



CLASSROOM CONTACT PROGRAMME
(Academic Session : 2021 - 2022)

Board Pattern
MAJOR
25-03-2022

ENTHUSIAST COURSE

BIOLOGY

SOLUTION

SECTION – A

- Allergy is due to the release of chemicals like histamine and serotonin from the mast cells. Common examples of allergens are mites in dust, pollen, animal dander etc.
The use of drugs like anti-histamine, adrenaline and steroids quickly reduces the symptoms of allergy. **[1+1=2 Marks]**
- When a small amount of curd as starter is added to fresh milk, millions of lactic acid bacteria (LAB) present in the starter and convert it to curd.
During this process lactic acid are produced LAB increases vitamin B₁₂ content along with other vitamins in the curd. **[1+1=2 Marks]**

OR

Organic farming is a holistic approach for controlling plant pest because it seeks to develop an understanding of the interactions amongst the organisms in the ecosystem. Organic farmers do not try to completely eradicate the pest but keep them at manageable levels. A complete eradication of the pest is not beneficial and also not desirable because many beneficial predatory and parasitic insects cannot survive without them. **[2 Marks]**

- (a) Antibody molecule
(b) a- Antigen binding site. b- Heavy chain.
(c) B-lymphocytes (B- cells). **[1+½+½ = 2 Marks]**
- (a) Cyclosporin A is obtained from *Trichoderma polysporum*. **[1+1=2 Marks]**
(b) Statins are obtained from the yeast *Monascus purpureus*.
- It is the interaction between two species in which both organisms are benefited to maintain the life process called as mutualism.

Example :

- (i) Co-evolution is also seen in many species of fig trees which are pollinated by specific species of wasp. Female wasp uses fruit for oviposition and also uses developing seeds within fruit for nourishing its larvae.
(ii) Mycorrhizae are close mutual association between fungi and the root of higher plants, where fungi help the plant for absorption of nutrients while the plant provides food, & protection for fungus. **[1+½+½=2 Marks]**
- Animals have achieved greater diversification than plants due to following reasons:
They are mobile and thus can move away from their predators or unfavourable environments. On the other hand, plants are fixed and have fewer adaptation to obtain optimum amount of raw materials and sunlight therefore, they show lesser diversity
Animals have well-developed nervous system to receive stimuli against external factors and thus can respond to them. On the other hand, plants do not exhibit any such mechanism, thus, they show lesser diversity than animals. **[1+1=2 Marks]**

OR

Sacred groves are forest patches for worship in several parts of India. All the trees and wildlife in them are venerated and given total protection. They are found in Khasi and Jaintia Hills in Meghalaya, Aravalli hills of Rajasthan, Western Ghat regions of Karnataka and Maharashtra, The Surguja, Chanda and Baster areas of Madhya Pradesh etc.

Tribe do not allow anyone to cut even a single branch of tree in these sacred groves, thus sacred groves have been free from all types of exploitations. [1+1 = 2 Marks]

SECTION-B

7. (i) Sneezing, watery eyes, running nose, difficulty in breathing.
(ii) Body releases antibodies, IgE type and chemicals like histamine and serotonin from mast cells which produce symptoms of allergy.
(iii) Anti histamine, adrenalin, steroids. [1 + 1 + 1 = 3 Marks]

OR

- (a) If the boy is suffering from typhoid then he should have sustained high fever (39° to 40°C), weakness, stomach pain, constipation and headache. (Typhoid is not the adequate reason)
(b) If the boy is suffering from viral fever, he will suffer from high fever, joint pain, weakness, and headache. (Viral fever is not the adequate reason)
(c) If the boy is suffering from malaria, he should have high fever recurring with profuse sweating every three to four days associated with chills and headache. There is a possibility that he is suffering from Malaria. [1 + 1 + 1 = 3 Marks]
8. (a) Taking smack is considered as abuse because it is highly addictive. It is a depressant and slow down body functions. It causes psychological and physical dependence.
(b) Its chemical name is Di-Acetyl Morphine and is obtained from poppy plant, *Papaver somniferum* (Opium plant)
(c) Drugs taken intravenously (direct injection into the vein using a needle and syringe) are much likely to acquire serious infections like AIDS and hepatitis B. The viruses, which are responsible for these diseases are transferred from one person to another by sharing infected needle and syringes. [1 + 1 + 1 = 3 Marks]
9. (a) DNA is a hydrophilic molecule (cell membrane is hydrophobic).
(b) Proteases are added to remove the proteins.
(c) Presence of more than one recognition site will generate several fragments which will complicate the gene cloning. [1+1+1 = 3 Marks]
10. There may not seem to be direct co-relationship between the number of ant species and our quality of life,
• However each species has its specific role in the ecosystem.
• The stability of ecosystem depends on the species diversity.
• Initially there would be no significant effect, but as the numbers of species rapidly decrease, the ecosystem becomes unstable and will disappear rapidly. (Rivet popper Hypothesis) [1+1+1=3 Marks]

11. (a) Immigration and Natality
 (b) The density at time $t+1$ is represent by formula:

$$N_{t+1} = N_t + [(B + I) - (D + E)]$$

 (c) Here $N_t=60$; $I=10$; $E=14$; $D=12$; $B=16$
 Putting the value in $N_{t+1} = N_t + [(B + I) - (D + E)]$

$$N_{t+1} = 60 + [(16 + 10) - (12 + 14)]$$

$$= 60 + [(26) - (26)]$$

$$= 60 + 0$$

$$= 60 \text{ rats} \quad [1+1+1 = 3 \text{ Marks}]$$
12. (A) Antibiotic resistance genes, (ampicillin and tetracycline) the ligation of alien DNA is carried out at a restriction site on this gene / acts as selectable marker present in this antibiotic resistance gene.
 (B) Ori, the sequence where replication starts
 (C) Rop, codes for proteins involved in the replication of the plasmids. $[1 + 1 + 1 = 3 \text{ Marks}]$

SECTION- C

13. (a) It caused due to deletion of the gene for adenosine deaminase.
 (b) Adenosine deaminase (ADA) deficiency
 (c) In Enzyme Replacement Therapy, functional ADA is introduced to the patient (by injection), this therapy is not completely curative / enzyme can act only for a limited time period.
 (d) Introduction of genetically engineered lymphocytes in to such type of patient is not a permanent cure because these cells are not immortal and the patient required periodic infusion of such genetically engineered lymphocytes. A possible permanent cure can be isolating the gene producing adenosine deaminase (ADA) from bone marrow cells and introducing it into cells at early embryonic stage. $[1 + 1 + 1\frac{1}{2} + 1\frac{1}{2} = 5 \text{ Marks}]$
- OR**
- (a) Selectable markers are essential to identify and eliminate non-transformants, by selectively permitting the growth of the transformants.
 (b) Bam HI site will affect tetracycline antibiotic resistance gene, hence the recombinant plasmids will lose tetracycline resistance due to inactivation of the resistance gene. Recombinants can be selected from non-recombinant by plating into a medium containing tetracycline, as the recombinant will not grow in the medium because the tetracycline resistance gene is cut.
 (c) In insertional inactivation method, the presence of a chromogenic substrate gives blue coloured colonies in absence of an insert. Presence of an insert in the enzyme site does not produce colour. Selection of recombinant due to inactivation of antibiotics is a cumbersome procedure because it required simultaneous plating on two plates having different antibiotics. Therefore, selectable markers are preferred for selection of recombinants.
 (d) When a recombinant DNA is inserted within the coding sequence of the enzyme β -galactosidase, it result into inactivation of the enzyme. The presence of a chromogenic substrate give blue coloured colonies if the plasmid in the bacteria does not have an insert, whereas presence of insert do not produce any colour. $[1 + 1 + 1\frac{1}{2} + 1\frac{1}{2} = 5 \text{ Marks}]$