

Chapter: Human Health and Disease

Exercise questions

Question 1. What are the various public health measures, which you would suggest as a safeguard against infectious diseases?

Answer: Public health measures are preventative actions taken to stop the spread of infectious diseases. To avoid coming into contact with infectious agents, several precautions should be taken. The following are a few examples of these techniques:

- One of the most essential techniques of preventing infectious diseases is to maintain personal and public hygiene. This includes keeping a clean physique, eating healthy and nutritious foods, and drinking clean water, among other things. Proper trash disposal, excreta disposal, periodic cleaning, and disinfection of water reservoirs are all part of public hygiene.
- Isolation: To prevent the transmission of airborne diseases such as pneumonia, chickenpox, tuberculosis, and others, it is necessary to keep the sick individual in isolation.
- Vaccination: Vaccination is the process of protecting the body from communicable diseases by injecting a substance into the body that resembles the pathogen. It contributes to the body's passive immunization. Many diseases, such as tetanus, polio, measles, and mumps, have vaccinations available.
- Malaria, filariasis, dengue fever, and chikungunya are only a few of the diseases conveyed by vectors. As a result, many infections can be avoided by maintaining a clean atmosphere and minimising mosquito breeding. This can be accomplished by preventing water from stagnating near residential areas. In addition, actions such as regular cooler cleaning, the use of mosquito nets, and the use of insecticides such as malathion in drains, ponds, and other areas can be implemented to ensure a healthy environment. Incorporating fish such as *Gambusia* into ponds also helps to prevent mosquito larvae from developing in stagnant water.

Question 2. In which way has the study of biology helped us to control infectious diseases?

Answer: Certain advances in the realm of biology have aided us in gaining a better grasp of how to combat various infectious diseases. Biology has aided our understanding of the life cycles of numerous parasites, pathogens, and vectors, as well as the routes of disease transmission and control techniques. Vaccination programmes against diseases like smallpox, chicken pox, tuberculosis, and others have aided in the eradication of these diseases. Biotechnology has aided in the development of safer and more effective medications and vaccinations. Antibiotics have also been useful in the treatment of infectious disorders.

Question 3. How does the transmission of each of the following diseases take place?

- (a) Amoebiasis
- (b) Malaria
- (c) Ascariasis

(d) Pneumonia

Answer:

	Disease	Causative organism	Mode of transmission
1	Amoebiasis	Entamoeba histolytica	It is a vector-borne disease which is spread by the means of contaminated food and water. The vector involved in the transmission of this disease is the housefly.
2	Malaria	Plasmodium sp.	It is a vector-borne disease that spreads by the biting of the female Anopheles mosquito.
3	Ascariasis	Ascaris lumbricoides	It's spread occurs via contaminated food and water.
4	Pneumonia	Streptococcus pneumoniae	It's spread occur by the sputum of an infected person

Question 4. What measure would you take to prevent water-borne diseases?

Answer: Cholera, typhoid, hepatitis B, and other water-borne diseases are spread by drinking contaminated water. These water-borne infections can be avoided by providing efficient sewage and excreta disposal, as well as regular cleaning. Additionally, precautions such as sanitising community water reservoirs and boiling drinking water should be taken.

Question 5. Discuss with your teacher what does 'a suitable gene' means, in the context of DNA vaccines.

Answer: A suitable gene' is a specialised DNA fragment that can be injected into host body cells to make specific proteins. This protein offers immunity by killing the disease-causing bacterium in the host body.

Question 6. Name the primary and secondary lymphoid organs.

Answer:

- The principal lymphoid organs are the bone marrow and the thymus.
- Secondary lymphoid organs include the spleen, lymph nodes, tonsils, Peyer's patches of the small intestine, and appendix.

Question 7. The following are some well-known abbreviations, which have been used in this chapter. Expand each one to its full form:

(a) MALT

(b) CMI

(c) AIDS

(d) NACO

(e) HIV

Answer:

- (a) MALT- Mucosa-Associated Lymphoid Tissue
- (b) CMI- Cell-Mediated Immunity
- (c) AIDS- Acquired Immuno Deficiency Syndrome
- (d) NACO- National AIDS Control Organization
- (e) HIV- Human Immuno Deficiency virus

Question 8. Differentiate the following and give examples of each:

(a) Innate and acquired immunity

(b) Active and passive immunity

Answer:

(a) Innate and acquired immunity

	Innate immunity	acquired immunity
1	It is a type of defence mechanism that is not specific to pathogens.	It's a type of pathogen-specific defence mechanism.
2	It is passed down the generations and protects the individual from birth.	It is acquired after an individual's birth.
3	It works by erecting barriers to prevent foreign infectious pathogens from entering the country.	It works by inducing primary and secondary reactions that are mediated by Blymphocytes and Tlymphocytes, respectively.
4	It doesn't have a memory of its own.	Immunological memory is one of its characteristics.

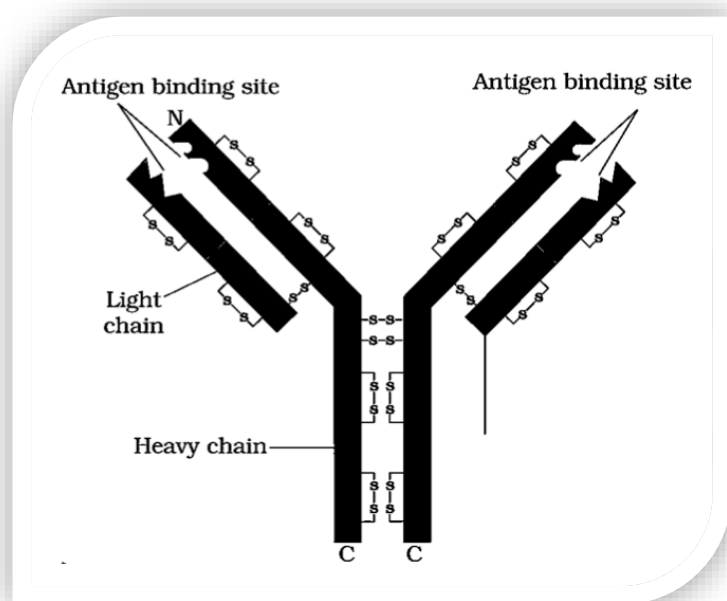
(b) Active and passive immunity

	Active immunity	Passive immunity
1	It's a form of acquired immunity in which the body makes its own antibodies to fight disease-causing antigens.	It's a sort of acquired immunity in which prepared antibodies are passed from one person to the next.
2	It has a long-term impact.	It does not have a long-term impact.
3	It is sluggish. Antibodies are made and responses are given throughout time.	It is sluggish. Antibodies are made and responses are given throughout time.

4	Active immunity is the injection of microorganisms into the body by vaccination.	Passive immunity is defined as the transfer of antibodies from the mother's milk to the newborn.
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Question 9. Draw a well-labelled diagram of an antibody molecule.

Answer:



Question 10. What are the various routes by which transmission of the human immunodeficiency virus takes place?

Answer: The Human Immunodeficiency Virus (HIV) causes AIDS (Acquired Immuno Deficiency Syndrome) (HIV). It has the following transmission modes:

- Sexual contact with an infected person without protection.
- A healthy individual's blood is transfused into an infected person.
- Infected needles and syringes are shared.
- Through the placenta, from an infected mother to a child.

Question 11. What is the mechanism by which the AIDS virus causes deficiency of the immune system of the infected person?

Answer: The Human Immunodeficiency Virus (HIV) causes AIDS (Acquired Immuno Deficiency Syndrome) through sexual or blood-to-blood contact. The HIV virus assaults and infects macrophages after entering the human body.

The virus's RNA replicates inside macrophages with the help of the enzyme reverse transcriptase, resulting in viral DNA. The viral DNA then binds to the host DNA and guides the production of virus particles. HIV also infects helper T cells at the same time. There, it replicates and generates viral

offspring. These newly produced offspring viruses are then discharged into the bloodstream, where they target additional healthy T Lymphocytes.

Question 12. How is a cancerous cell different from a normal cell?

Answer:

	Normal cells	Cancerous cells
1	Contact inhibition is a feature of normal cells. As a result, these cells cease dividing when they come into touch with other cells.	Cancerous cells lack the ability to prohibit interaction. As a result, they continue to divide, resulting in a cell mass or tumour.
2	After reaching a certain level of development, they undergo differentiation.	These cells are restricted to a certain place.
3	These cells do not stay in one place for long periods of time.	They infiltrate nearby tissues, disrupting their function.

Question 13. Explain what is meant by metastasis.

Answer: Malignant tumours display the property of metastasis. It is the harmful process of malignant cells spreading to various regions of the body. These cells divide at an uncontrollable rate, resulting in a tumour. Some cells from the tumour are sloughed off and enter the bloodstream. These cells spread throughout the body via the bloodstream and thereby trigger the creation of new tumours by aggressively proliferating.

Question 14. List the harmful effects caused by alcohol/drug abuse.

Answer: Alcohol and drugs have a number of negative consequences for the individual, his family, and society as a whole.

Alcohol's side effects include:

- Individual repercussions: Alcohol has a negative impact on an individual's body. When a person consumes too much alcohol, it harms his or her liver and nervous system. As a result, the individual may have various symptoms such as sadness, weariness, hostility, weight loss, and appetite loss. Excessive alcohol consumption can sometimes result in cardiac failure, which can lead to a coma and death. Alcohol should also be avoided by pregnant women since it may impair the baby's proper growth.
- Effects on the family: Excessive alcohol consumption by any family member can have disastrous consequences for the entire family. It causes a variety of domestic issues such as quarrels, frustrations, insecurity, and so on.
- Effects on the society:
 - Rash behavior
 - Malicious mischief and violence
 - Deteriorating social network

→ Loss of interest in social and other activities

Effects of drugs: A person who is addicted to drugs causes problems for himself as well as his family.

- Individual repercussions: Drugs have a negative impact on a person's central nervous system. This causes various other organs in the body to malfunction, including the kidneys, liver, and others. These people are at the highest risk of contracting HIV because they share needles when injecting drugs into their bodies. Both males and females have long-term negative effects from drugs. Increased aggression, mood fluctuations, and despair are among the negative effects.
- Family and societal consequences: A drug addict causes problems for his family and society. A person who is addicted to drugs becomes irritable, frustrated, and antisocial.

Question 15. Do you think that friends can influence one to take alcohol/drugs? If yes, how may one protect himself/herself from such an influence?

Answer: Yes, friends can persuade you to use drugs or drink alcohol. To protect oneself from drug misuse, one can take the following steps:

- Increase one's willpower to stay away from alcohol and drugs. For the sake of curiosity and amusement, one should not experiment with alcohol.
- Avoid hanging out with drug-addicted friends.
- Seek aid from parents and classmates, and educate yourself on the subject of drug usage. Use your time and energy to participate in other extracurricular activities.
- If symptoms of despair or frustration appear, seek quick professional and medical care from psychologists and psychiatrists.

Question 16. Why is it that once a person starts taking alcohol or drugs, it is difficult to get rid of this habit? Discuss it with your teacher.

Answer: Drug and alcohol use has a built-in addictive quality connected with euphoria and a fleeting sense of well-being. The tolerance level of the body's receptors grows with repeated drug administration, leading to increased drug consumption.

Question 17. In your view what motivates youngsters to take to alcohol or drugs and how can this be avoided?

Answer: Many factors influence young people's decisions to use alcohol or drugs. Curiosity, a need for adventure and excitement, and the desire to try new things are the primary motivators. Some teenagers start abusing drugs and alcohol to cope with unpleasant feelings (such as stress, pressure, depression, and frustration) and to achieve success in many disciplines. Television, the internet, newspapers, movies, and other forms of media are all responsible for marketing the idea of alcohol to the younger generation. Among these factors, unstable and unsupportive family structures, as well as peer pressure, can contribute to a person becoming addicted to drugs and alcohol.

Various preventive measures against addiction of alcohol and drugs include:

- Parents should encourage and try to strengthen their children's willpower.
- Parents should teach their children about the dangers of drinking alcohol.
- They should offer them accurate information and counselling on the dangers of alcoholism.

- They should offer them accurate information and counselling on the dangers of alcoholism.
- Children should be encouraged to spend their time participating in extracurricular and recreational activities.
- If a youngster exhibits unexpected symptoms of despair and frustration, professional and medical aid should be sought.

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