



BIOLOGY FOR ENGINEERS

SNS COLLEGE OF TECHNOLOGY



COIMBATORE – 35

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (UG & PG)

Final Year Computer Science and Engineering, 7th Semester

2 Marks Question and Answer

Subject Code & Name: 19GET277 – BIOLOGY FOR ENGINEERS

UNIT 1

INTRODUCTION TO LIFE

1. What are the seven characteristics of living organisms?

A: The seven characteristics of living organisms are organization, metabolism, growth, adaptation, reproduction, response to stimuli, and evolution.

2. What are the five kingdoms of living organisms?

A: The five kingdoms of living organisms are Monera, Protista, Fungi, Plantae, and Animalia.

3. What is the cell theory, and who proposed it?

A: The cell theory is a scientific theory that states that all living organisms are made up of cells. It was proposed by Matthias Schleiden and Theodor Schwann in the 1830s.

4. What are the three main parts of a prokaryotic cell?

A: The three main parts of a prokaryotic cell are the cell membrane, cytoplasm, and genetic material.

5. What are the four main parts of a eukaryotic cell?

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A: The four main parts of a eukaryotic cell are the cell membrane, cytoplasm, nucleus, and membrane-bound organelles.

6. What are the four main types of biomolecules?

A: The four main types of biomolecules are carbohydrates, lipids, proteins, and nucleic acids.

7. What are the three important functions of carbohydrates in living organisms?

A: The three important functions of carbohydrates in living organisms are providing energy, serving as structural components, and aiding in cell communication.

8. What are the three important functions of lipids in living organisms?

A: The three important functions of lipids in living organisms are energy storage, insulation, and serving as structural components.

9. What are the four main functions of proteins in living organisms?

A: The four main functions of proteins in living organisms are catalyzing chemical reactions, providing structural support, facilitating cell communication, and transporting molecules.

10. What are the two main types of nucleic acids, and what are their functions?

A: The two main types of nucleic acids are DNA and RNA. DNA stores genetic information, while RNA helps to translate genetic information into proteins.

11. What are the two main types of vitamins, and what are their functions?

A: The two main types of vitamins are fat-soluble and water-soluble vitamins. Fat-soluble vitamins are important for vision and bone health, while water-soluble vitamins are important for energy metabolism and immune function.

12. What is the function of enzymes in living organisms?

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A: Enzymes are proteins that catalyze chemical reactions in living organisms, allowing these reactions to occur more quickly and efficiently.

13. What is a gene, and what is its function?

A: A gene is a segment of DNA that contains the instructions for building a particular protein. Genes are the basic units of heredity and determine many of an organism's traits.

14. How many chromosomes do humans have, and what is their function?

A: Humans have 46 chromosomes, which contain DNA and are responsible for transmitting genetic information from one generation to the next.

15. What are the key differences between prokaryotic and eukaryotic cells?

A: Prokaryotic cells are smaller and simpler in structure than eukaryotic cells, and they lack a nucleus and membrane-bound organelles. Eukaryotic cells are larger and more complex, and they have a nucleus and various membrane-bound organelles that perform specific functions.

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UNIT-2

BIODIVERSITY

1.What is the function of chlorophyll in photosynthesis?

Answer: Chlorophyll is a pigment that absorbs light energy and uses it to convert carbon dioxide and water into glucose and oxygen during photosynthesis.

2.What is the role of phosphorus in plant growth?

Answer: Phosphorus is important for plant growth and development, particularly in the formation of roots, flowers, and fruits.

3.What is nitrogen fixation?

Answer: Nitrogen fixation is the process by which atmospheric nitrogen is converted into a usable form, such as ammonia or nitrate, by certain bacteria or through industrial processes.

4.What is transpiration?

Answer: Transpiration is the process by which water is released from plant leaves through small pores called stomata.

5.What is the function of the xylem in plants?

Answer: The xylem is responsible for transporting water and minerals from the roots to the rest of the plant.

6.What is the function of the circulatory system?

Answer: The circulatory system is responsible for transporting blood and nutrients throughout the body, as well as removing waste products.

7.What is the role of the liver in the digestive system?

Answer: The liver produces bile, which helps break down fats during digestion.

8.What is the purpose of the respiratory system?

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Answer: The respiratory system is responsible for taking in oxygen and expelling carbon dioxide, and also helps regulate pH levels in the body.

9.What is the function of the kidneys in the excretory system?

Answer: The kidneys filter waste products from the blood and excrete them in the form of urine.

10.What is the function of the stomach in the digestive system?

Answer: The stomach breaks down food through the use of acid and enzymes.

11.What is the difference between bacteria and viruses?

Answer: Bacteria are single-celled organisms that can reproduce independently, while viruses require a host cell to replicate.

12.What is fermentation?

Answer: Fermentation is the process by which microorganisms convert sugars into acids, gases, or alcohol, often used in food and beverage production.

13.What is pasteurization?

Answer: Pasteurization is a process of heating food or beverages to a specific temperature for a certain period of time to kill bacteria and other microorganisms.

14.What is the purpose of antibiotics?

Answer: Antibiotics are used to treat bacterial infections by targeting specific components of bacterial cells, such as their cell walls or protein synthesis machinery.

15.What is the economic importance of microbes in the food industry?

Answer: Microbes are used in a variety of food production processes, such as cheese and yogurt making, beer brewing, and bread baking.

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UNIT-3

GENETICS AND IMMUNE SYSTEM

1. What is the theory of evolution?

Answer: The theory of evolution is the scientific explanation for how species change and adapt over time through the process of natural selection.

2. Who proposed the theory of evolution?

Answer: Charles Darwin is credited with proposing the theory of evolution through his book, "On the Origin of Species," published in 1859.

3. What is Mendel's cell division?

Answer: Mendel's cell division refers to the process of cell division, either mitosis or meiosis, that results in the transmission of genetic material from one generation to the next.

4. What is mitosis?

Answer: Mitosis is a type of cell division that results in two identical daughter cells, each with the same number and type of chromosomes as the parent cell.

5. What is meiosis?

Answer: Meiosis is a type of cell division that results in four daughter cells, each with half the number of chromosomes as the parent cell. It is involved in the production of gametes, such as sperm and egg cells.

6. What is the evidence for the laws of inheritance?

Answer: The laws of inheritance, specifically Mendel's laws, have been supported by numerous genetic studies, as well as the discovery of DNA as the genetic material.

7. What is variation?

Answer: Variation refers to differences in traits between individuals of the same species, which are the result of genetic and environmental factors.

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8.What is speciation?

Answer: Speciation is the process by which new species arise through the accumulation of genetic and morphological differences between populations of the same species.

9.What are nucleic acids?

Answer: Nucleic acids are complex biomolecules that store and transmit genetic information. DNA and RNA are the two main types of nucleic acids.

10.What is the central dogma?

Answer: The central dogma is the fundamental principle of molecular biology that describes the flow of genetic information from DNA to RNA to protein.

11.What is immunity?

Answer: Immunity refers to the ability of an organism to resist or defend against infection and disease through the action of its immune system.

12.What are antigens?

Answer: Antigens are molecules, typically proteins or carbohydrates, that are recognized by the immune system as foreign and elicit an immune response.

13.What are antibodies?

Answer: Antibodies are specialized proteins produced by the immune system in response to the presence of antigens. They bind to and neutralize or eliminate antigens from the body.

14.What is the immune response?

Answer: The immune response is the coordinated set of physiological and cellular mechanisms that respond to the presence of antigens and eliminate them from the body.

15.How do nucleic acids contribute to the immune response?

Answer: Nucleic acids, specifically RNA and DNA, can act as potent immune activators and stimulate the production of cytokines and other molecules involved in the immune response. They can also be recognized as foreign by the immune system and elicit an immune

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UNIT 4

HUMAN DISEASES

1.What is diabetes?

Diabetes is a chronic disease that affects the way your body regulates blood sugar (glucose) levels.

2.What are the causes of diabetes?

The exact cause of diabetes is unknown, but factors that may contribute to its development include genetics, lifestyle factors (such as obesity and lack of physical activity), and certain medical conditions.

3.What are the symptoms of diabetes?

Symptoms of diabetes may include increased thirst and urination, fatigue, blurred vision, slow healing wounds, and frequent infections.

4.How is diabetes diagnosed?

Diabetes can be diagnosed through a blood test that measures your blood sugar levels.

5.What are the treatments for diabetes?

Treatment for diabetes may include lifestyle changes (such as eating a healthy diet and exercising regularly), medication (such as insulin), and monitoring blood sugar levels.

6.How can diabetes be prevented?

Diabetes can be prevented by maintaining a healthy weight, exercising regularly, eating a healthy diet, and avoiding tobacco and excessive alcohol use.

7.What is cancer?

Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells in the body.

8.What are the causes of cancer?

The causes of cancer can vary, but risk factors may include genetics, exposure to certain substances or environments, and lifestyle factors such as tobacco and alcohol use.

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9. What are the symptoms of cancer?

Symptoms of cancer may vary depending on the type and stage of the disease, but may include fatigue, unexplained weight loss, pain, and changes in the appearance of the skin or other tissues.

10. How is cancer diagnosed?

Cancer can be diagnosed through various tests such as imaging studies, biopsies, and blood tests.

11. What are the treatments for cancer?

Treatment for cancer may include surgery, radiation therapy, chemotherapy, immunotherapy, and targeted therapy.

12. How can cancer be prevented?

Cancer can be prevented by maintaining a healthy lifestyle, avoiding tobacco and excessive alcohol use, and getting regular screenings for certain types of cancer.

13. What is hypertension?

Hypertension, also known as high blood pressure, is a condition in which the force of blood against the walls of your arteries is consistently too high.

14. What are the causes of hypertension?

The causes of hypertension can vary, but risk factors may include genetics, lifestyle factors such as obesity and lack of physical activity, and certain medical conditions.

15. What are the symptoms of hypertension?

Hypertension may not cause any symptoms, but over time it can lead to serious complications such as heart disease, stroke, and kidney disease.

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UNIT-5

BIOLOGY AND ITS INDUSTRIAL APPLICATION

1. What are transgenic plants?

Transgenic plants are genetically modified plants that have had foreign genes inserted into their DNA to express specific traits.

2. What are transgenic animals?

Transgenic animals are genetically modified animals that have had foreign genes inserted into their DNA to express specific traits.

3. What is stem cell and tissue engineering?

Stem cell and tissue engineering is the use of stem cells and other cellular and molecular techniques to develop replacement tissues or organs for the treatment of diseases.

4. What are recombinant vaccines?

Recombinant vaccines are vaccines that are made by genetically engineering organisms to express antigens that stimulate an immune response.

5. What is the difference between transgenic plants and traditional plant breeding methods?

Transgenic plants involve inserting specific genes from one organism into another, while traditional plant breeding relies on natural genetic variation and selective breeding.

6. What are some potential applications of stem cell and tissue engineering?

Stem cell and tissue engineering can be used to create replacement tissues and organs for transplantation, model diseases for drug discovery, and study developmental biology.

7. How do recombinant vaccines differ from traditional vaccines?

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Recombinant vaccines use genetic engineering to produce a specific antigen, while traditional vaccines often use weakened or dead pathogens to stimulate an immune response.

8. What are some potential applications of biological neural networks in medicine?

Biological neural networks can be used to study brain function, develop new treatments for neurological disorders, and create artificial intelligence systems.

9. What are biopolymers and some examples of biopolymers?

Biopolymers are polymers that are produced by living organisms, and include proteins, nucleic acids, and polysaccharides.

*Biopolymers include DNA

*RNA

*Cellulose

10. What are some potential applications of biological neural networks in medicine?

Biological neural networks can be used to study brain function, develop new treatments for neurological disorders, and create artificial intelligence systems.

11. What are some common applications of biosensors?

Biosensors are used in medical diagnosis, environmental monitoring, food safety testing, and other fields where detection of biological molecules is important.

12. What is biofertilizer?

Biofertilizer is a type of fertilizer that is made from living organisms or their byproducts, and is used to improve soil fertility and plant growth.

13. What are some examples of basic biomedical instrumentation?

Basic biomedical instrumentation includes microscopes, centrifuges, spectrophotometers, and other devices used for laboratory analysis of biological samples.

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14. What is cloning?

Cloning is the process of producing genetically identical copies of an organism.

15. What are the ethical concerns associated with cloning?

Cloning raises questions about the value and uniqueness of life, as well as potential risks to the cloned individual and to society as a whole.