

**BT503 – ENVIRONMENTAL BIOTECHNOLOGY**

ALL OBJECTIVES &amp; SUBJECTIVES FROM PAST FILES FOR MID TERM

👤: MISBAH SANIA | 📞: ARHAM ( +923351328979 ) | 📝: AIZA WRITES

**OBJECTIVES**

1. For instance, the plant Wolffia Globosa is used to detect\_\_\_ **Cadmium Mottle**
2. Phytoplankton are similar to terrestrial plants they need\_\_\_for their development. **Chlorophyll & Required Light**
3. \_\_\_\_\_ tolerance in tomatoes has been established by introducing genes involved in Na<sup>+</sup>/H<sup>+</sup> antiport. **Salt**
4. Bacteria that thrive at temperatures above 45°C. **Thermophiles**
5. Due to continuous arrival of food in the form of BOD to the aeration tank, bacteria grow and Increased, which one of the plus points of if: **(The Secondary Sedimentation Tank Would Become Overloaded, The Solids Would Not Settle Well and They Would Start to Leave with The Final Effluent)**
6. Modelling of shark skin and the subsequent development of a novel biomimetic coating technology – known as **Sharklet**
7. An increased rate of error may be forced upon the organisms spreading up the rate of mutation by including a \_\_\_\_\_ in growth medicine. **Mutagen**
8. The nature of the soil or water which harbors the pollution can have a major effect on the actual\_\_\_\_\_ **Expressed End-Result**
9. To reach desired efficiency, some form of post-treatment must follow the. **UASB Reactors**
10. Bio assessment is also known as: **Bio Monitoring**
11. Which of ..... does not use to make vessel of bio filter. **Formic Sheet**
12. Deliberate transfer of a gene from one organism to another is called\_ **Foreign Gene**
13. Which plant is used as a model to protect from various agents? \_ **Tabacco Plants**
14. 25% contribution to the global environmental market is made by\_ treatment. **Water**
15. True statement about septic tank is: **The Septic Tank Can Be A Single-Chamber Tank or A Two-Compartment Tank (Called an Imhoff Tank)**
16. The \_\_\_\_\_ is designed to bring about the increase in effectiveness of natural enemies to a given pest. **Augmentation**
17. Which of the following technique is most suitable for the detection? of RNA? **Northern Blotting**
18. Extremozymes capable of functioning below pH1 have been isolated from these structures in some species \_\_\_\_\_ **Acidophile**
19. Field of science in which inspirations are elicited from nature to design practical materials and systems that can imitate structure and function of native biological systems. **Biomimetic**
20. Which is not a possible destination of the pollutants in soil **(Retention in The Soil Matrix, Retention By The Plants, Appearance In The Underground Water, Collection By Underdrains) Are Destinations**
21. When facultative ponds receive raw sewage, they also called \_\_ ponds. **Primary**
22. Which is true about the preliminary treatment of wastewater. **The Removal of Coarse Solid Only**
23. ----- Is the application of biotechnology for solving environmental problems? **Environmental biotechnology**
24. In bacteria genetic transferor materials occur through\_\_\_\_\_ **Plasmid**
25. By using recombinant technologies scientists are now producing\_\_\_\_\_ **Insulina**

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26. Bacteria which Thrive at temperatures above 45°C Is called as ----- **Thermophiles**
27. Bacteria which Thrive at temperatures above ~85°C Is called as \_\_\_\_\_ **Hyper Thermophiles**
28. A strain of \_\_\_\_\_ putida known to degrade PCBs. **Pseudomonas**
29. Which statement about endocrine disruptures is true ---, **Feminization of male fish has occurred due to increase the level of estrogen in water ways,**
30. Microorganisms are now being used for removal of plants from environment; all the statements are true regarded except \_\_\_\_\_ **the toluene degradation pathways and p-cumate pathway are coded by genes present on the same operon.**
31. Halophiles are extremely important in environment biotechnology these are microorganisms that survive in highly saline environment. they do so by ensuring that \_\_\_\_\_ **Their cytoplasm contains a higher concentration of solutes then their surroundings**
32. Biological system may be used to clean up pollutants which of the following attributes must be present in the pollutants. **It should be highly toxic**
33. Chlorinated polycyclic aromatic hydrocarbons (CL-PAHs) are the group of compounds with two or more aromatic rings and one or more \_\_\_\_ atoms are attached to the ring system. **Chlorine**
34. Making the compound more polar and easily cleared from the blood by the \_\_\_\_ **Kidney**
35. Methanogenic consortium of over 100 bacterial clones with the capability to digest \_\_\_\_\_ **Terephthalate.**
36. For land-based applications, the soil types best suited to biotechnological interventions are \_\_\_\_\_ **Sands and Gravels.**
37. Insect virus that causes over expression of genes in molecular biology \_\_\_\_\_ **Baculovirus**
38. Herbicide resistant plants \_\_\_\_\_ **Pests**
39. mer A gene is one of **A Cluster Of Genes** involved in bacterial detoxification of mercury, and is the one coding for the enzyme, mercuric ion reductase, which converts **Mercury** from an ionic to a **Volatile Form.**
40. The insect virus ..... has been shown to be the method of choice for the over expression of genes in many applications of molecular biology \_\_\_\_\_ **Baculovirus**
41. Attack by insect not only cause damage to the plant but also provide route \_\_\_\_\_ **For Bacterial Or Fungal Infection**
42. Insertion of foreign DNA in the vector resulting in the loss of the future \_\_\_\_\_ **Marker Gene**
43. Glyphosate (herbicide) is analyze of phosphoenol pyruvate and inhibits the enzyme plants that gave the best result were \_\_\_\_\_ **Petunias**
44. Many of the transgenic plants have been produced using the Ti plasmid transfer system of \_\_\_\_\_ **Agrobacterium Tumefaciens**
45. The plants pathogen that is used to increase the resistance of plant to disease is \_\_\_\_ **Erwinia Carotovora**
46. One such recombinant is a plant where the fatty acid composition in the seed has been modified to produce triacylglycerol's containing elevated levels of trierucinic acid suitable for use In the polymer industry \_\_\_\_\_ **Arabidopsis Thaliana**
47. Western blotting Is used to detect \_\_\_\_\_ **Protein.**
48. Planktons are often used as indicator of water pollution, many planktons reproduce at increased rate in lakes when there are high centralization of \_\_\_\_\_ **Phosphorus And Nitrogen**
49. Living organisms may be used to define the characteristics of biosphere, those that are used to get quantitative information on the quality of the environment. ----- **Bio Monitors**

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50. Lichens are used as bio indicators to monitor ----- quality. --- **Air**
51. Why frogs are helpful as bio indicators \_\_\_\_\_ **Influenced By Changes That Take Place In Their Freshwater And Terrestrial Habitats.**
52. Factors related to bio magnifications except \_\_\_\_ **Source**
53. Most significant temperature for bioremediation is ---- **20-30°C**
54. What is true regarding Zooplankton? ----- **Relying On Tides And Currents As A Transport**
55. Which of does not use to make vessel of bio filters \_\_\_\_\_ **May Be Formic Sheet**
56. What Is not true about bio scrubbers? ----- **Remove Toxic Metals**
57. Unlike other marines' species, sharks are characteristically untroubled by ----- and studies of their skin have established that its unique texture coupled with its inherent antimicrobial properties help keep them clean of fouling organisms. ----- **Bio Fouling**
58. Facultative ponds receive raw sewage; they are also called----- Primary **Ponds.**
59. For which of the following waste water treatment system the equipment depend on the post treatment process used. ----- **Rapid Infiltration**
60. The removal of pollutants by plants that breaking down into compound that can be vaporized is known as ----- **Degradation, Phytovolatilization, Phytosorption**
61. Bio substitution is: \_\_\_\_\_ **1-Biofueis, 2-Polymers 3-Biodegradable**
62. In the soil, a -----has basically four possible destinations ----- **Pollutant**
63. The septic tank can be a single chamber tank or two compartment tank \_\_\_\_\_ **Imhoff Tanks**
64. In the imhoff tank, setting occurs in the upper compartment **Setting Compartment.**
65. Preliminary treatment: the removal of coarse \_\_\_\_\_ **Solids Only**
66. Due to continuous arrival of food in the form of BOD to the aeration tank, bacteria grow and reproduce continuously \_\_\_\_\_ **If An Indefinite Population Growth Were Allowed**
67. \_\_\_\_\_is a very effective agent for the removal of pathogens. **Ozone**
68. Lime stabilization is used to treat \_\_\_\_ sludge. **ALL (primary, secondary, or digested)**
69. Thermal decomposition process by oxidation is known as ----- **Incineration**
70. Which of the following process does not introduce chemical products Into the liquid. **Membranes**
71. A sludge with a level of dry solids of 2% has a water content of \_\_\_\_\_ **98%**
72. Which of the following method for pathogen removal affects the reproduction of Pathogenic agents? **UV Radiations**
73. Wastewater is applied to the soil, supplying water and nutrients necessary for plant growth. Which is not true? ----- **Generations Of Aerosols**
74. Nonspecific enzymes are \_\_\_\_\_ that initiate the oxidation of hydrocarbons such as methane or toluene. **Oxygenases**
75. Thickening in sludge management is removal of ----- **Walter**
76. UASB stands for \_\_\_\_\_ **Up Flow Anaerobic Sludge Blanket Reactor**
77. The process of bio scrubbers is particularly applied to remove \_\_\_\_ **Odor Component**
78. In the Inhofe tank, settling occurs in the upper compartment. Settling compartment
79. Phytoplankton is similar to terrestrial plants they need \_\_\_\_\_ for their developmental. **Day Time**
80. The process of bio scrubbers is partially applied to remove \_\_\_\_\_ present in industrial gases emission. **Acetone or Methanol.**
81. A cloning vector is frequency a plasmid or bacteriophage \_\_\_\_\_ **Bacterial Viruses**

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82. Which statement is true for phenomena: **They Are Natural Messenger, Which Influence the Growth, Developmental or Behavior in Plant and Animal Species?**
83. In submerged aerated filters the air flow is \_ and liquid flow is **Upward, Downward**
84. Natural estrogens deactivated by..... **Glucuronidation**
85. Average oceanic temperature is \_\_\_\_\_ **1–3°C**

**SUBJECTIVES****1. Transformation?**

In transformation, a bacterium takes piece of DNA floating in its environment.

**2. Transduction?**

In transduction, DNA is accidentally moved from one bacterium to another by a virus.

**3. Conjugation?**

In conjugation, DNA is transferred between bacteria through a tube between cells.

**4. Phytoplankton's**

Phytoplankton's, also known as microalgae, are similar to terrestrial plants in that they contain chlorophyll and require daylight to live and develop. Most are light and swim in the upper portion of the sea, where light infiltrates the water

**5. Maturation Pond**

The main objective is the removal of pathogenic organisms. Adverse environmental conditions, such as UV radiation, high pH, high DO, lower temperature, lack of nutrients, etc. Maturation ponds are a post-treatment stage for BOD-removal processes.

**Extremophile**

In general the use of biotechnology for environmental management relies on mesophilic microorganisms. Some microbial species tolerate extreme conditions, like high salinity, pressures and temperatures, useful for biotech applications that tolerance to these conditions

**The Archaea**

They are extreme thermophiles, extreme halophiles, and methanogens, species that tolerate high levels of ionizing radiation, pH, or high pressure. Extremophiles provide way of developing alternative routes to many conventional chemicals or material Much of the interest centers on the extremophile





enzymes, the so-called extremozymes. The promise of extremozymes lies in their ability to remain functional when other enzymes cannot.

## Thermophile

A thermophile is an organism, type of extremophile that thrives at temperatures above 45°C. Many thermophiles are archaea, though they can be bacteria. Hot-springs, deep sea-vents, geothermal fluids, etc.

## Acidophile

Acidophiles thrive in the conditions of low pH, typically below. Protective molecules present in their cell walls, membranes or outer cell coatings to exclude acids

## Endocrine Disrupter

There are chemicals which resist degradation. Partly due to lack of organisms with degradative abilities, or worse due to microbial activities that change them to more toxic form.

## 6. Catabolic Expansion

Catabolic expansion: Improving microbe's ability to degrade a contaminant by culturing the bacteria in growth medium in which the contaminant is supplied as an essential part of the nutrition.

Only bacteria which have undergone a mutation enabling them to utilize this food source will be able to survive.

## 7. Fundamental Requirements Of All Cloning Techniques

The enzymes, solutions and equipment necessary to perform the procedures;

- The desired piece of DNA to be transferred
- A cloning vector
- The recipient cell

It is also essential to have some means of determining whether or not the transfer has been successful. This is achieved by the use of marker genes.

## 8. Psychrophile

Thriving at a relatively low temperature psychrophilic bacterium. Psychrophiles hold tremendous potential as 'environmental cleaners' to successfully degrade pollutants of petroleum hydrocarbons in extreme cold conditions.

## 9. Acidophile?



**Acidophiles** or **acidophilic** organisms are those that thrive under highly acidic conditions (usually at pH 2.0 or below). These organisms can be found in different branches of the tree of life, including Archaea, Bacteria, and Eukarya.

## 10. Biotechnology And Its All Applications?

Biotechnology has applications in four major industrial areas, including health care (medical), crop production and agriculture, non-food (industrial) uses of crops and other products (e.g. biodegradable plastics, vegetable oil, biofuels, and environmental uses).

## 11. How Can Be Prepared Plant As Recombinant?

In simpler terms, recombinant DNA is formed when the DNA from one organism is incorporated into the DNA of another organism of the same or different species ..... Using enzymes like ligase, the cut DNA fragment is attached to the vector. This is then introduced into the host cell, which takes it up as part of its own DNA.

## 12. What Are Thermophile? Where Are They Found?

- Thrive at temperatures above 45°C.
- Hyperthermophiles... ~85°C.
- *Thermus aquaticus*...
- Hot-springs, deep sea-vents, geothermal fluids, etc.
- Potential for the industrial exploitation...
- Temperatures where other organisms do not survive

**OR**

A thermophile is an organism—a type of extremophile—that thrives at relatively high temperatures, between 41 and 122 °C. Many thermophiles are archaea. Thermophilic eubacteria are suggested to have been among the earliest bacteria. Thermophiles are found in various exothermally heated regions of the Earth, such as hot springs like those in Yellowstone National Park (see image) and deep sea hydrothermal vents, as well as decaying plant matter, such as peat bogs and compost.

## 13. Difference Between Transformation, Transduction And Conjugation? 5

In transformation, a bacterium takes up a piece of DNA floating in its environment. In transduction, DNA is accidentally moved from one bacterium to another by a virus. In conjugation, DNA is transferred between bacteria through a tube between cells.

## 14. What Is Xenobiotics?

Greek word 'xenos' meaning foreign. Xenobiotics are the foreign chemical substances found within an organism, which are not normally naturally produced by an organism or expected to be present within that organism.



## 15. What Is Recombinant? 2

Recombinant DNA molecules are DNA molecules formed by laboratory methods of genetic recombination to bring together genetic material from multiple sources, creating sequences that would not otherwise be found in the genome.

## 16. Environmental Biotechnology? 2

Environmental biotechnology is the branch of biotechnology that addresses environmental problems, such as the removal of pollution, renewable energy generation or biomass production, by exploiting biological processes (nature.com)

## 17. Use Of Recombinant Viruses?

A recombinant virus is a virus produced by recombining pieces of DNA using recombinant DNA technology. This may be used to produce viral vaccines or gene therapy vectors. It is also used to refer to naturally occurring recombination between virus genomes in a cell infected by more than one virus strain. (Internet)

## 18. What Is Mobility Of Dna? 2

Movement of genes within and between organisms. Genetic transfer through physical contact between bacteria (conjugation). Genetic transfer through bacteriophages (Transduction). Taking up of foreign DNA by bacteria (Transformation).

## 19. What Are Thermophiles And Their Application In Genetic Engineering? 2

Thermophiles are organisms that grow and thrive at temperatures (60– 80°C) that are often too high for mesophiles—most thermophiles are Archaea. Possible Application of Advancement of Thermophilic Bacterial Research Wastes utilization Biomass conversion Biofuels Food bioprocessing Detergents.

## 20. Enzyme Equipment And Solution Used In Genetic Engineering? 3

Here is a list of a genetic engineer's molecular tools/enzymes most commonly used in genetic engineering experiments:

- ⇒ Polymerase Chain Reaction (PCR) ...
- ⇒ Restriction Enzymes (Molecular Scissor) ...
- ⇒ Gel Electrophoresis. ...
- ⇒ DNA Ligase. ...
- ⇒ Plasmids. ...
- ⇒ Transformation/Transduction. ...



⇒ Identifying Transgenic Organisms.

## 21. What Are Gmos Example?

A recombinant microbe is applied in bio augmentation it comes in competition with indigenous species which could outgrow it.

## 22. What Are Types Of Pollution?

Types of pollution There are different types of the pollution which are given below: Air pollution  
Water pollution Land pollution Environmental pollution Light pollution Noise pollution.

## 23. What Is Annealing In Pcr?

Polymerase chain reaction (PCR) The process is repeated by a constant cycling of denaturation of double stranded DNA at elevated temperature to approximately 95 °C, followed by cooling to approximately 55- 60 °C to allow annealing of the primers, followed by extension of the 3' end of the primer by Polymerase usually at 72 °C.

## 24. Endocrine Disruptor Examples? 3

### Endocrine disruptor is:

An exogenous agent that interferes with synthesis, secretion, transport, binding, action, or elimination of natural hormones in the body which are responsible for the

maintenance of homeostasis, reproduction, development and/or behavior **Examples of Endocrine**

### Disruptors

- ❖ Diethylstilbesterol (DES).
- ❖ Polychlorinated biphenyls (PCBs).
- ❖ Polybrominated biphenyls (PBB).
- ❖ Chloroform.
- ❖ Dioxins and furans.
- ❖ Pesticides

## 25. What Is Pcr? 3

Polymerase chain reaction (PCR) is a method widely used in molecular biology to make several copies of a specific DNA segment. Using PCR, copies of DNA sequences are exponentially amplified to generate thousands to millions of more copies of that particular DNA segment.

This is a catabolic pathway. Catabolic pathways involve the degradation (or breakdown) of complex molecules into simpler ones. Molecular energy stored in the bonds of complex molecules is released in catabolic pathways and harvested in such a way that it can be used to produce ATP.





## 26. Difference Between Extremophiles And Hyperthermophiles. 5

Extremophiles are organisms that have evolved to survive in environments once thought to be entirely uninhabitable. These environments are inhospitable, reaching extreme conditions of heat, acidity, pressure, and cold that would be fatal to most other life forms. Because extremophiles live on extreme ends of the spectrum, they can indicate the range of conditions under which life is possible.

Read more on [Brainly.in](https://brainly.in) -

A hyperthermophile is an organism that thrives in extremely hot environments— from 60 °C (140 °F) upwards. An optimal temperature for the existence of hyperthermophiles is above 80 °C (176 °F). Hyperthermophiles are often within the domain Archaea, although some bacteria are able to tolerate temperatures of around 100 °C (212 °F), as well. Some bacteria can live at temperatures higher than 100 °C at large depths in sea where water does not boil because of high pressure. Many hyperthermophiles are also able to withstand other environmental extremes such as high acidity or high radiation levels.

## 27. What Are Animal Indicators?

Animal indicators help in detecting the amount of toxins present in the tissues of animals. Frogs are Bioindicators; influenced by changes that take place in their freshwater and terrestrial habitats. Zooplanktons like *Alona guttata*, *Mesocyclops edax*, *Cyclops*, etc. Invertebrates can also be Bioindicators; aquatic invertebrates tend to be bottom-feeders (also known as Benthos or macro invertebrates).

## 28. Blotting Northern & Western

Northern blotting is a technique which detects a specific RNA sequence from a RNA sample. Western blotting is a method which detects a specific protein from a protein sample.

## 29. Way To Improve The Crop Quality /Food

### Crop quality improvements:

Control of fruit ripening, production of cereals with improved nutritional value. These although are of great interest to the food industry, they are of more peripheral relevance to environmental biotechnology. Many of the transgenic plants have been produced using the Ti plasmid transfer system of *Agrobacterium tumefaciens* and are often used together with the 35S CaMV promoter.

## 30. Transformation Of Plant Resistance Against Herbicide?

The transfer of herbicide resistance genes from various sources into crop plants has been performed using several techniques. These transgenic products rely on both target site and metabolic detoxification resistance mechanisms.

## 31. Glyphosates?



Glyphosate is a broad-spectrum systemic herbicide and crop desiccant. It is an organophosphorus compound, specifically a phosphonate, which acts by inhibiting the plant enzyme 5-enolpyruvylshikimate- 3-phosphate synthase. It is used to kill weeds, especially annual broadleaf weeds and grasses that compete with crops.

## 32. How Can Be Prepared Plant As Recombinant?

In simpler terms, recombinant DNA is formed when the DNA from one organism is incorporated into the DNA of another organism of the same or different species .... Using enzymes like ligase, the cut DNA fragment is attached to the vector. This is then introduced into the host cell, which takes it up as part of its own DNA.

## 33. Genetic Modification Of Popular Plants How They Remove Mercury From Plants? 5

Genetic modification of plants involves adding a specific stretch of DNA into the plant's genome, giving it new or different characteristics. This could include changing the way the plant grows, or making it resistant to a particular disease.

There are two types of mercury removal materials: non-regenerative sorbents and regenerative adsorbents. With non-regenerative types of mercury sorbents, the process fluid flows through the sorbent bed for a number of years, after which the sorbent is replaced.

## 34. Difference Between Transformation, Transduction And Conjugation? 5

In transformation, a bacterium takes up a piece of DNA floating in its environment. In transduction, DNA is accidentally moved from one bacterium to another by a virus. In conjugation, DNA is transferred between bacteria through a tube between cells.

## 35. Recombinant Microorganism Particularly Bacteria And Yeast? 5

GE of microorganisms for use in environmental biotechnology: expansion of metabolic pathways either to modify the existent metabolic capability, or to introduce new pathways.

**Many Examples:** A strain of Escherichia coli into which was engineered some 15 genes originating from Pseudomonas.

These were introduced to construct a pathway able to produce indigo for the dyeing of denim (Bialy, 1997). The traditional method requires the use of toxic chemicals.

## 36. What Are The Two Main Responsibilities Of DNA Vector?2

Viruses may be used as vectors i.e., the DNA of viruses can be used to carry foreign DNA. Most such recombinant viral DNA vectors need phage particles to perform proper gene transfer



i.e. **Transduction.** Transfer of naked viral recombinant vector to host cells is called transfection, and tends to have lower uptake rates as compared to transduction.

## 37. Vector? 2

A vector is an organism that does not cause disease itself but which spreads infection by conveying pathogens from one host to another.

A "vector" in this sense is a vehicle for delivering genetic material such as DNA to a cell.

## 38. Principle Of Plant Transformation? 3

Transformation is the genetic alteration of a cell resulting from the direct uptake and incorporation of exogenous genetic material from its surroundings through the cell membrane.

**Principle:** There are number of principles which are used for the transformation of the plants which are given: Vector method: There are two vector methods which are given below:

Agrobacterium Viral transformation Vector Free method: There are different vector free methods which are given below: Gene gun Electroporation.

## 39. Steps Of Cdna Libraries? 3

cDNA libraries In eukaryotes, the first product of transcription from DNA is not messenger RNA (mRNA) but heterogeneous nuclear RNA (hnRNA). This is mRNA prior to the removal of all the non-coding sections, or introns, which are discarded during the processing to produce the mature mRNA. cDNA is DNA which has been artificially made using the mature mRNA as a template (through Reverse Transcriptase enzyme).

## 40. Applications Of Cloning Vectors? 5

Method of gene cloning is useful in studying the structure and function of genes in detail. Medical Applications: In medicine, cloned bacteria plays important role for the synthesis of vitamins, hormones and antibiotics. Agricultural Applications: cloning in Bacteria facilitates nitrogen fixation in plants.

## 41. Steps Of Making Genomic Libraries? 5

Steps for creating a genomic library from a large genome

- ✈ Extract and purify DNA.
- ✈ Digest the DNA with a restriction enzyme. This creates fragments that are similar in size, each containing one or more genes.
- ✈ Insert the fragments of DNA into vectors that were cut with the same restriction enzyme. Use the enzyme DNA ligase to seal the DNA fragments into the vector. This creates a large pool of recombinant molecules.



➤ These recombinant molecules are taken up by a host bacterium by transformation, creating a DNA library. (Internet)

## 42. Applications Of Plasmid Vectors? 5

Plasmids are the most-commonly used bacterial cloning vectors. These cloning vectors contain a site that allows DNA fragments to be inserted, for example a multiple cloning site or polylinker which has several commonly used restriction sites to which DNA fragments may be ligated.

## 43. Advantage Of Yeast In Recombination?

Yeasts have been used for thousands of years in food and fermentation processes to produce alcoholic beverages and breads. In recent times, the industrial importance of yeasts has extended beyond its traditional use in fermentation into various healthcare sectors, such as in the production of therapeutic recombinant proteins. Yeast cells are particularly advantageous as hosts for biopharmaceutical production in that they are generally recognized as safe (GRAS) organisms.

## 44. Write A Note On Expression Vector?

These are similar to the vectors described above but in addition have the required regulatory regions located before and after the 'foreign' gene which direct the host cell to translate the product of transcription into a protein. It is sometimes a difficult, expensive or time consuming procedure to analyse for product from the 'foreign' gene and so, in addition to the selector genes described above, there are frequently reporter genes to indicate whether or not the signals are 'switched on' allowing the 'foreign' DNA to be expressed. In expression cloning, there are many circumstances which can be difficult to predict.

## 45. How To Generate Recombinant Virus Vaccine?

A number of genetically stable, safe live viral vaccines have been produced, e.g. measles and yellow fever. Live vaccines have a number of advantages but when attempting to expand the range of vaccines to include new targets it is often not possible to achieve a suitable live vaccine derivative of the pathogenic virus. Recombinant viral vaccines offer a path to achieving the benefits of live vaccines for such difficult cases. The principle is to embed one or more genes from the target pathogen into the genome of an established attenuated viral vaccine strain or other nonpathogenic viral genome. Generate a Recombinant Virus Vaccine 198.

## 46. Define Genetic Engineering





## Genetic Engineering

**Definition:** The technology entailing all processes of altering the genetic material of a cell to make it capable of performing the desired functions, such as producing novel substances Recombinant Viruses for Gene.

## 47. Difference Between Persistence And Mobility

### Persistence

How persistent a pollutant is? Environmental persistence is a particularly important factor in pollution and is often linked to mobility and bioaccumulation. Highly toxic chemicals which are environmentally unstable and breakdown rapidly are less harmful than persistent substances, even though these may be intrinsically less toxic.

### Mobility

The tendency of a pollutant to disperse or dilute is a very important factor in its overall effect, since this affects concentration, as well as exposure to the living organisms. Some pollutants are not readily mobile and tend to remain in 'hotspots' near to their point of origin. Others spread readily and can cause widespread contamination. Whether the pollution is continuous or a single event, and if it has arisen from a single point or multiple sources, form important considerations.

## 48. What Is The Bio Indicator?

Bio indicators are living organisms such as plants, planktons, animals, and microbes, which are utilized to screen the health of the natural ecosystem in the environment. The expression 'Bio indicator' is used as an aggregate term referring to all sources of biotic and abiotic reactions to ecological changes. They are used for assessing environmental health and biogeographic changes taking place in the environment e.g., a plankton responding rapidly to changes taking place in the surrounding.

## 49. How Marine Plants Indicate The Health Of Environment Give Example?

Marine plants provide valuable information to predict the status of oceanic environment, as they are immobile and rapidly obtain equilibrium with their natural surroundings. Changes in the diversity of species of phytoplankton, including *Euglena clastica*, *Phacus tortus*, and *Trachelon anas*, indicate the pollution of marine ecosystems

## 50. Phytoplankton?

Phytoplankton is microscopic marine algae. Phytoplankton is the base of several aquatic food webs. In a balanced ecosystem, they provide food for a wide range of sea creatures including whales, shrimp, snails, and jellyfish.



## 51. Role Of Phytoplankton For The Transfer Of Pollutant Among The Different Trophic Level? What Is The Role Of Phytoplankton In The Transfer Of Pollutants Among Different Trophic Level?

Phytoplankton are the primary producers in aquatic ecosystems and play a key role in the transport of organic contaminants through the food chain to higher trophic levels. The bioaccumulation at lower trophic levels forms the first step in the transfer of chemicals through the food chain.

## 52. Advantages Of Bioindicators

- ⇒ Biological impacts can be determined.
- ⇒ To monitor synergetic and antagonistic impacts of various pollutants on a creature.
- ⇒ Early-stage diagnosis as well as harmful effects of toxins to plants, as well as human beings, can be monitored.
- ⇒ Can be easily counted, due to their prevalence.
- ⇒ Economically viable alternative when compared with other specialized measuring systems.

## 53. How Plants Are Modified As Bio Indicator?

Plant indicators the presence or absence of certain plant or other vegetative life in an ecosystem can provide important clues about the health of the environment: environmental preservation. There are several types of plant biomonitors, including mosses, lichens, tree bark, bark pockets, tree rings, and leaves.

## 54. Animal As Bio Indicator And Give Example?

bioindicator is a living organism that gives us an idea of the health of an ecosystem. The numbers of earthworms in the soil can also be used to indicate the health of the soil. One example of a bioindicator is lichens.

## 55. What Is Toxicity? 3

Toxicity is the degree to which a chemical substance or a particular mixture of substances can damage an organism. Toxicity can refer to the effect on a whole organism, such as an animal, bacterium, or plant, as well as the effect on a substructure of the organism, such as a cell (cytotoxicity) or an organ such as the liver (hepatotoxicity).

## 56. Note On Zooplanktons. 5

The word "zooplankton" is derived from the Greek zoon, meaning "animal", and planktos, meaning "wanderer" or "drifter".

Zooplanktons are microscopic animals living near to the surface of the water body. They are poor swimmers, instead relying on tides and currents as a transport mechanism. They feed upon



phytoplanktons, bacterioplanktons, or detritus (i.e. marine snow). Zooplanktons constitute a vital food source for fish. They also play an important role as Bioindicators and help to evaluate the level of water pollution. They are assumed to be a vital part in indicating water quality, eutrophication, and production of a freshwater body. In order to determine the status of a freshwater body it is necessary to measure seasonal variations and presence of zooplanktons. Zooplankton development and conveyance are subject to abiotic (e.g. temperature, saltiness, stratification, and pollutants) and biotic parameters (e.g. limitation of food, predation, and competition)

## 57. What Is Abiotic Stress?

The negative impact of the non-living factors on living organisms in a specific environment is called the abiotic stress.

## 58. Pollutant?

pollutant is a substance or energy introduced into the environment that has undesired effects, or adversely affects the usefulness of a resource.

## 59. Contaminants Released From The Environment?

Inorganic pollutants. Industrial, agricultural and domestic wastes contribute to environmental pollution, which cause adverse harm to human and animal health. From such sources, inorganic pollutants are released. (Internet)

## 60. What Are Types Of Pollution?

### Types of pollution

There are different types of the pollution which are given below:

Air pollution, Water pollution, Land pollution, Environmental pollution, Light pollution Noise pollution

## 61. Function Of Filter Medium In Bio Filter And Of Compound Used In? 5

The medium offers good water holding capacity and soluble chemicals within the waste gas dissolve into the film of moisture around the matrix. The medium itself provides physical support for microbial growth, with a large surface area to volume ratio, high in internal void spaces and rich in nutrients to stimulate and sustain bacterial activity.

## 62. Difference Between Bioremediation & Environmental Biotechnology?

Bioremediation: Bioremediation. "Remediate" means to solve a problem, and "bioremediate" means to use biological organisms to solve an environmental problem such as contaminated soil or



groundwater. In a nonpolluted environment, bacteria, fungi, protists, and other microorganisms are constantly at work breaking down organic matter.

**Environmental Biotechnology:** Environmental biotechnology is the branch of biotechnology that addresses environmental problems, such as the removal of pollution, renewable energy generation or biomass production, by exploiting biological processes.

## 63. What Is Biomimetic?

Biomimetics is an interdisciplinary field in which principles from engineering, chemistry and biology are applied to the synthesis of materials, synthetic systems or machines that have functions that mimic biological processes.

## 64. Maturation Ponds

The main objective is the removal of pathogenic organisms. Adverse environmental conditions, such as UV radiation, high pH, high DO, lower temperature, lack of nutrients, etc. Maturation ponds are a post-treatment stage for BOD-removal processes.

## 65. Bio Filter? What Is The Bio Filter Give Example?

Bio filtration is a pollution control technique using a bioreactor containing living material to capture and biologically degrade pollutants.

**Examples of bio filtration include:** Bioswales, biostrips, biobags, bioscrubbers, Vermifilters and trickling filters. Constructed wetlands and natural wetlands. Slow sand filter.

## 66. Function Of Bio Trickling Filter Over Bio Filter?

A bio trickling filter is a combination of a biofilter and a bio scrubber. The bacteria responsible for decomposition are immobilized on a carrier or filter material. .... This water also carries away excess sludge/biofilm, as well as decomposition products which may hinder the biomass

## 67. What Are Phase Of Bio Filters?

The first methods to be developed. Consists of a relatively large vessel or container, typically made of cast concrete, metal or durable plastic, which holds a filter medium of organic material such as peat, heather, bark chips and the like. The gas to be treated is forced, or drawn, through the filter.

## 68. Submerged Bio Filter?

Besides being a support medium for biomass growth, the granular material acts also as a filter medium. Periodic washings are necessary to eliminate the excess biomass accumulated.





## 69. Function Or Purpose Of Bio Disc

The main purposes of the discs are:

- ✂ To serve as the surface for microbial film growth;
- ✂ To promote the contact between the microbial film and the sewage;
- ✂ To maintain the biomass that detached from the discs in suspension in the liquid;
- ✂ To promote the aeration of the sewage that is adhered to the disc and the sewage immersed in the liquid.

## 70. Natural Processes To Remove The Pathogens Organisms

**Removal of Pathogenic Organism by natural process**

**Maturation Ponds:**

Shallow ponds, where the penetration of solar UV radiation and unfavorable environmental conditions causes a high mortality of the pathogens. The maturation ponds do not need chemical products or energy, but require large areas. They are highly recommended systems.

**Land Treatment (Infiltration In Soil):**

The unfavorable environmental conditions in the soil favor the mortality of the pathogens. Chemical products are not needed. Requires large areas.

## 71. What Is The Importance Of Anaerobic Zone?

It is essential to have anaerobic and aerobic zones in the treatment line for the biological removal of phosphorus. The anaerobic zone gives good conditions for the development or selection of a large population of phosphorus accumulating organisms. When the biological excess sludge is wasted from the system, phosphorus is removing.

## 72. Three Phases Of Submerged Aerated

**Aerobic biofilm reactors Submerged aerated biofilters**

It consists of a tank filled with a porous material, through which wastewater and air permanently flow. The porous medium is maintained under total immersion.

This bio filter is a three-phase reactor composed of:

- ✂ **Solid phase:** consists of a support medium and biofilms,
- ✂ **Liquid phase:** consists of the liquid in permanent flow through the porous medium,
- ✂ **Gas phase:** formed by artificial aeration and by the gaseous by-products of the biological activity.

## 73. Two Advantage Of Conventional System Of Sludge?

Advantages of Conventional Dispersed Plug Flow Process



- ✈ Allows smaller volume than CSTR
- ✈ Flexible operation, zone aeration, step feeding options, accommodates anoxic and aerobic processes with single biomass for biological nutrient removal
- ✈ Less aeration than CSTR

## 74. Three Phase Of Bio Filter?

This biofilter is a three-phase reactor composed of:

- **Solid phase:** consists of a support medium and biofilms
- **Liquid phase:** consists of the liquid in permanent flow through the porous medium
- **Gas phase:** formed by artificial aeration and by the gaseous by-products of the biological activity.

## 75. Define Ion Exchange Chromatography? 2

Ion chromatography is a chromatography process that separates ions and polar molecules based on their affinity to the ion exchanger. It works on almost any kind of charged molecule—including large proteins, small nucleotides, and amino acid

## 76. Define Puc8 Plasmid? 3

pUC8 Plasmid The pUC8 plasmid was designed by scientists and contains the lac z gene. To produce the plasmid, the pBR322 plasmid was cut in half with EcoR I and the section containing the ampicillin resistance gene was combined with a DNA fragment containing the lac z gene. (Internet)

## 77. Cosmid Vector? 3

A cosmid is a type of hybrid plasmid that contains a

Lambda phage cos sequence . Cosmids (cos sites + plasmid = cosmids) DNA sequences are originally from the lambda phage. They are often used as a cloning vector in genetic engineering. Cosmids can be used to build genomic libraries.

## 78. Plac Z Expression Vector? 3

Lac –Z promoter operator is in frame with lac-Z alpha fragment (the NH<sub>3</sub> terminal part of Galactosidase gene. Multiple cloning sites are found in the border of NH<sub>3</sub> end including ATG sequence.

## 79. Why Does Hydrogen Bonding Occur? 3

The reason hydrogen bonding occurs is because the electron is not shared evenly between a hydrogen atom and a negatively charged atom. Hydrogen in a bond still only has one electron, while it takes two electrons for a stable electron pair. ... Any compound with polar covalent bonds has the potential to form hydrogen bonds.



## 80. Write Down The Principal Of Gel Filtration Chromatography? 5

Gel filtration chromatography (sometimes referred to as molecular sieve chromatography) is a method that separates molecules according to their size and shape. The separation of the components in the sample mixture, with some exceptions, correlates with their molecular weights

## 81. What Is Aerobic Degradation And Anaerobic Degradations?

### Aerobic Degradation:

**AEROBIC BIODEGRADATION:** Organic contaminants are rapidly It is the breakdown of organic contaminants by microorganism when oxygen is present degraded under aerobic conditions by aerobic bacteria called aerobes.(Internet)

**ANAEROBIC DEGRADATIONS:** The aromatic hydrocarbons generally degrade readily under aerobic conditions, but anaerobic degradation by pure bacterial cultures has also been recognized (PPTS)

## 82. What Are The Two Schools Of Thought To Determine To Pursue The Biotechnologies?

Metaphysics attempts to find unity across the domains of experience and thought. At the metaphysical level, there are four\* broad philosophical schools of thought that apply to education today. They are idealism, realism, pragmatism (sometimes called experientialism), and existentialism. Each will be explained shortly. (Internte)

## 83. Define Biosensor?

### Biosensor

Environmental biosensor is the analytical device composed of biological sensing elements and a physically transducer which together relate to measure able signal

Types of biosensor based on transduction signal

- Electrochemical
- Optical
- Piezoelectric
- Thermal sensor

## 84.Pu38 Plasmid? 3 Marks

The pUC8 plasmid was designed by scientists and contains the lac z gene. To produce the plasmid, the pBR322 plasmid was cut in half with EcoR I and the section containing the ampicillin resistance gene was combined with a DNA fragment containing the lac z gene.



- As a result, the plasmid provides a transformed cell with both ampicillin resistance and the ability to utilize lactose as a food source, since the lac z gene produces B galactosidase (degrades lactose)

## 85.Cdna Libraries

cDNA libraries In eukaryotes, the first product of transcription from DNA is not messenger RNA but heterogeneous nuclear RNA (hnRNA). This is mRNA prior to the removal of all the non-coding sections or introns which are discarded during the processing to produce the mature mRNA. cDNA is DNA which has been artificially made using the mature mRNA as a template.



**“Every Saint has a past,  
and every sinner has a  
future.”**

Oscar Wilde