

MULTIPLE-CHOICE QUESTIONS

1. The term 'Health' is defined in many ways. The most accurate definition of 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 a symbol of economic prosperity.

Solution:

Option (c) is the answer.

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

- a. Pathogens
- b. Vectors
- c. Insects
- d. Worms

Solution:

Option (a) is the answer.

3. The clinical test that is used for the diagnosis of typhoid is:

- a. ELISA
- b. ESR
- c. PCR
- d. Widal

Solution:

Option (d) is the answer.

4. Diseases are broadly grouped into infectious and non-infectious diseases.

In the list given below, identify 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

Solution:

Option (d) is the answer.

5. The sporozoites that cause infection when a female Anopheles mosquito bites a person, are formed in:

- a. liver of the person
- b. RBCs of mosquito
- c. salivary glands of mosquito
- d. gut of mosquito

Solution:

Option (d) is the answer.

6. The disease chikungunya is transmitted by:

- a. house fly
- b. Aedes mosquito
- c. cockroach
- d. female Anopheles

Solution:

Option (b) is the answer.

7. Many diseases 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, headache
- b. Constipation, abdominal pain, cramps, blood clots
- c. Nasal congestion and discharge, cough, constipation, headache
- d. High fever, weakness, stomach pain, loss of appetite and constipation

Solution:

Option (a) is the answer.

8. Cancer-causing genes are called:

- a. structural genes
- b. expressed genes
- c. oncogenes
- d. regulatory genes

Solution:

Option (c) is the answer.

9. In malignant tumours, the cells proliferate, grow rapidly and move to other parts of the body to form new tumours. This stage of the disease is called:

- a. metagenesis
- b. metastasis
- c. teratogenesis
- d. mitosis

Solution:

Option (b) is the answer.

10. When a 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 an interest in sports

Solution:

Option (c) is the answer.

11. Which of the following is the reason(s) for Rheumatoid arthritis? Choose

the correct option.

- i. The ability to differentiate pathogens or foreign molecules from self cells increases.
 - ii. The 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

Solution:

Option (b) is the answer.

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 person
- d. Sexual contact with infected persons

Solution:

Option (c) is the answer.

13. 'Smack' is a drug obtained from the:

- a. latex of *Papaver somniferum*
- b. leaves of *Cannabis sativa*
- c. flowers of *Datura*
- d. fruits of *Erythroxylum coca*

Solution:

Option (a) is the answer.

14. The substance produced by a cell in a viral infection that can protect other cells from further infection are:

- a. serotonin
- b. colostrum
- c. interferon
- d. histamine

Solution:

Option (c) is the answer.

15. Transplantation of tissues/organs to save certain patients often fails due to the 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

Solution:

Option (d) is the answer.

16. Antibodies present in colostrum which protect the newborn from certain diseases are of

- a. IgG type**
- b. Ig A type**
- c. Ig D type**
- d. Ig E type**

Solution:

Option (b) is the answer.

17. Tobacco consumption is known to stimulate secretion of adrenaline and nor-adrenaline. The component causing this could be:

- a. Nicotine**
- b. Tannic acid**
- c. Curamin**
- d. Catechin**

Solution:

Option (a) is the answer

18. Antivenom against snake poison contains:

- a. Antigens**
- b. Antigen-antibody complexes**
- c. Antibodies**
- d. Enzymes**

Solution:

Option (c) is the answer.

19. Which of the following is not a lymphoid tissue?

- a. Spleen**
- b. Tonsils**
- c. Pancreas**
- d. Thymus**

Solution:

Option (c) is the answer.

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**

Solution:

Option (c) is the answer.

21. Haemozoin is a:

- a. precursor of haemoglobin**
- b. the toxin released from Streptococcus infected cells**



- c. the toxin released from Plasmodium-infected cells
- d. the toxin released from Haemophilus infected cells

Solution:

Option (c) is the answer.

22. Which of the following is not the causal organism for ringworm?

- a. Microsporium
- b. Trichophyton
- c. Epidermophyton
- d. Microsporium

Solution:

Option (d) is the answer.

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

Solution:

Option (c) is the answer.

VERY SHORT ANSWER TYPE QUESTIONS

1. Certain pathogens are tissue/organ-specific. Justify the statement with suitable examples.

Solution:

Pathogens are disease-causing agents. Certain pathogens are tissue/organ-specific as they only attack a certain tissue. Typhoid: Salmonella typhi only infects the small intestine.

2. The immune system of a person is suppressed. In the ELISA test, he was found positive to a pathogen.

- a. Name the disease the patient is suffering from.
- b. What is the causative organism?
- c. Which cells of the body are affected by the pathogen?

Solution:

- a. The patient is suffering from Acquired Immuno Deficiency Syndrome (AIDS).
- b. The causative organism is the Human Immuno Deficiency Virus (HIV).
- c. T4 lymphocytes or helper cells are affected in this disease.

3. Where are B-cells and T-cells formed? How do they differ from each other?

Solution:

B-cells are produced in the bone marrow. They also go through maturation in the bone marrow. B cells provide immunity by detecting the antigens on the pathogens whereas T cells provide immunity by detecting antigen on pathogens.

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 | cold |
| b. Salmonella | Typhoid |
| c. Microsporium | Filariasis |
| d. Plasmodium | malaria |

Solution:

In the above question option, 'c' is incorrectly matched. The disease filariasis is caused by an infection caused by roundworms of Filarioidea genus.

5. What would happen to the immune system, if thymus gland is removed from the body of a person?

Solution:

If thymus gland is removed from the body of a person T-lymphocytes would not be able to mature.

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?

Solution:

Our body has preventive barriers which are as follows:

1. Lysozyme present in saliva
2. The mucous coating on the epithelium lining of the gut.
3. Hydrochloric acid secreted by the parietal cells in the stomach. This type of immunity is known as Innate Immunity.

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

Solution:

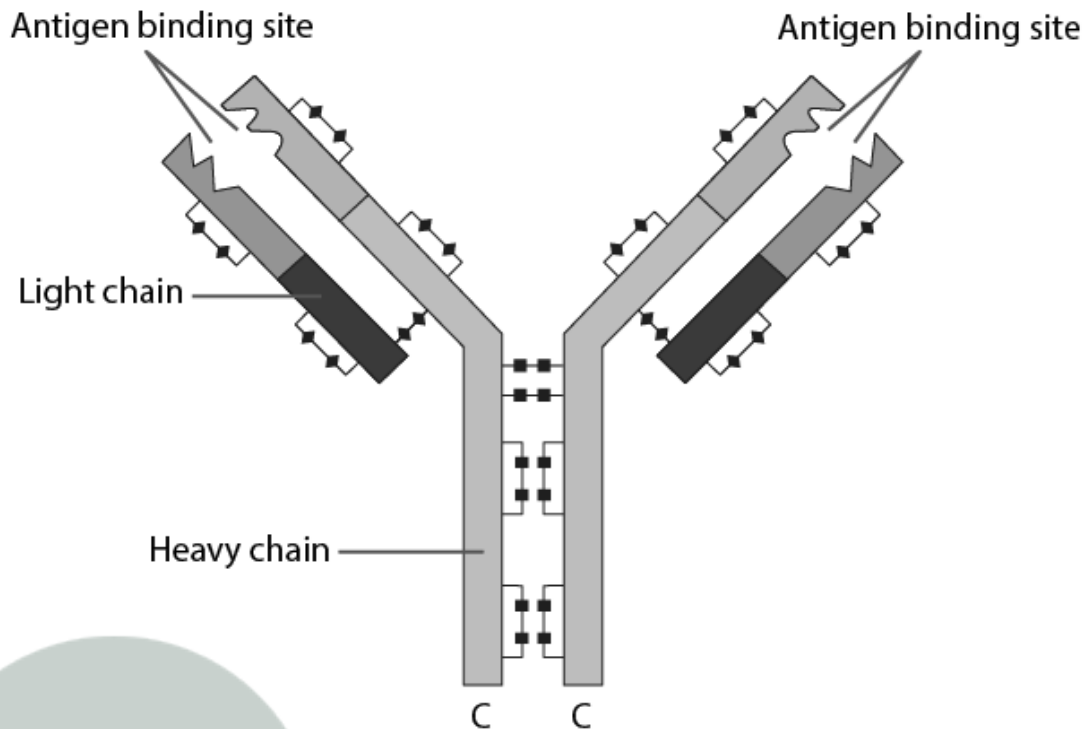
Mother's milk is considered the most appropriate food for a newborn infant because in the initial days the thick yellowish fluid called colostrum is produced which has antibodies which boost the immune system.

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

Solution:

Interferons are a group of natural proteins released by the host cell in the presence of any virus, tumour cells and parasites etc. Interferons inhibit viral replication within the host cells.

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



Solution:

Site A is the constant region for heavy chain.

Site B is the constant region for the light chain.

Site C is the variable region of light and heavy chain.

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

Solution:

1. It leads to anxiety.
2. Trouble concentrating on things and thinking clearly.
3. Headache and nausea.
4. Mood swings are also seen

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

Solution:

At this time the microbes are active and prevalent. This makes the individual more susceptible to viral infections.

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

Solution:

The harmful allele of sickle cell anaemia has not been eliminated from the human population. Such afflicted people derive some other benefit. This will make less prone to malaria.

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

Solution:

The main function of the lymph node is to clear the lymph (it is a clear liquid which comes from plasma) which carries pathogens and other foreign substances (like cancer cells) that are brought by the lymph, through lymphatic cells.

14. Why is an antibody molecule represented as H₂L₂?

Solution:

It has two light chains (L₂) and two heavy chains (H₂) hence the representation H₂L₂.

15. What does the term 'memory' of the Immune system mean?

Solution:

The memory of the immune system means the body remembers the antigen, recognize it from the previous encounter and initiate the immune response against it.

16. If a patient is advised Anti Retroviral Therapy, which infection is he suffering from? Name the causative organism.

Solution:

If a patient is advised Anti Retroviral Therapy the patient is suffering from Acquired Immune Deficiency Syndrome (AIDS). The causative organism is a virus called HIV or Human Immuno Deficiency Virus.

SHORT ANSWER TYPE QUESTIONS

1. Differentiate between active immunity and passive immunity.

Solution:

Active immunity is the direct immune response of the body towards an antigen whereas passive immunity is the transfer of lymphocytes to an individual from an already immunized person as in the case of breastfeeding.

2. Differentiate between a benign tumour and malignant tumour.

Solution:

A benign tumour is a non-cancerous form of tumour which is slow-growing. A malignant tumour is cancerous and it is fast growing.

3. Do you consider passive smoking is more dangerous than active smoking? Why?

Solution:

Passive smoking means indirectly inhaling the smoke produced by someone else, also known as second-hand smoke. It is equally dangerous as active smoking and can cause lung cancer like harmful diseases.

4. "Prevention is better than cure". Comment.

Solution:

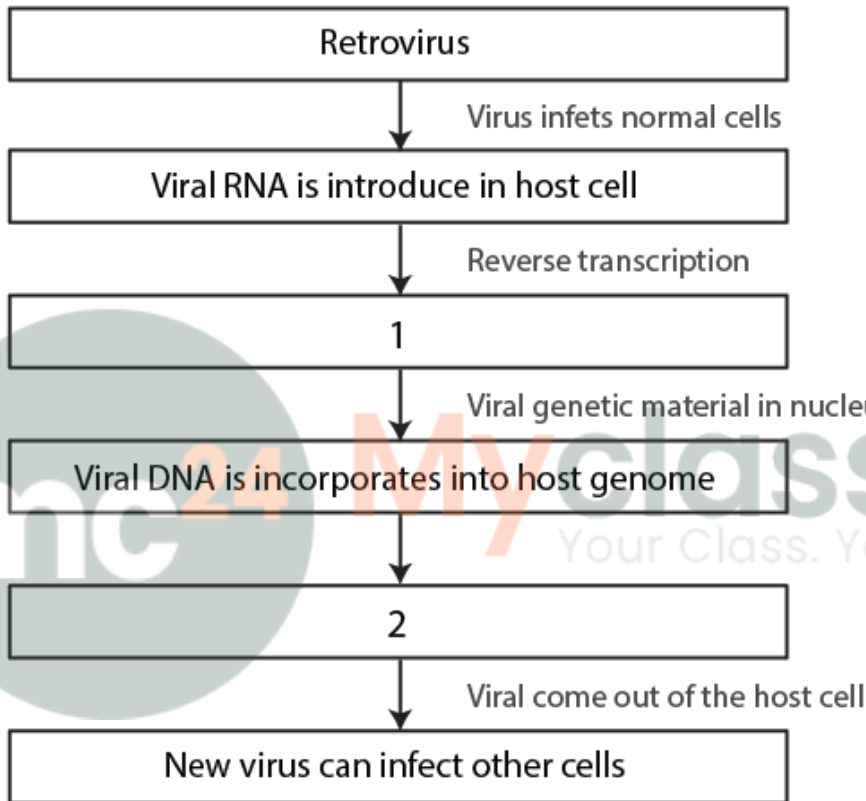
Prevention is always better than cure. Any disease enters the body cause severe problems and discomfort to the person. So if we take prevention it will be always good for the person as well as the family.

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

Solution:

1. Overcrowded places should be avoided
2. Preventive vaccination could be done
3. Hygiene should be maintained

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



a. Fill in (1) and (2)

b. Why the virus called retrovirus?

c. Can the infected cell survive while viruses are being replicated and released?

Solution:

1) Block 1: Viral DNA is produced by reverse transcriptase.

Block 2: New viral RNA is produced by the infected cell.

2) RNA is the genetic material of this virus. So it produces DNA by reverse transcription. Hence, it does not follow central dogma hence, is known as a retrovirus.

3) Yes, the infected cell survives 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 by giving suitable examples.

Solution:

Maintenance of personal and public hygiene is necessary for prevention and control of many infectious

diseases because of the hygiene is not maintained microbes would grow and would easily get transmitted. By giving proper awareness program for the people can make some knowledge about the importance of hygiene. Proper sanitation should be provided so that air and water would not get contaminated. Proper vaccination should be done to control the spread of infection.

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

| | Name of the disease | Casulative organism | Symptoms |
|-------|---------------------|--------------------------|--|
| (i) | Ascariasis | Ascaris | _____ |
| (ii) | _____ | Trichophyton | Appearance of dry, scaly lesions on various parts of body |
| (iii) | Typhoid | Salmonella typhi | High fever, weakness, headache, stomach pain, constipation |
| (iv) | Pneumonia | Streptococcus pneumoniae | _____ |
| (v) | _____ | Rhino viruses | Nasal congestion and discharge, sore throat, cough, headache |
| (vi) | Filaris | _____ | Inflamation in lower limbs |

Solution:

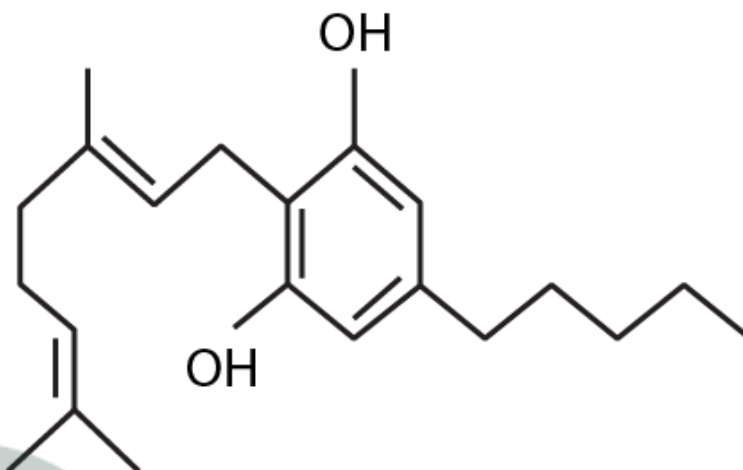
| | | | |
|-------|-------------|----------------------------|--|
| (i) | Ascariasis | Ascaris | Internal bleeding, muscular pain, fever, anemia and blockage of the intestinal passage |
| (ii) | Ringworm | Trichophyton | Appearance of dry, scaly lesions on various parts of body |
| (iii) | Typhoid | Salmonella typhi | High fever, weakness, headache, stomach pain, constipation |
| (iv) | Pneumonia | Streptococcus pneumoniae | Fever, chills, cough and headache |
| (v) | Common cold | Rhino viruses | Nasal congestion and discharge, sore throat, cough, headache |
| (vi) | Filaris | W. bancrofti and W. malayi | Inflamation 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 the consumption of these drugs.



Solution:

a. It belongs to Cannabinoids group of drugs.

b. This drug can be consumed either orally or Inhalation.

c. The cardiovascular system of the body is most affected.

10. Give the full form of CT and MRI. How are they different from each other? Where are they used?

Solution:

CT: Computed Tomography

MRI: Magnetic Resonance Imaging

CT uses X-ray and is an invasive technique. MRI uses a magnetic field and radiofrequency pulses and non-invasive technique.

11. Many secondary metabolites of plants have medicinal properties. It is their misuse that creates problems. Justify the statement with an example.

Solution:

This is because they could be drugs like opium, heroin, LSD etc which are the chemical compounds that act on the receptor of the brain They make a person relax, improves their strength, free from pain, nausea and anxiety.

12. Why cannabinoids are banned in sports and games?

Solution:

These drugs are banned in sports as they are known to enhance performance and hurt the player's health in the long run.

13. What is secondary metabolism?

Solution;

It is the term for pathways and small molecules products of metabolism that are not required for the survival. They are termed as secondary metabolites like antibiotics and pigments produced in bacteria, fungi etc.

14. Drugs and alcohol give short-term 'high' and long-term 'damages', Discuss.

Solution:

Alcohol and drugs may irritate the lining of the stomach and can trigger nausea, vomiting and other gastric troubles and is a CNS depressant.

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

Solution:

The water gets mixed with the infected excreta and the contaminated water spreads the disease further in case of open excretion.

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

Solution:

Cannabinoids are the chemical substances that mainly act on the cannabinoid receptor in the brain. It is obtained from Inflorescence of Cannabis Sativa. Example of Cannabinoids: Marijuana, Ganja and Charas etc. Cardiovascular System is the most affected.

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.

Solution:

1. Cities are highly polluted by air and noise. The use of factories and other industries releases pollutants which cause allergies.
2. It lowers immunity in children and makes them more sensitive towards the allergens.

Symptoms:

1. Breathing Difficulty.
2. Sneezing
3. Runny Nose
4. Burning and watery eyes.

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

Solution:

Vaccination is the process of injecting weak or inactive pathogen of a specific disease in the body of an individual. This makes the body generate an immune response by releasing antibodies with memory B and T cells. 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?

Solution:

Mutation in the genes may lead to the uncontrollable and rapid division of the cells forming a mass or

tumour. This mass is known as cancer. A cancer cell is a metastasis that is moving from one place to another through the lymphatic system and the bloodstream and is highly invasive. Normal cells divide in a controlled manner and cells show inhibition.

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 precaution should be taken to avoid such reactions?

Solution:

This unusual hypersensitive reaction is an allergy which is caused due to exposure towards allergens. Mast cells are responsible for such reactions. This can be prevented by taking precautions like avoiding exposure to the allergens and medicine should be taken which are suggested by the doctors.

21. For an organ transplant, it is an advantage to have an identical twin. Why?

Solution:

In the case of identical twins, the chances of graft rejection are less because the blood group and tissue match are easy.

22. What are lifestyle diseases? How are they caused? Name any two such diseases.

Solution:

Lifestyle diseases are the diseases caused because of the way a person lives his life or his daily habits and routine. They are caused by unhealthy eating, Lacking physical activity and exercise. Diabetes and hypertension are the two diseases caused.

23. If there are two pathogenic viruses, one with DNA and other with RNA, which would mutate faster? And Why?

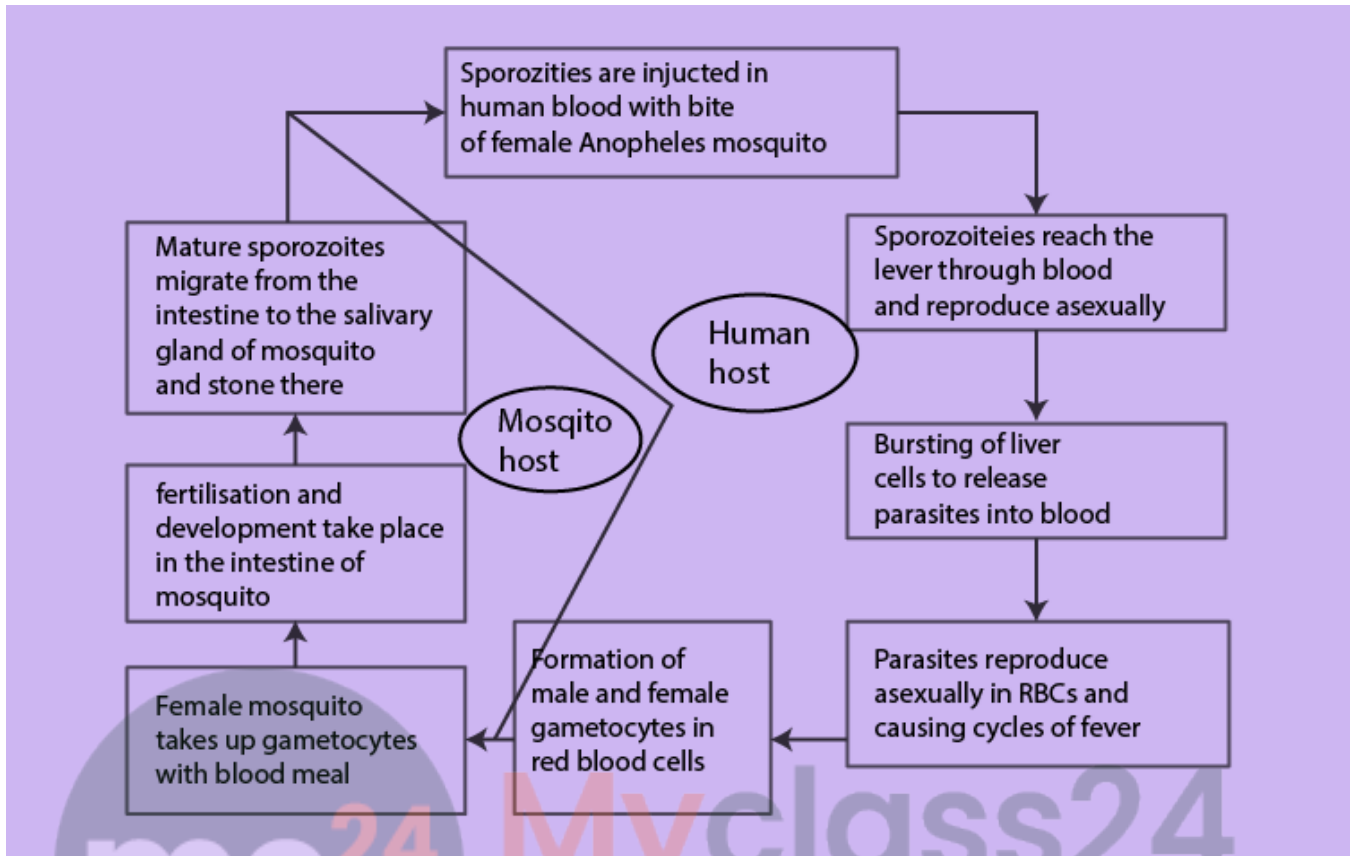
Solution;

If there are two pathogenic viruses, one with DNA and other with RNA than the one having RNA would mutate faster because RNA being a single-stranded structure is quite unstable and can mutate at a faster rate.

LONG ANSWER TYPE QUESTIONS

1. Represent schematically the life cycle of a malarial parasite.

Solution:



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

Solution:

| Rural area | Urban area |
|--|--|
| Lack of health facilities Poor sanitation Poor living condition Unavailability of water, electricity etc. | Health facilities are present Better sanitation facilities Better standard of living Available all the basic sources. |

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

Solution:

Adolescents start taking drugs because it affects both physiologically and psychologically on our system. There are some reasons for the addiction

1. Peer pressure
2. Feeling of Betterment
3. Experimentation
4. Depression

These can be avoided by counseling. Say 'NO' to any person forcing drugs on you and also don't taking too much of pressure from anyone for anything.

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.

Solution:

1. If a person is addicted, an individual would develop a selfish attitude and may deprive his family for the needs to fulfill their own.
2. Reduced attention to personal and professional life.
3. Withdrawal symptoms are seen when alcohol intake stops.
4. Repeated unsuccessful attempts to stop alcohol intake.

Measures to overcome alcoholism are:

1. Counseling will be better
2. Spend time with family and friends
3. Make sure that alcohol is limited below the recommended guideline
4. Don't try to pressure yourself. Try to do medication all-day
5. Listen to music or engage in some other things which makes you relaxed.

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

Solution:

Mutation in the genes may lead to the uncontrollable and rapid division of the cells forming a mass or tumour. This mass is known as cancer.

Methods of cancer detection:

1. Bone marrow biopsy
2. Endoscopic Assessment
3. CT scan
4. Monoclonal antibodies
5. MRI
6. Ultrasound

Surgery, radiation therapy and immunotherapy are the common approaches for the treatment of cancer. In radiotherapy, the cancer cells are radiated. Several chemotherapeutic drugs are used to kill cancerous cells.

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.

Solution;

Drugs are chemical substances that have a psychological and physiological effect on your system but overdose may lead to the following adverse effects:

1. If it is overdosed it causes anxiety and shakiness
2. Vomiting and Nausea
3. A person will show less interest in personal and professional life.
4. Social adjustment problems are seen.
5. Reckless behaviour, violence and vandalism
6. General lack of interest is seen.

7. What is the Pulse Polio Programme of Government of India? What is OPV? Why is it that India is yet to eradicate Polio?

Solution:

Pulse Polio Programme is the Government of India initiative to abolish Polio from India since 1995. In this programme, all children below the age of five are immunized orally against the poliovirus. The programme aimed to eradicate polio from India.

Polio also is known as Poliomyelitis is an infectious disease caused by poliovirus which leads to muscle weakness and further inability to move. OPV is the Oral Polio Vaccine. This vaccine is used to eradicate polio. In OPV a weakened poliovirus is given orally through the mouth. It consists of a mixture of live attenuated poliovirus strains which are injected inside the body to initiate an immune response. One dose of OPV produces long-lasting immunity towards all three types of strains of the poliovirus

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

Solution:

A recombinant vaccine is a vaccine produced through recombinant DNA technology that involves inserting the DNA encoding an antigen that stimulates an immune response into bacterial or mammalian cells.

Example:

1. Bird Flu virus vaccine for humans.
2. West Nile virus vaccine for horses.

Advantages:

1. Minimal risk of infection.
2. They initiate both cell-mediated and humoral immune response.
3. Cost-effectiveness
4. Long-term persistence of immunogenic

