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**PB-T2/EEE-BIQP/1221/A 17-MAR-2022**

**EEE CONSORTIUM**

**PREBOARD EXAMINATION 2021-2022**

**CLASS XII**

**BIOLOGY**

**Max. Marks 35 Time allowed: 2 hours**

General Instructions:

i) All questions are compulsory.

ii) The question paper has three sections and 13 questions. All questions are compulsory.

iii) Section–A has 6 questions of 2 marks each; Section–B has 6 questions of 3 marks each; and Section–C has a case-based question of 5 marks.

iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

v) Wherever necessary, neat and properly labeled diagrams should be drawn.

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| SECTION A | | |
| 1 | Identify A, B, C and D from the following table.   |  |  |  | | --- | --- | --- | | Diseases | Causative  organisms | Symptoms | | Typhoid | B | High fever, stomach pain | | Filariasis | A | Inflammation of lymphatic  vessels | | Ascariasis | Ascaris | D | | C | Rhinoviruses | Nasal congestion and discharge | | 2 |
| 2 | (a) If you had suffered from chickenpox in your childhood, you may not contact the same disease in your adulthood.Explain giving reasons the basis of such an immunity in an individual. Name this kind of immunity.  (b) What are interferons? Mention their role. | 2 |
| 3 | Write the names of microorganisms responsible for producing the following products.  (i) Citric acid  (ii) Acetic acid  (iii) Butyric acid  (iv) Lactic acid | 2 |
| 4 | (a) What does the following figure depict?  (b) Identify A, B and C | 2 |
| 5 | |  | | --- | | Write the equations for curve A and B in the graph given below and identify the type of curve A and B.    OR   1. Why do people suffer from altitude sickness after reaching the high-altitude regions? 2. How does their body get acclimatized after a couple of days? | | Species diversity decreases as we move away from the equator towards the poles. What could be the possible reasons?  **OR**  List four causes of biodiversity loss. | | 2 |
| 6 | **State the uses of biodiversity in modern agriculture.**  *OR*  **Differentiate between in situ and ex situ approaches of conservation of biodiversity.** | 2 |
|  | SECTION B |  |
| 7 | **How does the transmission of each of the following diseases take place?** **(a)Amoebiasis (b) Malaria** **(c)Ascariasis** | 3 |
| 8 | **How do biofertilizers enrich the fertility of the soil?** | 3 |
| 9 | **Describe briefly the followings:** **(a) Origin of replication** **(b) Bioreactors** **(c) Downstream processing** | 3 |
| 10 | **Explain briefly** **(a) PCR** **(b) Restriction enzymes and DNA** **(c) Chitinase** | 3 |
| 11 | The following graph represents the organismic response to certain environmental condition (e.g. temperature)    (i)Which one of these A or B depicts conformers? (ii)What does the other line graph depict? (iii)How do these organisms differ from each other with reference to homeostasis? (iv)Mention the category to which human belong.  OR  How is diapause different from hibernation? | 3 |
| 12 | 1. Why should biodiversity be conserved? Explain giving three reasons. | 3 |
|  | SECTION C |  |
| 13 | Severe combined immunodeficiency (SCID) is a group of rare disorders caused by mutations in different genes involved in the development and function of infection-fighting immune cells. Infants with SCID appear healthy at birth but are highly susceptible to severe infections. The condition is fatal, usually within the first year or two of life, unless infants receive immune-restoring treatments, such as transplants of blood-forming stem cells, gene therapy, or enzyme therapy. More than 80 percent of SCID infants do not have a family history of the condition. However, development of a newborn screening test has made it possible to detect SCID before symptoms appear, helping ensure that affected infants receive life-saving treatments. Gene therapy is the process of introduction of DNA into an organism e.g. human beings in order to treat a disease. It is used to replace a missing gene product or to correct mutant alleles. ADA is an autosomal-recessive inherited disorder that occurs due to defective adenosine deaminase (ADA) enzyme. Please with this enzyme deficiency suffer from severe combined immunodeficiency (SCID) conditions. Human gene therapy trial can be used for ex vivo introduction of functional ADA gene in bone marrow cells of the patient, suffering from SCID. For this process, an engineered retrovirus containing a functional ADA gene is used to transfer the ADA gene into stem cells isolated from the patient with SCID.   1. **What is ADA deficiency?** 2. **How are infants with ADA deficiency?** 3. **What should be the gene version of parents if the child has to be ADA deficient?** 4. **Is there a permanent cure for ADA deficiency? If so what is the cure?**     OR  The process of selecting for genetically desirable plants has always been a time-consuming one. Performing conventional plant crosses is laborious and involves waiting for the planted seed to germinate and for the plant to mature. Plant breeding has been revolutionized by the use of plant cells grown in culture. Clones of plant cells, including cells that have been genetically altered by recombinant DNA techniques, can be grown in large numbers. These cells can then be induced to regenerate whole plants, from which seeds can be harvested. Recombinant DNA can be introduced into plant cells in several ways. Previously we mentioned protoplast fusion and the use of DNA-coated "bullets." The most elegant method, however, makes use of a plasmid called the Ti plasmid (Ti stands for tumor-inducing), which occurs naturally in the bacterium *Agrobacterium tumefaciens* This bacterium infects certain plants, in which the Ti plasmid causes the formation of a tumor like growth called a crown gall . A part of the Ti plasmid, called T-DNA, integrates into the genome of the infected plant. The T-DNA stimulates local cellular growth (the crown gall) and simultaneously causes the production of certain products used by the bacteria as a source of nutritional carbon and nitrogen. For plant scientists, the attraction of the Ti plasmid is that it provides a vehicle for introducing rDNA into a plant. A scientist can insert foreign genes into the T-DNA, put the recombinant plasmid back into the *Agrobacterium* cell, and use the bacterium to insert the recombinant Ti plasmid into a plant cell. The plant cell with the foreign gene can then be used to generate a new plant. With luck, the new plant will express the foreign gene. Unfortunately, *Agrobacterium* does not naturally infect grasses.   1. Name the gene of the Agrobacterium tumefaciens that causes crown gall disease. 2. How is plant breeding revolutionized? 3. Describe the role of *Agrobacterium tumefaciens in transforming a plant cell?* | 5 |

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