as highlighted by recent scientific findings?

A) They provide beneficial nutrients

B) They are easily removed by traditional filtration

C) They persist as pollutants and accumulate in food chains

D) They improve water clarity

Answer: C
Explanation: Microplastics persist in water systems and can move through food chains, creating ecological and health concerns.

Q.33 A recent breakthrough in nanotechnology has led to the development of a novel water purification system that uses nanofilters to remove heavy metals and microplastics from contaminated water sources with high efficiency.

What key advantage does nanotechnology offer in water purification according to the latest research?

A) It increases water acidity

B) It enhances the removal efficiency of contaminants

C) It produces excessive wastewater

D) It eliminates all microbial life

Answer: B
Explanation: Nanofilters can improve removal of very small contaminants such as heavy metals and microplastics.

Q.34 Recent research using CRISPR gene-editing technology has enabled scientists to modify wheat plants to express genes that reduce stomatal density, thereby increasing drought tolerance. Field trials have shown that these modified plants conserve water more effectively under arid conditions.

What is the primary benefit of reducing stomatal density in wheat plants as observed in the study?

A) Increased water loss

B) Reduced water loss

C) Enhanced nutrient uptake

D) Increased susceptibility to pests

Answer: B
Explanation: Lower stomatal density can reduce water loss through transpiration, improving drought tolerance.

Q.35 A recent study has revealed that certain strains of gut microbiota produce short-chain fatty acids (SCFAs), which are critical in maintaining intestinal health and modulating the immune system. These SCFAs have been linked to reduced inflammation and improved metabolic health in clinical trials.

What is the primary role of short-chain fatty acids (SCFAs) produced by gut microbiota in human health?

A) Promote inflammation

B) Inhibit digestive processes

C) Maintain gut health and modulate the immune response

D) Increase blood sugar levels

Answer: C
Explanation: Short-chain fatty acids help maintain the gut barrier and modulate immune responses.

Section C - Reason and Assertion

Select the option that best describes the relation between assertion and reason

Q.36 Assertion: Crop rotation improves soil fertility and reduces pest buildup.

Reason: Leguminous crops included in rotation fix atmospheric nitrogen, thereby replenishing soil nutrients.

Answer: A
Explanation: Legumes in crop rotation fix nitrogen, which explains how crop rotation can improve soil fertility and reduce pest buildup.

Q.37 Assertion: A decrease in genetic diversity within isolated populations reduces the species' adaptability to environmental changes.

Reason: Isolation leads to inbreeding, which increases the frequency of deleterious alleles and reduces overall fitness.

Answer: A
Explanation: Isolation reduces gene flow, increases inbreeding risk, and directly limits adaptability.

Q.38 Assertion: Biological control is an environmentally friendly method for managing crop pests.

Reason: Biological control relies on the use of natural predators, parasites, and pathogens to reduce pest populations without harmful chemical residues.

Answer: A
Explanation: Biological control uses living natural enemies of pests, explaining why it can be environmentally friendly.

Q.39 Assertion: Peroxisomes are essential for protecting cells against oxidative damage.

Reason: Peroxisomes contain enzymes such as catalase that break down hydrogen peroxide into water and oxygen.

Answer: A
Explanation: Catalase in peroxisomes breaks down hydrogen peroxide, explaining their role in oxidative protection.

Q.40 Assertion: Microplastics in water pose a serious threat to human and animal health.

Reason: Microplastics persist in the environment and bioaccumulate in the food chain, leading to potential health risks from toxic contaminants.

Answer: A
Explanation: Microplastics persist and bioaccumulate, directly explaining the potential risk to humans and animals.

Section D - Achievers Section

Higher-order reasoning and advanced application questions

Q.41 Recent advances in precision agriculture involve the use of variable rate technology (VRT) for nutrient management. What is the primary advantage of VRT in crop production?

A) It allows uniform fertilizer application across all fields.
B) It minimizes fertilizer use by adjusting doses based on real-time soil data.
C) It increases overall water usage for crop irrigation.
D) It eliminates the need for crop rotation.

Answer: B
Explanation: Variable-rate technology applies nutrients according to real-time needs, reducing fertilizer waste.

Q.42 Siderophores are organic compounds secreted by certain beneficial bacteria in the rhizosphere. What is their primary function in promoting plant growth?

A) Directly fixing atmospheric nitrogen.
B) Solubilizing phosphate for plant uptake.
C) Chelating iron to make it more available to plants.
D) Producing antifungal compounds to suppress pathogens.

Answer: C
Explanation: Siderophores bind iron and make it more available in the rhizosphere, supporting plant growth.

Q.43 How does habitat fragmentation primarily affect the genetic diversity of a species?

A) By increasing gene flow between populations.
B) By isolating populations, which reduces genetic exchange.
C) By creating larger, more diverse populations.
D) By encouraging rapid mutation rates in isolated groups.

Answer: B
Explanation: Fragmentation isolates populations and reduces genetic exchange, lowering genetic diversity.

Q.44 The Golgi apparatus is crucial for modifying and packaging proteins in eukaryotic cells. Which of the following processes is most directly associated with the Golgi apparatus?

A) ATP production
B) Lipid degradation
C) Glycosylation of proteins
D) DNA replication

Answer: C
Explanation: The Golgi apparatus modifies proteins, including glycosylation, and packages them for transport.

Q.45 Which hormone surge is primarily responsible for triggering ovulation in female mammals?

A) Follicle-Stimulating Hormone (FSH)
B) Luteinizing Hormone (LH)
C) Progesterone
D) Estrogen

Answer: B
Explanation: The luteinizing hormone surge triggers ovulation in female mammals.

Q.46 During male adolescence, a sudden increase in testosterone leads to several secondary sexual characteristics. Which of the following is NOT a typical effect of increased testosterone?

A) Increased muscle mass
B) Deepening of the voice
C) Growth of facial hair
D) Significant decrease in height

Answer: D
Explanation: Testosterone promotes muscle mass, facial hair, and voice deepening, not a significant decrease in height.

Q.47 Acid rain is primarily caused by the emission of certain pollutants into the atmosphere. Which pollutant is most directly involved, and what chemical process does it undergo to form acid rain?

A) Carbon dioxide reacting with water to form carbonic acid
B) Methane reacting with oxygen to form formaldehyde
C) Sulfur dioxide reacting with water and oxygen to form sulfuric acid
D) Nitrogen reacting with ozone to form nitric acid

Answer: C
Explanation: Sulfur dioxide can react with water and oxygen to form sulfuric acid, a major cause of acid rain.

Q.48 Recent CRISPR studies have enabled modifications in crops to enhance drought tolerance. Which of the following genetic modifications is most likely to improve water-use efficiency in plants?

A) Increasing stomatal density
B) Decreasing stomatal density
C) Enhancing root hair growth only
D) Overexpressing chlorophyll-binding proteins

Answer: B
Explanation: Decreasing stomatal density can reduce transpiration and improve water-use efficiency.

Q.49 In an ecosystem, the removal of a keystone species can lead to a trophic cascade. What is the most likely effect of such a removal?

A) Stabilization of the ecosystem structure
B) Rapid expansion of all species populations
C) Disruption of food chains and collapse of ecosystem balance
D) Increase in habitat complexity for all species

Answer: C
Explanation: Removing a keystone species can trigger trophic cascades and destabilize food chains.

Q.50 Which strategy is considered most effective for the bioremediation of heavy metals from contaminated water, according to recent scientific advances?

A) Use of genetically modified algae
B) Traditional chemical precipitation
C) Increased chlorination
D) Mechanical filtration alone

Answer: A
Explanation: Advanced bioremediation can use engineered or selected algae to bind and remove heavy metals from contaminated water.

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Answer Key

Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.	Q.No.	Ans.
1	B	2	D	3	C	4	B	5	A
6	C	7	B	8	C	9	C	10	B
11	B	12	C	13	B	14	C	15	B
16	B	17	C	18	C	19	B	20	B
21	C	22	C	23	C	24	A	25	C
26	B	27	B	28	C	29	C	30	B
31	C	32	C	33	B	34	B	35	C
36	A	37	A	38	A	39	A	40	A
41	B	42	C	43	B	44	C	45	B
46	D	47	C	48	B	49	C	50	A

Space for Rough Work