

**CBSE SAMPLE QUESTION PAPER**  
**CLASS-XII**  
**BIOLOGY [TERM-II]**  
**Hints & Solutions**

**Section 'A'**

1. Antibodies are Y shaped structures with two chains, four peptide- two light chains ( $L_2$ ) and two heavy chains ( $H_2$ ), hence the representation.
2. *Streptococcus* bacterium produces streptokinase. It is used for removing clots from the blood vessels in a patient suffering from myocardial infarction/or in a heart patient.

**OR**

Co-evolution can be observed in plant and wasp animal. The female wasp uses the fruit for oviposition or egg laying. It also uses developing seeds within the fruit for nourishing its larvae. The wasp in turn pollinates the Plant inflorescence. The given plant species can be pollinated by its 'partner' wasp species and no other species.

3. Role of proteases is to degrade the proteins present inside a cell (from which DNA is being isolated). If the proteins are not removed from DNA preparation then they could interfere with any downstream treatment of DNA.
4. Gene expression can be controlled by using RNA molecule and this technology is called RNA interference or RNAi or gene silencing. During this process nematode specific gene is introduced into host plant (using *Agrobacterium*) which produces *dsRNA*. This silences specific *mRNA* of the nematode and parasite dies.
5. Plants in wetland are adapted differently. The soil in wetland lacks oxygen. So, for respiration the roots have to grow above the soil. These roots are called breathing roots or pneumatophores. This feature is not present in roots of plants growing in rainforest.
6. (a) Due to natural calamities like volcanic eruptions, prolonged drought, heavy rains, earthquakes, asteroid collision, etc., a large number of species become extinct at the same time which is called mass extinction.

- (b) Biosphere reserves have three zones :  
 Core or natural zone : Undisturbed and legally protected area where no human activity is allowed.  
 Buffer zone : Limited human activity like research, education and resource utilisation strategies are allowed.  
 Transition zone : Outermost region where human activity like recreation, cropping, forestry, etc., are allowed.

**OR**

Biopiracy is the use of bioresources by organisations without proper authorisation from the countries and people concerned without compensatory payment. The government has cleared patent terms, emergency provisions and research and development initiative.

**Section 'B'**

7. (a) In normal cells, growth and differentiation is highly controlled and regulated (contact inhibition). The cancerous cells have lost the property of contact inhibition, hence continue to divide giving rise to masses of cells (tumors).
- (b) The benign tumor remains confined in the organ affected as it is enclosed in a connective tissue sheath and does not enter the metastatic stage.
- (c) Cancer may be caused due to carcinogens which are physical (radiations), chemicals (Nicotine, Aflatoxin, Cadmium oxide, Asbestos) and biological (viral oncogens).

**OR**

Adaptation in desert plants:

- (i) Desert plants have thick waxy coating on leaf called cuticle for minimum loss of water, through transpiration.
- (ii) They have special photosynthetic pathway (CAM) that enables minimum loss of water during day time because stomata remain closed.
- (iii) Some desert plants develop spines instead of leaf and photosynthetic function is carried out by the flattened stem.
- (iv) Stomata are arranged in deep pits to minimise loss, through transpiration.

8. Following are the advantages of using biofertilisers in agriculture:
- Biofertilisers do not cause any pollution.
  - These are cheap and economical.
  - Some of them act as biopesticides also.
  - In ill-irrigated conditions few biofertilisers can enhance the crop yield.
  - They improve soil structure and function.
  - They make available vitamins and other growth promoting biochemicals.
9. Kangaroo rats are capable of meeting its water requirements through its internal fat oxidation in which water is a by product. It also has the ability to concentrate its urine so that minimal volume of water is used to remove excretory products. Desert plants have a thick cuticle on their leaf surface and have their stomata arranged in deep pits to minimise water loss. They also have leaves reduced to spines and deep roots to absorb more water. They have a special photosynthetic pathway (CAM).
10. (a) Positive terminal – ‘B’  
Negative terminal – ‘A’
- DNA is negatively charged. Because of its negative charge, DNA moves towards the positive electrode (anode).
  - The separated DNA fragments are separated by elution. The separated bands of DNA are cut out from the agarose gel and extracted from the gel piece.
11. (a) Speciation is a function of time, unlike temperate regions subjected to frequent glaciations in the past, tropical latitude have remained relatively undisturbed for million of years and thus had long evolutionary time for species diversification
- Tropical environment are less seasonal, more constant and predictable
  - More solar energy available in the tropics contributing to high productivity leading to greater diversity.
12. (a) *Bacillus thuringiensis*.
- These Cry proteins are toxic to certain larvae of insects and thus provide resistance against them. The gene encoding Cry proteins are used in several crop plants (Bt toxin). Such a crop plant is resistant to the particular insect pest.
  - Cry represents crystal protein while cry refers to the gene encoding the Cry protein.

**Section 'C'**

13. (a) There is no effects have been found related to Genetically Modified (GM) foods currently in the market.
- Genetically modified crops should be tested for possible reactions in people, because these crops are prepared by the insertion of gene of the other species into their DNA. So, there is a possibility that they can cause some health issues, i.e. allergies due to release of new kind of proteins. Hence, GM crops should be tested.
  - Most of the genetically modified crops currently available are designed to reduce farmers production costs. They are neither better nor worse than food from conventional crops.
  - Crops modified using *Bacillus thuringiensis* are corn, cotton, tomato, rice, potato and soybean.

**OR**

- B in the diagram stands for Natality (Births) and E depicts Emigration.
- If the sum of births and immigration (B + I) exceeds the sum of deaths and emigration (D + E) then the number of people added in the habitat will be more than the number of people moving out. Thus, the population density will increase.
- Under normal condition, number of births and deaths will influence or affect an area's population density.
- If a habitat is being colonised recently then the number of individuals of a same species that have come into the habitat from elsewhere during the time period contribute more to the population growth. So, it is known as immigration.
- The population density at time (t + 1) will be  $N_{(t+1)} = N_t[(B + I) - (D + E)]$