Human Health and Diseases

NCERT Exemplar Solutions

Multiple Choice Questions (MCQs)

1. The term 'Health' is defined in many ways. The most accurate definition of the health would be

(a) Health is the state of body and mind in a balanced condition

(b) Health is the reflection of a smiling face

(c) Health is a state of complete physical, mental and social well-being

(d) Health is the symbol of economic prosperity.

Ans: (c) Health is a state of complete physical, mental and social well-being

2. The organisms which cause diseases in plants and animals are called

(a) pathogens

(b) vectors

(c) insects

(d) worms

Ans: (a) pathogens

3. The chemical test that is used for diagnosis of typhoid is

(a) ELISA test

(b) ESR test

(c) PCR test

(d) Widal test

Ans: (d) Widal test

4. Diseases are broadly grouped into infectious and non-infectious diseases. In the list given below, identify the infectious diseases.

I. Cancer

II. Influenza

III. Allergy

IV. Smallpox

(a) I and II

(b) II and III

(c) III and IV

(d) II and IV

Ans: (d) II and IV (Influenza and smallpox)

5. The sporozoites that cause infection when a female Anopheles mosquito bites a human being are formed in
(a) liver of human
(b) RBCs of mosquito
(c) salivary glands of mosquito
(d) intestine of human
Ans: (c) salivary glands of mosquito

6. The disease chikungunya is transmitted by
(a) house flies
(b) Aedes mosquitoes
(c) cockroach
(d) female Anopheles
Ans: (b) Aedes mosquitoes

7. Many disease can be diagnosed by observing the symptoms in the patient. Which group of symptoms are indicative of pneumonia?
(a) Difficulty in respiration, fever, chills, cough and headache
(b) Constipation, abdominal pain, cramps and blood clots
(c) Nasal congestion and discharge, cough, sore throat and headache
(d) High fever, weakness, stomach pain, loss of appetite and constipation.
Ans: (a) Difficulty in respiration, fever, chills, cough and headache

8. The genes causing cancer are
(a) structural genes
(b) expressor genes
(c) oncogenes
(d) regulatory genes
Ans: (c) oncogens

9. In malignant tumours, the cells proliferate, grow rapidly and move to other parts of the body to form new tumours. This stage of disease is called
(a) metagenesis
(b) metastasis
(c) teratogenesis
(d) mitosis

Ans: (b) metastasis

10. When an apparently healthy person is diagnosed as unhealthy by a psychiatrist, the reason could be that
(a) The patient was not efficient at his work
(b) The patient was not economically prosperous
(c) The patient shows behavioural and social maladjustment
(d) He does not take interest in sports
Ans: (c) the patient shows behavioural and social maladjustment

11. Which of the following are the reasons (s) for rheumatoid arthritis? Choose the correct option.
I. Lymphocytes become more active
II. Body attacks self-cells
III. More antibodies are produced in the body
IV. The ability to differentiate pathogens or foreign molecules from self-cells is lost
(a) I and II
(b) II and IV
(c) III and IV
(d) I and III
Ans: (b) II and IV

12. AIDS is caused by HIV. Among the following, which one is not a mode of transmission of HIV?
(a) Transfusion of contaminated blood
(b) Sharing the infected needles
(c) Shaking hands with infected persons
(d) Sexual contact with infected persons
Ans: (c) Shaking hands with infected persons

13. 'Smack' is a drug obtained from the
(a) latex of *Papaver somniferum*
(b) leaves of *Cannabis sativa*
(c) flowers of *Dhatura pinata*
(d) fruits of *Erythroxylum coca*
Ans: (a) latex of Papaver somniferum

14. The substance produced by a cell in viral infection that can protect other cells from further infection is
(a) serotonin
(b) colostrum
(c) interferon
(d) histamine
Ans: (c) interferon

15. Transplantation of tissues/organs to save certain patients often fails due to rejection of such tissues/organs by the patient. Which type of immune response is responsible for such rejections?
(a) Auto-immune response
(b) Humoral immune response
(c) Physiological immune response
(d) Cell-mediated immune response
Ans: (d) Cell-mediated immune response

16. Antibodies present in colostrum, which protect the newborn from certain diseases, is of
(a) IgG type
(b) IgA type
(c) IgD type
(d) IgE type
Ans: (b) IgA type

17. Tobacco consumption is known to stimulate secretion of adrenaline and noradrenaline. The component causing this could be.
(a) nicotine
(b) tannic acid
(c) curaimin
(d) catechine
Ans: (a) nicotine

18. Anti-venom against snake poison contains
(a) antigens
(b) antigen-antibody complexes

(c) antibodies
(d) enzymes
Ans: (c) antibodies

19. Which of the following is not a lymphoid tissue?
(a) Spleen
(b) Tonsils
(c) Appendix
(d) Thymus
Ans: (c) Appendix

20. Which of the following glands is large-sized at birth but reduces in size with ageing?
(a) Pineal
(b) Pituitary
(c) Thymus
(d) Thyroid
Ans: (c) Thymus

21. Haemozoin is
(a) precursor of haemoglobin
(b) toxin from Streptococcus
(c) toxin from Plasmodium species
(d) toxin from Haemophilus species
Ans: (c) toxin from Plasmodium species

22. One of the following is not the causal organism for ringworm
(a) Microsporum
(b) Trichophyton
(c) Epidermophyton
(d) Macrosporum
Ans: (d) Macrosporum

23. A person with sickle–cell anaemia is
(a) more prone to malaria
(b) more prone to typhoid
(c) less prone to malaria

(d) less prone to typhoid
Ans: (c) less prone to malaria

Very Short Answer Type Questions

1. Certain pathogens are tissue/organ specific. Justify the statement with suitable example.
Ans: Certain pathogens are tissue/organ specific as they are adapted to overcome the resistance mechanisms of those tissues and organs, e.g., the pathogens that enter the gut must know a way of surviving in the stomach at low pH and be resistant to various digestive enzymes.

2. The immune system of a person is suppressed. In the ELISA test, was found positive to a pathogen.
(a) Name the diseases the patient is suffering from.
(b) What are the causative organisms?
(c) Which cells of body are affected by the pathogen?
Ans: The immune system of a person is suppressed. In the ELISA test, he was found to be positive for a pathogen.
(a) The patient is suffering from AIDS.
(b) AIDS is caused by Human Immunodeficiency Virus (HIV). It is a retrovirus containing RNA as genetic material.
(c) Macrophages and helper T-cells are affected by the pathogen.

3. Where are B-cells and T-cells formed? How do they differ from each other?
Ans: Both types of lymphocytes and other cells of the immune system are produced in the bone marrow.
B and T-cells are different from each other in the following aspects.

B-lymphocytes (B-cell)	**T-lymphocytes (T-cells)**
They mature in bone marrow.	They mature in the thymus gland.
They produce antibodies against antigens.	They directly attack the antigen or attach B-cells to produce antibodies.
They do not respond to organ transplantation.	They respond to organ transplantation.

4. Given below are the pairs of pathogens and the diseases caused by them. Which out of these is not a matching pair and why?

(a) Virus	**Common cold**
(b) *Salmonella*	**Typhoid**
(c) *Microsporium*	**Filariasis**
(d) *Plasmodium*	**Malaria**

Ans: (c) *Wuchereria bancrofti* and *W.malayi*, the filarial worms cause a slowly developing chronic inflammation of the organs in which they live for many years. Usually, the lymphatic vessels of the lower limbs and the disease is called elephantiasis or filariasis.
Fungi belonging to the genera Microsporium, Trichophyton and Epidermophyton are responsible for ringworms, which are one of the most common infectious diseases in man.

5. What would happen to immune system if thymus gland is removed from the body of a person?
Ans: If the thymus gland is removed from the body of a person, their immune system will become weak. As a result, the person's body becomes prone to infectious diseases.

6. Many microbial pathogens enter the gut of humans along with food. What are the preventive barriers to protect the body from such pathogens? What type of immunity do you observe in this case?
Ans: Many microbial pathogens enter the gut of humans along with food.
The preventive barriers to protect the body from such pathogens are as follows

- (i) The mucus coating of the epithelium lining of the gut helps in trapping microbes entering the body.
- (ii) Saliva in the mouth and hydrochloric acid in gastric juice secreted by the stomach prevent microbial growth.

This type of immunity is innate immunity. It is present from birth and is inherited from parents. The innate immunity remains throughout life.

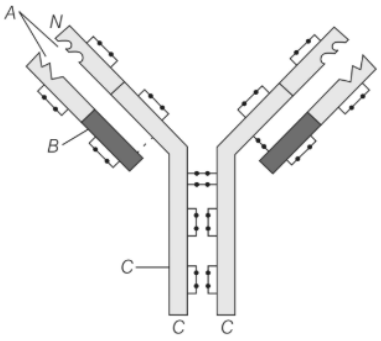
7. Why is mother's milk considered the most appropriate food for a newborn infant?

Ans: Colostrum contains several antibodies (especially IgA), which are essential for developing resistance in newborn babies.

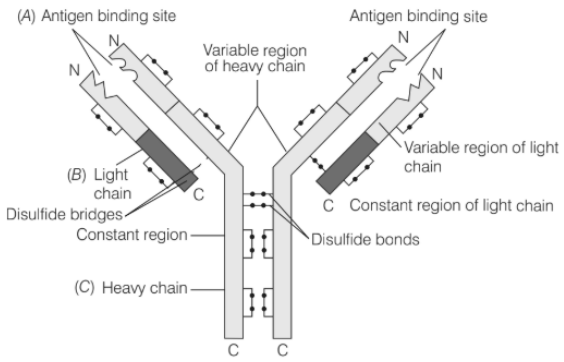
8. What are interferons? How do interferons check infection of new cells?

Ans: In response to viral infections, our body produces glycoproteins called interferons. Such types of barriers of innate immunity are called the cytokine barrier. Interferons protect the non-infected cells from further viral infection.

9. In the figure, structure of an antibody molecule is shown. Name the parts A, B and C.



Ans:



10. If a regular dose of drug or alcohol is not provided to an addicted person, he show some withdrawal symptoms. List any four such withdrawal symptoms.

Ans: The withdrawal symptoms are

(i) anxiety (ii) shakiness

(iii) nausea (iv) sweating

11. Why is it that during changing weather, one is advised to avoid closed, crowded and air-conditioned places like cinema halls, etc?

Ans: During changing weather, one is advised to avoid crowded places, because changing seasons are the time when infectious agents are more prevalent, as moist conditions favour pathogens to grow fast, and people are more vulnerable as their body system is busy adapting to the changing environmental conditions of temperature, humidity, etc, and they get infected with their pathogen.

12. The harmful allele of sickle-cell anaemia has not been eliminated from human population. Such afflicted people derive some other benefit. Discuss.

Ans: Sickle-cell anaemia persists in the population despite being harmful because this mutation can also be beneficial in certain conditions.

The mutant Hb^5 type haemoglobin is found at high frequencies (up to 20% and above) in tropical Africa.

It is known that heterozygotes (HbS/Hb^A), having both types of haemoglobin, show resistance to malarial infection because the body targets the *Plasmodium falciparum*-infected cell for destruction. In contrast, individuals homozygous for normal haemoglobin (Hb^A/Hb^A) suffer high mortality rates in early childhood due to malaria infection.

Thus, the allele for sickle cells has been maintained because heterozygotes have a higher reproductive success than either of the two possible homozygotes.

13. Lymph nodes are secondary lymphoid organs. Explain the role of lymph nodes in our immune response.

Ans: The Lymphoid Organs' immune system of human beings consists of the lymphoid system. The organs involved in the maturation and proliferation of lymphocytes are called lymphoid organs. Lymphoid organs are of two types. These are

Lymphoid Organs	
Primary Lymphoid Organs	**Secondary Lymphoid Organs**
It includes bone marrow and thymus, where B and T-cell lymphocytes mature and acquire their antigen-specific receptor.	The organs where lymphocytes interact with the antigen and proliferate to become effector cells. E.g., spleen, lymph nodes, tonsils, Peyer's patches of the small intestine & appendix.

Lymph nodes are small, solid structures present at different points along the lymphatic system. They trap the microorganisms or other antigens that enter the lymph and tissue fluid. Antigens trapped in the lymph nodes activate the lymphocytes and produce an immune response.

14. Why is an antibody molecule represented as H_2L_2?
Ans: Each antibody molecule has four peptide chains, two small ones called light chains (represented by L) and two longer ones called heavy chains (represented by H). Hence, an antibody is represented as H_2L_2.

15. What does the term 'memory' of the immune system mean?
Ans: When the body encounters a pathogen for the first time, it mounts an immune response by generating antibodies. This response is of low intensity. Subsequent encounter with the same pathogen elicits a highly intensified secondary response. This is ascribed to the fact that our body appears to have a memory of the first encounter. This type of secondary immune response is elicited by memory T-cells, B-cells, which are ready to mount a rapid and vigorous attack as soon as the same pathogen infects the body again.

16. If a patient is advised anti-retroviral therapy, which infection is he suffering from? Name the causative organism.
Ans: The patient is suffering from AIDS. The causative agent is HIV, a member of the 'retrovirus group'.

Short Answer Type Questions

1. Differentiate between active immunity and passive immunity.
Ans: Difference between active immunity and passive immunity

Active Immunity	**Passive Immunity**
It is developed due to contact with pathogens or their antigen.	It is developed when ready-made antibodies are injected into the body.
It has no side effects.	It may cause a reaction.
It is slow but long-lasting.	It is fast but lasts only for a few days.

It takes time to develop its response.	It is used when the immune response has to be faster.
e.g., vaccination for polio, etc	E.g., administration of tetanus antitoxins, etc.

2. Differentiate between benign tumour and malignant tumour.
Ans: Benign tumour and malignant immunity

Benign Tumour	**Malignant Tumour**
It is a non-cancerous tumour.	It is a cancerous tumour.
Benign tumour does not show metastasis and is non-invasive.	It shows metastasis and thus invades other body parts.
It stops growing after reaching a certain size.	Malignant tumour shows indefinite growth.
Limited adherence occurs amongst cells of a benign tumour.	There is no adherence amongst cells. They tend to slip past one another.
It is less fatal to the body.	It is more fatal to the body.

3. Do you consider passive smoking is more dangerous than active smoking? Why?
Ans: Passive smoking can be equally dangerous because it exposes the person to the same harmful effects of smoke.
Passive or second-hand smoking means being in the same room or place where someone is smoking and getting exposed to smoke in the surrounding air.
Once inhaled, the smoke can trigger the release of mucus in the bronchioles that blocks the airways. This induces coughing. But prolonged exposures can lead to bronchitis, emphysema, respiratory tract infections and eventually lung cancer.

4. 'Prevention is better than cure'. Comment.
Ans: Prevention is always better than cure because some diseases cause extensive

damage to the body tissues or organs and have a

- (i) Negative effect on their capacity to function.
- (ii) Permanent or long-term debilitating effect.
- (iii) Negative mental and psychological effects.
- (iv) Financial burden.

Prevention, therefore, is easier and more effective than the cure of a disease.

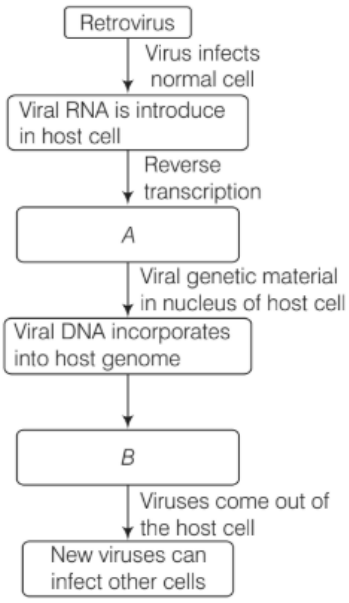
5. Explain any three preventive measures to control microbial infections.

Ans: Preventive measures to control microbial infection include

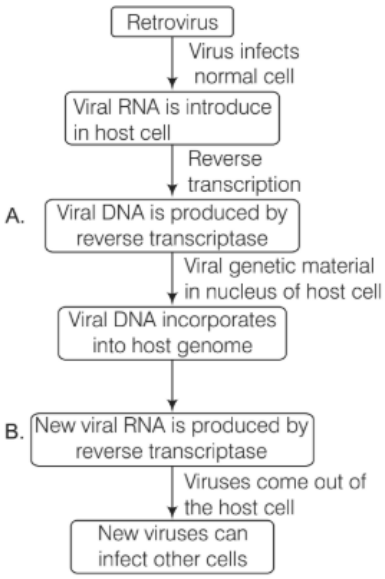
- (i) Maintenance of personal and public hygiene by
  - (a) Proper cleanliness standards and practices.
  - (b) Proper disposal of waste.
  - (c) Periodic cleaning of water reservoirs, etc.
- (ii) Control or elimination of vectors that transmit diseases by
  - (a) Checking water stagnation and garbage accumulation.
  - (b) Using disinfectants or biological methods to check their breeding and spread.
- (iii) Proper immunisation by vaccination, wherever available, to control or completely eradicate infectious diseases.

6. In the given flow diagram, the replication of retrovirus in a host is shown. Observe and answer the following questions.

(a) Fill in (A) and (B)



(b) Why is the virus called retrovirus?
(c) Can the infected cell survive while viruses are being replicated and released?
Ans: (a)



(b) The virus is called a retrovirus because it does not follow the central dogma of biology (DNA → RNA → Proteins).
Its genetic material is RNA that is transcribed to DNA using the enzyme reverse transcriptase.
(c) Yes, the infected cell can survive, while viruses are being replicated and released.

7. 'Maintenance of personal and public hygiene is necessary for prevention and control of many infectious diseases. Justify the statement, giving suitable examples.
Ans: Diseases which are easily transmitted from one person to another are called infectious diseases.
For the prevention and control of such diseases, the maintenance of personal and public hygiene is necessary. For this purpose, some common preventive measures should be taken as follows.

- (i) Education People should be educated about communicable diseases to protect themselves from such diseases.
- (ii) Isolation The infected person should be kept isolated to minimise the spread of infection.
- (iii) Vaccination: People should get vaccinated on time to avoid infection.
- (iv) Sanitation The sanitation should be improved to avoid infection from

polluted water, contaminated food, etc.

- (v) Eradication of Vectors The breeding places of vectors must be destroyed, and adult vectors should be killed by suitable methods.
- (vi) Sterilisation The patient's surroundings and articles of use should be completely sterilised to reduce the chances of infection.

8. The following table shows certain diseases, their causative organisms and symptoms. Fill the gaps.

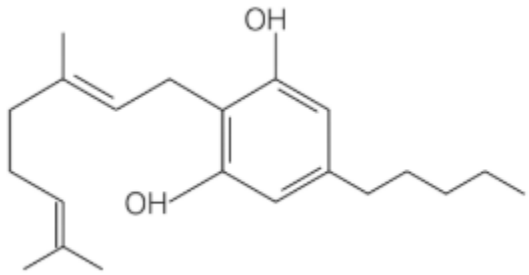
Diseases	**Causative organisms**	**Symptoms**
Ascariasis	Ascaris	—
—	Trichophyton	Appearance of dry, scaly lesions on various parts of the body
Typhoid	—	High fever, weakness, headache, stomach pain and constipation.
Pneumonia	Streptococcus pneumoniae	—
—	Rhino viruses	Nasal congestion and discharge, sore throat, cough, headache
Filariasis	—	Inflammation in lower limbs

Ans:

Diseases	**Causative organisms**	**Symptoms**
Ascariasis	*Ascaris*	Internal bleeding, muscular pain, fever, anaemia and blockage of the intestinal passage.
Ring worm	*Trichophyton*	Appearance of dry, scaly lesions on various parts of the body
Typhoid	*Salmonella typhi*	High fever, weakness, headache, stomach pain and constipation.
Pneumonia	*Streptococcus pneumoniae*	Fever, chills, cough and headache. In severe cases, the lips and finger nails

		may turn grey to bluish in colour.
—	Rhino viruses	Nasal congestion and discharge, sore throat, cough, headache
Filariasis	*Wuchereria (W. bancrofti* and *W. malayi)*	Inflammation in lower limbs

9. The outline structure of a drug is given below.
(a) Which group of drugs does this represent?
(b) What are the modes of consumption of these drugs?
(c) Name the organ of the body which is affected by consumption of these drugs.



Ans:

- (a) It represents the cannabinoid group of drugs.
- (b) Mode of consumption−nasal inhalation or oral intake.
- (c) Organs affected−heart and cardiovascular system.

10. Give the full form of CT and MRI. How are they different from each other? Where are they used?
Ans: CT-Computed Tomography. It uses X-rays to generate 3-D images of internal organs.
MRI−Magnetic Resonance Imaging. It uses strong magnetic fields and non-ionising radiations to detect pathological and physiological changes in the living tissue accurately.
Both are used in cancer detection.

11. Many secondary metabolites of plants have medicinal properties. It is their misuse that creates problems. Justify the statement with an example.
Ans: Drugs like barbiturates, amphetamines, benzodiazepines, lysergic acid

diethylamides (LSD) and other similar drugs are normally used as medicines to help patients cope with mental illnesses like depression and insomnia. Morphine is a very effective sedative and painkiller and is very useful in patients who have undergone surgery.
Misuse of plant metabolites, fruits and seeds in amounts/frequency more than prescribed for medicinal purposes can impair one's physical, physiological or functional behaviour, creating problems for society and slowly moving towards the eternal truth (death).

12. Why are cannabinoids banned in sports and games?
Ans: Cannabinoids are banned in sports, as athletes misuse these drugs to enhance their performance. But drugs obtained from cannabinoids can have a serious negative effect on their general health, and in the long term can hamper the normal functioning of the organ system.

13. What is secondary metabolism?
Ans: Secondary metabolism (also called specialised metabolism) is a term for pathways and metabolites are small molecules produced by metabolism that are not absolutely required for the survival of the organism.
In the case of plants, metabolites aid in the growth and development of plants. It also facilitates primary metabolism.

14. Drugs and alcohol give short-term 'high' and long-term 'damage'.
Ans: Curiosity, need for adventure and excitement, and experimentation constitute common causes which motivate youngsters towards drug and alcohol use.
The frequent use of drugs/alcohols drive people to take them even when these are not needed, or even their use becomes self-destructive.
Short-term effects of drugs/alcohol

- A relaxing effect
- Reduced tension
- Lowered inhibitions
- Poor concentration
- Slow reflexes
- Slow reaction time
- Reduced coordination
- Slower brain activity
- Sensations and perceptions that are less clear

Long-term effects of drugs/alcohol

- Disrupts normal brain development
- Liver damage and cirrhosis of the liver
- Brain cells die, decreasing brain mass
- Stomach and intestinal ulcers, and destroyed organs
- Blood pressure increases, causing heart disease, heart attack or stroke
- Male sperm production decreases
- Lower levels of iron and vitamin B, causing anaemia
- Alcoholism
- Death and
- Fetal alcohol syndrome in unborn children

15. Diseases like dysentery, cholera, typhoid, etc., are more common in over crowded human settlements. Why?

Ans: Dysentery, cholera, and typhoid are more common in crowded settlements because these are infectious diseases and spread from person to person contact. Water gets contaminated with the excreta of infected people and causes the spread of infection to other people.

16. From which plant are cannabinoids obtained? Name any two cannabinoids. Which part of the body is affected by consuming these substances?

Ans: Cannabinoids are obtained from the inflorescence of the plant Cannabis sativa. Marijuana, hashish, charas, and ganja are some cannabinoids. These chemicals interact with cannabinoid receptors of the body, mainly present in the brain. The cardiovascular system of the body is adversely affected by consuming these substances.

17. In the metropolitan cities of India, many children are suffering from allergy/asthma. What are the main causes of this problem? Give some symptoms of allergic reactions.

Ans: In metropolitan cities, lifestyle is responsible for lowering immunity and sensitivity to allergens. A more polluted environment, like dust in the surroundings, increases the chances of allergy in children. Some symptoms of allergic reactions are sneezing, watery eyes, a running nose and difficulty in breathing.

18. What is the basic principle of vaccination? How do vaccines prevent microbial infections? Name the organism from which hepatitis B vaccine is produced.

Ans: The principle of vaccination is based on the property of 'memory' of the immune system.
In vaccination, a preparation of antigenic proteins or inactivated/live but weakened pathogens is introduced into the body. The antigens generate a primary immune response by producing antibodies along with memory B-cells and T-cells.
When the vaccinated person is attacked by the same pathogens, the existing memory B-cells and T-cells recognise the antigen and overwhelm the invaders with massive production of lymphocytes and antibodies.
The Hepatitis-B vaccine is produced from yeast.

19. What is cancer? How is a cancer cell different from the normal cell? How do normal cells attain cancerous nature?
Ans: An abnormal and uncontrolled division of cells is termed cancer. Genes called cellular oncogenes (c-onc) or proto-oncogens present in normal cells, when activated under certain conditions, lead to oncogenic transformation of the normal cells, leading to cancer.
A cancer cell is different from the normal cell in the following ways.

Cancer cell	**Normal cell**
Cancer cells divide in an uncontrolled manner.	Normal cells divide in a controlled manner.
The cells do not show contact inhibition.	The cells show contact inhibition.
Life span is indefinite.	Life span is definite.

20. A person shows strong, unusual hypersensitive reactions when exposed to certain substances present in the air. Identify the condition. Name the cells responsible for such reactions. What precautions should be taken to avoid such reactions?
Ans: If a person is hypersensitive to certain substances present in the air, they may be allergic to them.
Mast cells release certain chemicals, e.g., histamine and serotonin, in response to this substance, which results in an allergic reaction.
Precautions taken to prevent such reactions are to avoid the allergens responsible for the particular allergy.

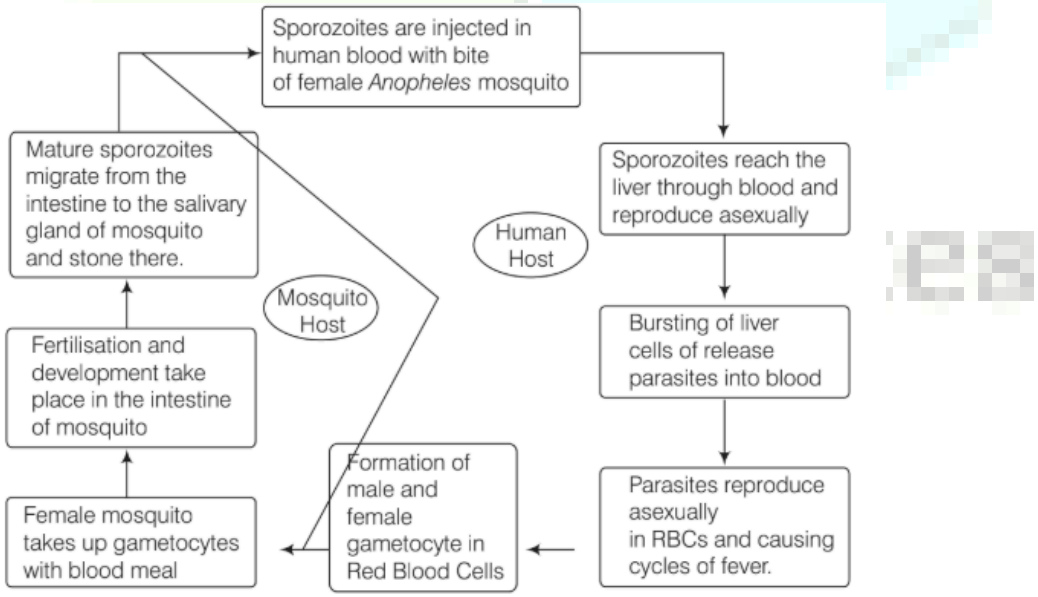
21. For an organ transplant, it is an advantage to have an identical twin. Why?
Ans: For an organ transplant, it is an advantage to have an identical twin because the organ will have the same surface markers and therefore, the recipient's immune system will not identify it as foreign and will not react against it. In case of different surface markers, the immune system starts a reaction, kills the foreign tissue or rejects it.

22. What are lifestyle diseases? How are they caused? Name any two such diseases.
Ans: Lifestyle diseases are caused by specific food habits, work-related posture or exposure to harmful radiations or substances, lack of physical exercise, mental stress, etc., e.g., cancer, alcoholism, heart disease, etc.

23. If there are two pathogenic viruses, one with DNA and other with RNA, which would mutate faster? And why?
Ans: RNA mutates faster than DNA.
DNA is more stable and also has better repair mechanisms that correct the changes in base pairs as soon as it is introduced.

Long Answer Type Questions

1. Represent schematically the life-cycle of a malarial parasite.
Ans: The life cycle of a malarial parasite



2. Compare the lifestyle of people living in the urban areas with of those rural areas and briefly describe how the lifestyle affects their health.

Ans: People think that city life is better than village life. However, there are many advantages as well as disadvantages of urban life and rural life.

Advantages of Urban (city) Life

City life is more comfortable as there are a lot of facilities in the city. There are more opportunities for people to progress in their lives, and they have more opportunities to make money.

Children living in the city can get a better education in the city than in the village.

When a person falls ill, there are good government and private hospitals in the city to get treatment.

There are large shopping complexes, banks, offices, cinemas, clubs, hospitals, etc., in and around the city for recreation.

People in the city have better transport facilities than in the village. There is electricity, a highway, communication, telecommunication, and plumbing facilities in the city. So, people can lead a comfortable and enjoyable life in the city.

Disadvantages of Urban (city) Life

Although living in the city has many advantages, there are some disadvantages too.

The cost of living is very high in the city. Goods are expensive, and no fresh air and pure water are present.

The environment is polluted with dust, smoke, garbage and gases from factories.

Most of the people who live in the city are corrupt, so there are lots of crimes in the city.

Many thefts and murders often take place in the city.

The city is always busy and noisy. There are a lot of vehicles and people on the road.

The streets are dusty and unclean. So, it is hard to lead a healthy life in the city.

Advantages of Rural (village) Life

- The people of the village live in unity and peace. The villagers earn enough money to live. So, they live with less competition with each other. They have more friends in the community.
- The village people always try to protect their traditional habits and culture. The village has clean air, and the environment is very beautiful. The village has less noise and rush. So, the pollution is less.
- The village does not have a lot of vehicles. So, roads are less dangerous for driving or cycling.
- They can get fresh vegetables and fresh fruits. The environment of the village is pleasant and silent, and it has scenic beauty.

Disadvantages of Rural (village) Life

- People living in rural areas have to face many problems like lack of good education, proper medical facilities, transportation, electricity, and telecommunication etc.
- Lifestyle affects human health and causes many diseases due to specific food habits, work-related posture or exposure to harmful radiation or substances, lack of physical exercise, mental stress, etc.
- Some lifestyle diseases are cancer, alcoholism, heart disease, etc.

3. Why do some adolescents start taking drugs? How can this be avoided?

Ans: The reasons why adolescents and youngsters start consuming drugs are

- (i) Curiosity of a child motivates him/her to do experiments.
- (ii) For adventure and excitement.
- (iii) Peer group pressure.
- (iv) Desire to do more physical and mental work.
- (v) To overcome frustration and depression due to failure in examinations or in other activities.
- (vi) Unstable or unsupportive family structures.

The following measures can be taken to avoid drug abuse

- (i) Avoid undue pressure on a child to perform beyond his/her capability in studies, sports or any other activities.
- (ii) Education and counselling are very important to face the problem of stress and failure in life.
- (iii) Seeking help from parents, elders and peers. This would help the young to share their feelings and concerns.
- (iv) Looking for danger signs and taking appropriate measures to treat them.
- (v) Seeking professional and medical help for de-addiction and rehabilitation.

4. In your locality, if a person is addicted to alcohol, what kind of behavioural changes do you observe in that person? Suggest measures to overcome the problem.

Ans: If a person is addicted to alcohol, it will give rise to some behavioural changes in that person. Alcoholic drinks are costly, and most drinkers, because of their selfish habits, deprive their children and other members of the family of basic needs.

The drinking of alcohol is invariably associated with social crimes and dissolution of moral and cultural inhibitions. Violence and other corrupt practices in the community are often directly or indirectly due to the consumption of alcohol.

Measures that should be taken to overcome the above-mentioned problem are

- (i) Avoid Undue Peer Pressure. Every person has his/her own choice and personality, which should be kept in mind. So he/she should not be pressed unduly to do beyond his/her capacities, in work conditions and other social gatherings or activities.
- (ii) Education and Counselling help to overcome the problems, like stress,
- disappointments and failure in life. One should utilise their energy in some beneficial activities like sports, music, reading, yoga and other extracurricular activities.
- (iii) Seeking Help from Parents and Peers. In case of minors, whenever there is any problem, one should seek help and guidance from parents and peers. Help should be taken from close and trusted friends. This would help young people to share their feelings of anxiety and wrongdoing.
- (iv) Looking for Danger Signs. If friends find someone using drugs or alcohol, they should bring this to the notice of parents or teachers so that appropriate measures can be taken to diagnose the illness and its causes. This would help in taking proper remedial steps or treatment.
- (v) Seeking Professional and Medical Help. Highly qualified psychologists, psychiatrists and de-addiction and rehabilitation programmes can help individuals who are suffering from drug/alcohol abuse.

If such help is provided to the affected persons, with sufficient effort and willpower, the patient could be completely cured and lead a normal and healthy life.

5. What are the methods of cancer detection? Describe the common approaches for treatment of cancer.

Ans: Early detection of cancer is essential. The methods of cancer detection and diagnosis are as follows.

- (i) Biopsy and histo-pathological studies of the tissue/ blood/ bone marrow.
- (ii) Tests for increased cell counts (in the case of leukaemia, blood cancer).
- (iii) Techniques like radiography (use of X-rays), CT (computed tomography) and MRI (Magnetic Resonance Imaging) to detect cancers of the internal organs.
- (iv) Detection of cancer-specific antigens.
- (v) Molecular biology techniques to detect genes in individuals with inherited susceptibility to certain cancers.

The common approaches for treatment of cancer

- (i) Surgical removal of tumour.
- (ii) Irradiation of tissue to kill cancerous cells.
- (iii) Immunotherapy using interferon to boost cancer cell killing.

6. Drugs like LSD, barbiturates, amphetamines, etc., are used as medicines to help patients with mental illness. However, excessive doses and abusive usage are harmful. Enumerate the major adverse effects of such drugs in humans.
Ans: Harmful effects of drugs like LSD, barbiturates are

- (i) Anxiety, shakiness, nausea and sweating, loss of mind control.
- (ii) Reckless behaviour, vandalism and violence.
- (iii) Lack of interest in personal hygiene, fluctuations in weight and appetite.
- (iv) Withdrawal, isolation, depression, fatigue, aggressive behaviour.
- (v) Social adjustment problems
- (vi) Withdrawal symptoms can be severe and life-threatening.
- (vii) Excessive doses of drugs may lead to coma and death may occur due to respiratory failure, heart failure or cerebral haemorrhage.

7. What is the Pulse Polio Programme of the Government of India? What is OPV? Why is it that India has yet to eradicate polio?
Ans: Pulse Polio is an immunisation campaign established by the Government of India in 1995-96 to eradicate poliomyelitis (polio) in India by vaccinating all children under the age of five years orally against the polio virus.
This project deals with the ways to fight poliomyelitis through a large-scale immunisation programme, co-operating with various international institutions, state governments and Non-Governmental Organisations. In 1995, following the polio eradication initiative of the World Health Organisation (1988), India launched the Pulse Polio Immunisation Program along with the Universal Immunisation Program, which aimed at 100% coverage.
Having made unprecedented progress in polio eradication, India is now gearing up to be declared polio-free by 2014 by guarding itself against the import of polio virus from neighbouring countries and by boosting routine immunisation.
Oral Polio Vaccine

- Oral Polio Vaccine (OPV) is a live-attenuated vaccine, produced by the passage of the virus through non-human cells at a sub-physiological temperature, which produces spontaneous mutations in the viral genome.
- OPV also proved to be superior in administration, eliminating the need for sterile syringes and making the vaccine more suitable for mass vaccination

campaigns. OPV also provides longer-lasting immunity than the Salk vaccine.

- One dose of OPV produces immunity to all three poliovirus serotypes in approximately 50% of recipients.
- India is yet to eradicate polio because, despite many initiatives taken by the government, a few cases have been reported.
- The last reported cases of polio in India were in West Bengal and Gujarat on 13 January 2011.
- Earlier this year, the World Health Organisation (WHO) removed India from the list of polio-endemic countries. If no fresh case is reported till 2014, the country will be declared polio-free.

On July 30, 2013, a nine-month-old boy from Navi Mumbai was found to be positive for Vaccine-Derived Polio-Virus(VDPV) type 2, and was on a ventilator at BJ Wadia Hospital in Parel. This is the fourth such case recorded in the country that year.
In India, the main obstacle in the eradication of polio had been the refusal of the polio vaccine by certain communities on account of illiteracy and misinformation.

8. What are recombinant DNA vaccines? Give two examples of such vaccines. Discuss their advantages.

Ans: Recombinant DNA vaccines are made up of a small circular DNA (plasmid) that has a very tiny piece of pathogen DNA incorporated in it to produce one or two specific proteins of the pathogen.
This recombinant DNA is introduced into the bacteria or yeast cells, where it can use the cell's machinery to produce polypeptides of the pathogen. These are used as vaccines to trigger a range of immune responses.
Vaccines produced by using this approach allow large-scale production. e.g.,

- (i) Hepatitis-B vaccine produced from yeast.
- (ii) Bird flu DNA vaccine.

Advantages

- (i) Recombinant DNA vaccines are advantageous over killed or attenuated vaccines since they do not get virulent or mutated again, as is seen in the case of attenuated vaccines.
- (ii) Secondly, these are highly pure, specific and elicit strong immune responses.