**Indraprastha Institute of Information Technology Delhi, New Delhi**

**EEE ESC 207 A Ecology, Evolution and Environment**

**Mid - Semester Examination ( 27/02/2024)**

**MM 20 Time : 1 hr.**

**Name :**

**Roll No. :**

**Attempt all the questions**

**Part A ( Each question carries one mark)**

1. **Describe the different types of mutagens.**

**There are three main types of mutagens: physical, chemical, and biological. Each type results in damage to DNA during the processes of replication and repair.**

**2. What do you understand by the horizontal gene transfer?**

**Horizontal gene transfer is the process of a current living bacteria acquiring new genetic material. While eukaryotes get variation in genetic material from sexual reproduction, bacteria can only acquire new genetic material through horizontal gene transfer.**

**3. What is gene hitch hiking?**

**Genetic hitchhiking, also called genetic draft or the hitchhiking effect, is when an allele changes frequency not because it itself is under natural selection, but because it is near another gene that is undergoing a selective sweep and that is on the same DNA chain.**

**4. What is the difference between C3 and C4 crops? How can the expression of genes help in improving the crop growth?**

**C4 plants such as maize, sorghum, and sugarcane, approximately have 50% higher photosynthesis efficiency than those of C3 plants such as rice, wheat, and potato. This is because the different mechanism of carbon fixation by the two types of photosynthesis.**

**Over expression and transfer of C4 genes in C3 plants is thought to enhance the photosynthetic efficiency of C3 plants.**

**5. Describe the mutualism between green algae and cyanobacteria.**

**Cyanobacteria can fix more nitrogen and transfer that to green algae and green algae can transfer carbohydrates to cyanobacteria.**

**6.**  **What is totipotency?**

**Totipotency is defined as the ability of a single cell to divide and produce all the differentiated cells in an organism, including extraembryonic tissues. Reproduction of an organism from a single cell.**

**7. How does DDT kill mosquitoes?**

**It poisons their neuro systems. It is neurotoxic.**

**8. What is law of jungle, how does it help in ecological balance.**

**In the jungle, order and chaos exist in a delicate equilibrium. Order provides structure, predictability, and stability to the ecosystem. It ensures that resources are distributed fairly, species can thrive, and natural processes can function harmoniously.**

**9.** **Who are fathers of evolution and ecology respectively?**

**Charles Darwin is considered as the Father of Evolution**

**Alexander von Humboldt is as the Father of Ecology.**

**Part B ( Each question carries half mark)**

**Answer which of the following a-d is correct.**

**1. Psychrophilic bacteria are also known as :**

**a. Psychrovile, b. Extremophiles, c. pseudomonas d. None of these. b**

**2. Microalgae use carbon dioxide to grow through the process known as :**

**a. Photo-oxidation, b. Autoereduction, c. Photorespiration, d. None of these d.**

**3. Bacteria which can grow in the presence as well as in the absence of oxygen are known as : a. anaerobes, b. aerobes, c. antivirus, d. facultative d.**

**4. Mutagens can alter the following :**

**a. metals , b. adhesives, c. genes,**

**d. none of these c**

**5. Tertiary wastewater treatments involve mostly**

**a. Photochemical treatments, b. Chemical treatments, c. Biochemical treatments, d. None of these. c**

**Answer True or False**

**6. Human is a prokaryote False**

**7 . Energy flow in the ecosystem is non-cyclic.. True**

**8. Trophic level includes studies of alotropics. False**

**9. More amount of energy is transferred to higher trophic levels. False**

**10. Secondary wastewater treatment involves mostly chemical treatments. False**

**11. Age and types of dinosaurs have been reconstructed by ornithologists False.**

**12. Analogous structures imply convergent evolution True**

**13. Organisms have traits that enable them to survive. True**

**14. According to Darwin organisms pass on their traits to their acquired offsprings. False**

**15. Anagenesis is the formation of new species True**

**16. Natural selection involves sexual selection as well. True**

**17. Human genome sequencing may help in providing the fundamental information about the human blueprint. True**

**18. Environmental challenges are also important in evolution. True**

**19. Horizontal flow of genes can occur between the parent and the offspring. False**

**20. Atavism is the reactivation of recessive genes after a number of generations True**

**21. Halotypes - are the variant genes present together in a single chromosome False**

**22. Artificial selection is the intentional selection of traits in a population of organisms. True**

**Please note : If required you may also refer to the Internet or my Lecture Slides or you can also contact me for any doubts in the Answers.**