

CBSE QUESTIONS PAPER SOLUTION – 2022 (57-3-3)**SUBJECT: BIOLOGY****TERM-II****SOLUTION****SECTION - A**

1. (i) Many fungi belonging to the genera *Microsporium*, *Trichophyton* and *Epidermophyton* are responsible for ringworms, Ringworms are generally acquired from soil or by using towels, clothes or even the comb of infected individuals.
(ii) *Wuchereria* (*W. bancrofti* and *W. malayi*), The pathogens are transmitted to a healthy person through the bite by the female mosquito vectors.

2. (a) (i) *Cannabis sativa*
(ii) Cannabinoids are obtained from the inflorescence of the plant.
(iii) These drugs affect cardiovascular system of the body. They affect brain areas that influence pleasure, memory, thinking, concentration, movement and coordination.

OR

- (b) There is lymphoid tissue also located within the lining of the major tracts (respiratory, digestive and urogenital tracts) called mucosal-associated lymphoid tissue (MALT). It constitutes about 50 percent of the lymphoid tissue in human body.
3. Symptoms of allergic reactions include sneezing, watery eyes, running nose and difficulty in breathing.
Immune system overreacts by producing antibodies called Immunoglobulin E (IgE). These antibodies travel to cells that release chemicals, causing an allergic reaction.
4. (i) *Rhizobium* is a bacterium found in soil that helps in fixing nitrogen in leguminous plants. It attaches to the roots of the leguminous plant and produces nodules. These nodules fix atmospheric nitrogen and convert it into ammonia that can be used by the plant for its growth and development.
(ii) *Anabaena* plays a significant role in farming where it is used as a biofertilizer and soil stabilizer.

- 5.(a) (i) A- Mortality B- Natalty
(ii) 100 %

OR

- (b) The given pyramid is expanding. The population of pre-reproductive is higher than the post reproductive population, which make the expanding pyramid of population.

6. B- Cells

- The B-lymphocytes produce an army of proteins in response to pathogens into our blood to fight with them. These proteins are called antibodies.
- They respond directly to antigens that has drained into the lymph node.
- Production and maturation in the bone marrow.

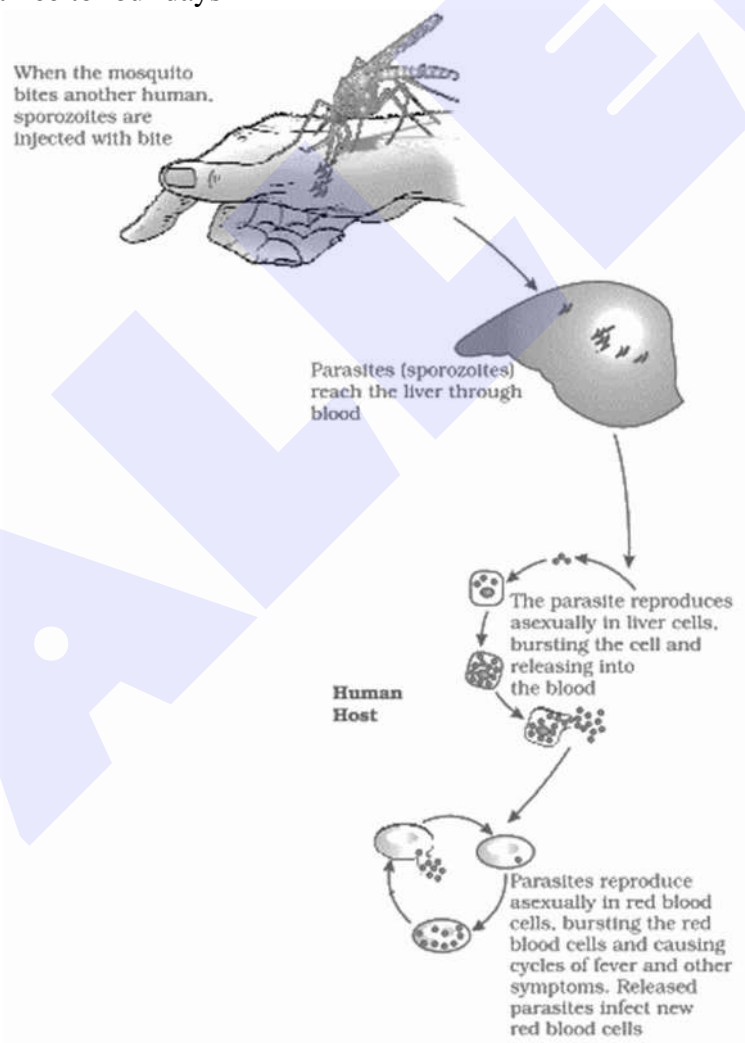
T- cell

- The T-cells themselves do not secrete antibodies but help B cells to produce them.
- Production in the bone marrow and maturation in thymus.
- T cells are interior to the lymph node.

SECTION-B

7. Plasmodium enters the human body through the bite of infected female Anopheles. Trace its life cycle till the onset of malaria in human.

Plasmodium enters the human body as sporozoites (infectious form) through the bite of infected female Anopheles mosquito. The parasites initially multiply within the liver cells and then attack the red blood cells (RBCs) resulting in their rupture. The rupture of RBCs is associated with release of a toxic substance, haemozoin, which is responsible for the chill and high fever recurring every three to four days



8. (a) ELISA – Enzyme Linked Immuno Sorbent Assay . It is based on the principle of antigen-antibody interaction where a pathogen can be detected by the presence of antibodies (proteins, glycoproteins, etc.) on it.
- (b) HIV is a retrovirus, which means it carries single-stranded RNA as its genetic material rather than the double-stranded DNA human cells carry.
9. (a) (i) Anode- S end (ii) R (iii) T
- (b) The separated bands of DNA are cut out from the agarose gel and extracted from the gel piece. This step is known as elution.

Importance:- The DNA fragments purified in this way are used in constructing recombinant DNA by joining them with cloning vectors.

10. (a) When a species becomes extinct, the plant and animal species associated with it in an obligatory way also become extinct.

Example: When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate. Another example is the case of a coevolved plant-pollinator mutualism where extinction of one invariably leads to the extinction of the other.

OR

(b) Intangible benefits from forests derived from forests, in other words influences of forests on environment are described below:

Improvement of climate: Forests ameliorate climate influencing temperature, rainfall, humidity, wind etc. Forests regulate temperature range balance in the atmosphere and water cycle.

11. Cry Protein: The insecticidal protein which is produced by soil bacterium named *Bacillus thuringiensis* is called cry protein.

For example- The proteins encoded by the genes *cryIAc* and *cryIIAb* control the cotton bollworms, The *cryIAb* controls corn borer.

12. (a) The ethical argument for conserving biodiversity relates to what we owe to millions of plant, animal and microbe species with whom we share this planet. Philosophically or spiritually, we need to realise that every species has an intrinsic value, even if it may not be of current or any economic value to us. We have a moral duty to care for their well-being and pass on our biological legacy in good order to future generations.
- (b) They identified for maximum protection certain 'biodiversity hotspots' regions with very high levels of species richness and high degree of endemism (that is, species confined to that region and not found anywhere else). Initially 25 biodiversity hotspots were identified but subsequently nine more have been added to the list, bringing the total number of biodiversity hotspots in the world to 34. These hotspots are also regions of accelerated habitat loss.

SECTION-C

- 13.(a)(i) Thermostable DNA polymerase (isolated from a bacterium, *Thermus aquaticus*), which remain active during the high temperature induced denaturation of double stranded DNA.
- (ii) Primer is a small segment of DNA that binds to a complementary strand of DNA. Primers are necessary to start the functioning of DNA polymerase enzyme and therefore are necessary in polymerase chain reaction.
- (iii) PCR is important because it can generate several copies of a DNA sequence in a very short time period. It is also important in forensic science as a tool for genetic engineering. It helps in analyzing the gene expression

OR

- (b) (i) ADA deficiency
- (ii) As a first step towards gene therapy, lymphocytes from the blood of the patient are grown in a culture outside the body. A functional ADA cDNA (using a retroviral vector) is then introduced into these lymphocytes, which are subsequently returned to the patient. However, as these cells are no immortal, the patient requires periodic infusion of such genetically engineered lymphocytes.
- (iii) If the gene isolate from marrow cells producing ADA is introduced into cells at early embryonic stages, it could be a permanent cure.