Human Health and Diseases

Case Study Based Questions

Case Study 1

Communicable Disease

Riya studies in IInd standard in a government school. She belongs to a backward family and her parents did not get her properly vaccinated according to immunisation programme. Once while playing in school playground she fell down due to weakness and developed high fever, headache and stiffness in her neck. Identify the illness she could be suffering from and answer the following questions:

Q1. The microbe responsible for Riya's illness could be:

a. Vibrio cholerae
c. Plasmodium
b. Enterovirus
d. Mycobacterium

Q2. Which vaccine, if administered earlier, would have saved Riya from the illness she unfortunately contracted?

a. Salk vaccine
c. Varicella vaccine
b. MMR vaccine
d. BCG vaccine

Q3. The disease that Riya has contracted spreads through:

a. bite of an infected mosquito.
b. bite of an infected dog.
c. faecal oral route.
d. direct contact with the infected person.

Q4. Riya can spread her illness to other children through:

a. her faeces
b. direct contact
c. coughing and sneezing in open
d. vectors

Q5. Assertion (A): Polio produces inflammation of the nervous system.
Reason (R): Stiffness of the neck and paralysis of particular skeletal muscle is an important symptom of polio.
a. Both Assertion and Reason are true, and Reason is the correct explanation of Assertion.
b. Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
c. Assertion is true, but Reason is false.
d. Assertion is false but Reason is true.

Answers

1. (c)
2. (d)
3. (d)
4. (c)
5. (d)

Case Study 3

Diseases in Human

X and Y are communicable diseases whereas W and Z are non-communicable diseases. X is transmitted through vectors whereas Y is transmitted through droplet infection. W is caused due to a hormone deficiency whereas Z is a degenerative disease.

Q1. Identify W, X, Y and Z.

	W	X	Y	Z
a.	Coronary artery disease	Cholera	Chikungunya	Hypertension
b.	Diabetes	Malaria	Rhinitis	Alzheimer's disease
c.	Arthritis	AIDS	*Shigella*	Plague
d.	Gonorrhoea	Diphtheria	Pertussis	Anthrax

Q2. Select the correct statement:

a. If X is sleeping sickness, then its vector is Leishmania.

b. If Y is diphtheria, then it is caused by Bacillus anthracis.

c. If W is hypothyroidism, then it is caused by deficiency of thyroxine hormone.

d. If Z is myocardial infarction, then patient develops acute rheumatic fever, joint pain and throat infection.

Q3. If X and Y both are usual diseases, then which of the following holds true?

a. X could be dengue caused by flavivirus and Y could be AIDS caused by HIV.

b. X could be chikungunya whereas Y could be rhinitis.

c. X could be hepatitis whereas Y could be rabies.

d. X could be chicken pox caused by Varicella zoster virus whereas Y could be yellow fever caused by flavivirus.

Q4. If X and Y both are bacterial diseases, then select the correct match from the following:

a. X-Bubonic plague - Yersinia pestis

b. Y- Leprosy - Mycobacterium leprae

c. X-Whooping cough - Bordetella pertussis

d. Y- Botulism - Clostridium botulinum

Q5. Assertion (A): Communicable diseases could be contagious or non-contagious.
Reason (R): Diseases that spread through vectors are non-contagious diseases.

a. Both Assertion and Reason are true, and Reason is the correct explanation of Assertion.

b. Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

c. Assertion is true, but Reason is false.

d. Assertion is false but Reason is true.

Answers

1. (b)
2. (c)
3. (b)
4. (a)

5. (b)

Case Study 4

Aditya went to his hometown located in countryside alongwith his parents during his summer vacations. His grand parents' house is surrounded by farmland from all sides. Lots of crops were growing nearby and Aditya was very excited to visit the crop fields. He seeked permission from his mother to play in farmland along with his friends and then went to play in the fields. On returning back he had running nose, watering eyes and continuous sneezing which was very frequent. The symptoms worsened with time.

Read the given passage carefully and give the answer of the questions that follows:

Q1. What could be the possible reason for Aditya's condition?
Ans. Aditya most probably had developed some sort of allergy due to pollens of grasses, trees and other plants.

Q2. How can energy be diagnosed in a person?
Ans. Allergies mainly involve IgE antibodies and chemicals like histamine and serotonin from most cells.

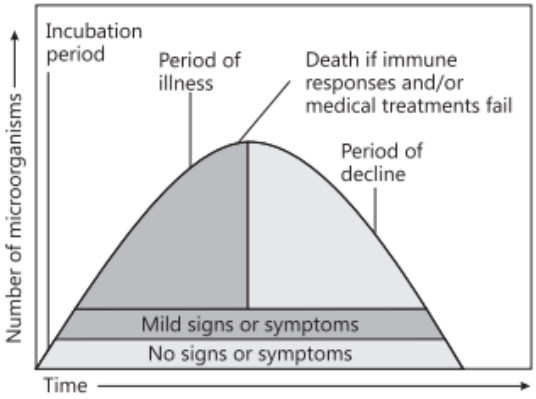
OR

Write the consequence of the symptoms which Aditya developed on account of being allergic?
Ans. The allergy which Aditya developed is characterised by inflammation of membrane lining the nose and conjunctiva leading to running nose, watering eyes and constant sneezing.

Q3. Name the type of allergy that Aditya developed.
Ans. Hay fever.

Case Study 5

When a microorganism invades a host, a definite sequence of events usually occur leading to infection and disease, causing suffering to the host. This process is called pathogenesis. Once a microorganism overcomes the defense system of the host, development of the disease follows a certain sequence of events as shown in the graph. Study the graph given below for the sequence of events leading to appearance of a disease and answer the questions that follow:



Read the given passage carefully and give the answer of the questions that follows:

Q1. In which period, according to the graph there are maximum chances of a person transmitting a disease/infection and why?

Ans. Period of illness. It is because the number of disease causing microorganisms reaches maximum in the period of illness.

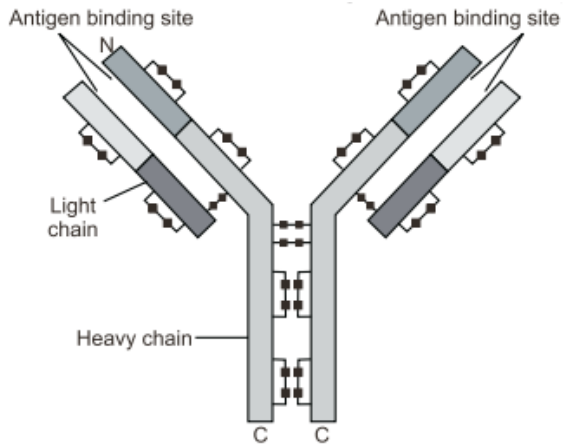
Q2. Study the graph and write what is an incubation period. Name a sexually transmitted disease that can be easily transmitted during this period. Name the specific type of lymphocytes that are attacked by the pathogen of this disease.

Ans. The time between no signs and symptoms till mild signs and symptoms is called incubation period. AIDS is the sexually transmitted disease that can spread in this period. Macrophages are specific type of lymphocytes that are attacked by the pathogen of this disease.

OR

Draw a schematic labelled diagram of an antibody.

Ans.



Structure of an antibody molecule

Q3. In which period, the number of immune cells forming antibodies will be the highest in a person suffering from pneumonia? Name the immune cells that produce antibodies.
Ans. The number of immune cells will be the highest during the period of illness. B-lymphocytes produce antibodies.

Solutions for Questions 6 to 15 are Given Below

Case Study 6

Read the following and answer any four questions from 1(i) to 1(v) given below:
Riya studies in II standard in a government school. She belongs to a backward family and her parents did not get her properly vaccinated according to immunisation programme. Once while playing in school playground she fell down due to weakness and developed high fever, headache and stiffness in her neck.
Identify the illness she could be suffering from and answer the following questions.

(i) The microbe responsible for Riya's illness could be
(a) *Vibrio cholerae* (b) *Enterovirus*
(c) *Plasmodium* (d) *Mycobacterium.*

(ii) Which vaccine, if administered earlier, would have saved Riya from the illness she unfortunately contracted?
(a) Salk vaccine (b) MMR vaccine
(c) BCG vaccine (d) Varicella vaccine

(iii) The disease that Riya has contracted spreads through
(a) bite of an infected mosquito (b) bite of an infected dog
(c) faecal oral route (d) direct contact with the infected person.

(iv) Riya can spread her illness to other children through
(a) her faeces (b) direct contact
(c) coughing and sneezing in open (d) vectors.

(v) **Assertion :** Polio produces inflammation of the nervous system.
Reason : Stiffness of the neck, paralysis of particular skeletal muscle is an important symptom of polio.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Case Study 7

Read the following and answer any four questions from 2(i) to 2(v) given below:
X and Y are communicable diseases whereas W and Z are non-communicable diseases. X is transmitted through vectors whereas Y is transmitted through droplet infection. W is caused due to a hormone deficiency whereas Z is a degenerative disease.
Based on the above information, answer the following questions.

(i) Identify W, X, Y and Z.

	W	X	Y	Z
(a)	Coronary artery disease	Cholera	Chikungunya	Hypertension
(b)	Diabetes	Malaria	Rhinitis	Alzheimer's disease
(c)	Arthritis	AIDS	Shigella	Plague
(d)	Gonorrhea	Diphtheria	Pertussis	Anthrax

(ii) Select the correct statement.
(a) If X is sleeping sickness then its vector is *Leishmania*.
(b) If Y is diphtheria then it is caused by *Bacillus anthracis*.
(c) If W is hypothyroidism then it is caused by deficiency of thyroxine hormone.
(d) If Z is myocardial infarction then patient develops acute rheumatic fever, joint pain and throat infection.

(iii) If X and Y both are usual diseases then which of the following holds true?
(a) X could be dengue caused by flavivirus and Y could be AIDS caused by HIV.
(b) X could be chikungunya whereas Y could be rhinitis.
(c) X could be hepatitis whereas Y could be rabies.
(d) X could be chicken pox caused by *Varicella zoster* virus whereas Y could be yellow fever caused by flavivirus.

(iv) If X and Y both are bacterial diseases then select the correct match from the following.
(a) X- Bubonic plague - *Yersinia pestis*
(b) Y - Leprosy - *Mycobacterium leprae*
(c) X - Whooping cough - *Bordetella pertussis*
(d) Y - Botulism - *Clostridium botulinum*

(v) **Assertion :** Communicable diseases could be contagious or non-contagious.
Reason : Diseases that spread through vectors are non-contagious disease.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Case Study 8

Read the following and answer any four questions from 3(i) to 3(v) given below:
Rajesh, Ravi and Rohit are roommates. They are doing their graduation. Few months back Ravi fell ill. It took him around 3 weeks to recover. Both his friends were absolutely healthy at that time. After sometime Rajesh also fell ill from some other disease. This time Ravi and Rohit both contracted the same illness.
Based on the above information, answer the following questions.

(i) Which of the following holds true for Ravi's illness?
(a) Ravi was suffering from a communicable disease that is transmitted through vector.
(b) Ravi was suffering from a communicable disease that is transmitted through faecal oral route.

(c) Ravi was suffering from a non-communicable disease like anaemia.
(d) Ravi was suffering from a non-communicable disease like Down's syndrome.

(ii) Select the correct statement.
(a) Ravi contracted a disease caused by air borne microbes.
(b) Ravi could have suffered a nutritional disorder.
(c) Ravi suffered a non-contagious disease.
(d) Both (b) and (c)

(iii) Which could be correctly said for Rajesh's illness?
(a) Rajesh's illness was due to a microbial infection.
(b) Rajesh's illness could be contagious or non-contagious.
(c) Rajesh's illness could be cured by antibiotics.
(d) All of these

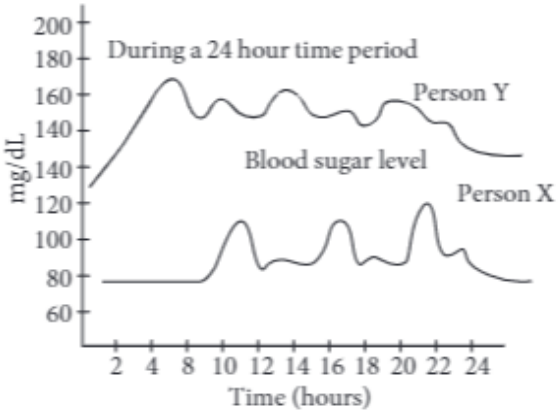
(iv) Which of the following may depicts Ravi's and Rajesh's illness?

	Ravi	**Rajesh**
(a)	Sickle cell anaemia	Myocardial infection
(b)	Whooping cough	Tetanus
(c)	Gastritis	Rhinitis
(d)	Hypertension	Thyroid

(v) **Assertion :** Diabetes mellitus is a non-communicable disease which can be completely cured.
Reason : Diabetes mellitus is caused by deficiency of aldosterone hormone.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Case Study 9

Read the following and answer any four questions from 4(i) to 4(v) given below:
The given graphs show fluctuations in blood sugar of person X and Y during a 24 hour time period.



Based on the above information, answer the following questions.

(i) Which of the following holds true for person X?
(a) Person X is suffering from type I diabetes.
(b) Person X shows severe insulin deficiency and beta cell depletion.

(c) Person X is normal and shows good control of blood sugar level.
(d) Person X is subjected to excessive urination and abnormal thrust.

(ii) The given graph indicates that person Y is suffering from
(a) diabetes
(b) hypertension
(c) atherosclerosis
(d) rheumatic heart disease.

(iii) Which of the following conditions are common in person Y?
(a) Excretion of glucose in urine and excessive urination
(b) Polydipsia and mild beta cell depletion
(c) Progressive erosion of articular cartilage at synovial joint
(d) Both (a) and (b)

(iv) A person suffering from diabetes mellitus becomes weak because
(a) the cells are unable to utilise glucose and other carbohydrates for energy production
(b) degradation of fat increases production of toxic ketone bodies
(c) cells utilize proteins for obtaining energy
(d) all of these.

(v) **Assertion :** Type I diabetes involves failure of insulin to facilitate the movement of glucose into cells.
Reason : Type II diabetes is caused by failure of beta cells to produce adequate amount of insulin due to beta cell depletion.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Case Study 10

Read the following and answer any four questions from 5(i) to 5(v) given below:
Priya was 4 years old when she contracted chicken pox. It took her around 15 days to recover completely. Now Priya is 5 years old so her mother got her vaccinated few days back for DPT (5^{th} dose) as per immunisation program. Recently she was playing with her friend in the park when her friend accidently fell on iron pipe and badly bruised her knee. She was taken to the hospital where doctor gave her ATS injection and painkillers.
Based on the above information, answer the following questions.

(i) Select the correct statement.
(a) Priya has developed natural active immunity against chicken pox.
(b) Priya has developed artificial active immunity against DPT.
(c) Priya's friend has developed artificial passive immunity against tetanus.
(d) All of these

(ii) Which of the following do you think is an example of natural passive immunity?
(a) Administration of AGS (anti gas gangrene serum) in a person
(b) Transfer of IgA antibodies from mother to baby through mother's milk
(c) A person recovered from viral infection
(d) A child vaccinated for polio

(iii) Which of the following is true for active immunity?
(a) It provides immediate relief.
(b) It is temporary, not long lasting.
(c) It has no side effects.
(d) None of these

(iv) Select the incorrect match.
(a) Passive immunity - IgG antibodies crossing placental barrier to reach fetus
(b) Active immunity - Vaccination against corona virus
(c) Active immunity - Administration of antidiphtheria serum in patient
(d) Passive immunity - Fetus having mother's milk

(v) **Assertion :** A person recovered from measles develops an active immunity against this infection.
Reason : In active immunity, person's own cells develop antibodies in response to infection.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Case Study 11

Read the following and answer any four questions from 6(i) to 6(v) given below:
In a study to test a new vaccine against a viral disease, mouse model testing is done. In this process, mice are vaccinated and their blood samples were tested. Mice developed mild disease symptom. After few days those mice were again infected with the virus. This time they do not show any disease symptoms. Their blood samples were tested. Two graphs show antibody concentration for the first and second infection in mice blood.

Based on the above information, answer the following questions.

(i) P and Q in the given graphs indicate
(a) IgM and IgG respectively
(b) IgG and IgM respectively
(c) IgG and IgE respectively
(d) IgM and IgA respectively.

(ii) Which form of pathogen is used in vaccination?
(a) Activated and strong pathogenic antigens
(b) Inactivated and weakened pathogenic antigens
(c) Hyperactive and strong pathogen
(d) Preformed antibodies

(iii) Which of the following is incorrect for P?
(a) It is the most abundant class of Ig.
(b) It is found in blood, lymph and intestine.
(c) It is unable to cross the placental barrier.
(d) It is a monomer.

(iv) How does vaccination work?
(a) The immune system produces antibodies which stay in the blood.
(b) Memory lymphocytes remain in the body to fight off any future infection with the same pathogen.
(c) The dead pathogen stays in the body and constantly stimulates the immune system.
(d) All of these.

(v) **Assertion :** Mice do not show any disease symptoms during second exposure to the pathogenic virus.
Reason : The antibody production is accelerated and more intense during secondary immune response.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Case Study 12

Read the following and answer any four questions from 7(i) to 7(v) given below:
Aditya went to his hometown located in countryside along with his parents during his summer vacations. His grand parents' house is surrounded by farmland from all sides. Lots of crops were growing nearby and Aditya was very excited to visit the crop fields. He seeked permission from his mother to play in farmland along with his friends and then went to play in the fields. On returning back he had running nose, watering eyes and continuous sneezing which was very frequent. The symptoms worsened with time.
Based on the above information, answer the following questions.

(i) What could be the possible reason for Aditya's condition?
(a) Allergy (b) Infection (c) Malnutrition (d) Genetic disorder

(ii) How can allergy be diagnosed in a person?
(a) Presence of large amount of IgE antibodies in the blood
(b) Presence of large number of bacteria in the blood
(c) Presence of bilirubin and bilirubin pigments in the stool
(d) Presence of sickle shaped RBCs in the blood

(iii) The symptoms which Aditya developed on account of being allergic are consequence of
(a) inflammation of membrane lining the nose and conjunctiva
(b) swelling up of tissue surrounding bronchioles of lungs
(c) dilation of all arteries so that large amount of fluid passes from blood to tissues.
(d) all of these.

(iv) Name the type of allergy that Aditya developed.
(a) Asthma (b) Anaphylaxis (c) Hay fever (d) Urticaria

(v) **Assertion :** Hay fever is the form of allergy due to pollens of grasses and other plants.
Reason : Hay fever symptoms are due to release of histamines and often respond well to treatment with antihistamines.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Case Study 13

Read the following and answer any four questions from 8(i) to 8(v) given below:
Reema, Jai and Ankit are suffering from autoimmune diseases of adrenal cortex, joints and thyroid gland, respectively. Their immune system failed to recognise self and non-self and started destroying their body's own proteins. They are seeking proper medical help for their conditions but their condition cannot be cured completely.

Based on the above information, answer the following questions.

(i) Select the option that correctly identifies autoimmune diseases of Reema, Jai and Ankit.

	Reema	Jai	Ankit
(a)	Diabetes	Grave's disease	Rheumatic fever
(b)	Pernicious anaemia	Multiple sclerosis	Myasthenia gravis
(c)	Addison's disease	Rheumatoid arthritis	Hashismoto's thyroiditis
(d)	Systemic lupus erythematosus	Severe combined immunodeficiency disease	AIDS

(ii) Reema's autoimmune condition is characterised by
(a) undersecretion of insulin
(b) destruction of RBCs and low RBC count
(c) undersecretion of adrenal cortex hormones
(d) low production of intrinsic factor required for absorption of B_{12}.

(iii) What do you think is the major cause of Jai's condition?
(a) Deterioration of myelin sheath around nerve cells leading to loss of precise muscle control.
(b) Destruction of heart cells leading to weakening of entire heart wall.
(c) Destruction of beta cells leading to undersecretion of insulin.
(d) Deposition of immune complexes of IgM, IgG and complement in joints thereby inflaming joints, destroying articular cartilage and fusing bones.

(iv) How do you think Ankit's condition got diagnosed?
(a) Low level of thyroid hormone and elevated levels of TSH in Ankit's blood.
(b) Presence of antibodies against thyroid pen oxidase (TPO antibodies) in Ankit's blood.
(c) Elevated erythrocyte sedimentation rate (ESR), reduced C-reactive protein (CRP) in Ankit.
(d) Both (a) and (b)

(v) **Assertion :** Immunosuppressive drugs often reduce the severity of autoimmune disorders.
Reason : Monoclonal antibodies have been successfully used in the treatment of autoimmune disease.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Case Study 14

Read the following and answer any four questions from 9(i) to 9(v) given below:
Siddharth is a chain smoker. He got into this habit in early adolescence due to peer pressure and gradually got addicted to this habit. Its now almost 20 years he is into the habit of smoking. Since few months he is experiencing pain in chest, shortness of breath, wheezing and chronic cough with phlegm. He seeked advice of a medical practitioner who diagnosed him with lung cancer.
Based on the above information, answer the following questions.

(i) What do you think is the possible carcinogen responsible for Siddharth's lung cancer?
(a) Nitrosamines (b) Benzo(a)pyrene (c) Hydrazine (d) All of these

(ii) How is lung cancer diagnosed?
(a) Computerised tomography scan (b) sputum cytology
(c) Biopsy of lung tissue (d) All of these

(iii) From which of the following type of cancer is Siddharth suffering from?

(a) Sarcoma (b) Carcinoma

(c) Lymphoma (d) Leukemia

(iv) Select the correct statement.

(a) Surgery, radiotherapy and chemotherapy can be used to treat lung cancer.

(b) Chemotherapy involves the exposure of cancerous parts to X rays which destroy rapidly growing cancer cells.

(c) Surgical removal of lung cancer tissue is suggested at advanced stage 4.

(d) Monoclonal antibodies can effectively treat lung cancer and can cure it completely.

(v) **Assertion :** Lung cancer if not treated at an early stage can spread to other initial organs of the body.
Reason : Cancer cell have uncontrolled proliferation and ability to invade new sites (metastasis).

(a) Both assertion and reason are true and reason is the correct explanation of assertion.

(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

(c) Assertion is true but reason is false.

(d) Both assertion and reason are false

Case Study 15

Read the following and answer any four questions from 10(i) to 10(v) given below:
A group of teenagers was involved in drug abuse. They used syringes and needles to inject drugs. They indulged in this habit when they became adults. Administration of drug through needles became a piece of cake for them. Raj was the most active drug abuser amongst them and used to take drugs in high profile parties. In a span of time he started losing weight and suffered persistent diarrhoea. He developed constant low grade fever and used to catch opportunistic infection. When he consulted a doctor, he got himself tested for HIV in his blood and finally diagnosed with AIDS.
Based on the above information, answer the following questions.

(i) Select the incorrect statement.

(a) AIDS is a disorder of cell mediated immune system of the body.

(b) AIDS is caused by Human Immunodeficiency virus.

(c) AIDS infections were detected in India for the first time in prostitutes of Chennai, Tamil Nadu in 1986.

(d) December 10 is recalled as World AIDS Day.

(ii) How do you think Raj got AIDS infection?

(a) Through transfusion of HIV infected blood

(b) Sexual intercourse with an infected partner

(c) Sharing towel with infected friend

(d) Use of contaminated needles and syringes to inject drugs

(iii) How AIDS can be diagnosed?

(a) ELISA test (b) Ames test (c) Pap's test (d) Widal test

(iv) How can AIDS be prevented?

(a) Blood tests of blood donor before transfusion to check for the presence of AIDS virus.

(b) Use of disposable needles and syringes for injecting medicines and vaccination

(c) Having protected sex by use of condoms

(d) All of these

(v) Select the correct statement for AIDS virus.
(a) It is rhomboid in shape with a diameter of 10-15 cm.
(b) Its genome consists of ds DNA.
(c) It consists of reverse transcriptase enzyme.
(d) Its envelope consists of lipid bilayer and three protein coats.

HINTS & EXPLANATIONS

6. **(i) (b) :** Riya is suffering from polio that is caused by an *Enterovirus*, called *Poliovirus*.
(ii) (a)
(iii) (c) : Polio virus enters the body *via* alimentary canal (faecal oral route)
(iv) (a) : Riya has contracted polio which is transmitted through faecal oral route, as urine and faeces of the patient contain polio virus.
(v) (b)

7. **(i) (b) :** X is a communicable disease that is transmitted through vectors. It could be malaria, chikungunya, etc. Y is communicable disease that is transmitted through droplet infection. It could be rhinitis, diphtheria, pertussis, etc
W is a non-communicable disease like diabetes that is caused by deficiency of insulin hormone.
Z is a non-communicable degenerative disease like Alzheimer's disease.
(ii) (c) : Sleeping sickness is caused by *Trypanosoma*. Diphtheria is caused by *Corynebacterium diphtheriae*. In myocardial infarction a large portion of heart muscle is deprived of blood due to coronary thrombosis and patient develops heart attack.
(iii) (b)
(iv) (a) : Leprosy is a bacterial infection that spreads through prolonged contact with the infected person. Whooping cough spreads through droplet infection. Botulism spreads through faecal oral route.

(v) (b)

8. (i) (c) : Ravi must have suffered from a non-communicable disease which cannot be spread from one person to another. Anaemia is caused by deficiency of iron and lead to general weakness and associated problems. It can be corrected by proper diet and dietary supplements. Down's syndrome is also a non-communicable disease but it is not cured completely. It is a genetic disorder and is congenital.
(ii) (d) : Non-communicable diseases are non-contagious.
(iii) (d)
(iv) (c)
(v) (d) : Diabetes mellitus is a non communicable disease that has no cure. It is caused by deficiency of insulin hormone.

9. (i) (c) : Blood sugar level fluctuations in person X indicate that sugar level never exceed the normal limit and sufficient secretion of insulin at required times removes any extra sugar from blood and converts it into glycogen for future use. This implies that person X is normal and healthy.
(ii) (a) : Elevated blood sugar levels in person Y indicate that he is suffering from diabetes mellitus.
(iii) (d)
(iv) (d)
(v) (d) : Type I diabetes or insulin dependent diabetes mellitus or juvenile diabetes is an autoimmune disorder caused by failure of beta cells to produce adequate amount of insulin. Type II diabetes or non insulin dependent diabetes mellitus involves failure of insulin to facilitate the movement of glucose into body cells.

10. (i) (d) : In active immunity, person's own cells produce antibodies in response to infection or vaccination. A person who has recovered from an infection develops natural active immunity whereas artificial active immunity is the resistance induced by vaccines. When ready-made antibodies are directly injected into a person to protect the body against foreign agents, it is called passive immunity.
(ii) (b)
(iii) (c) : Active immunity provides relief only after long period. It is long lasting.
(iv) (c) : Administration of antidiphtheric serum in a patient provides artificial passive immunity.
(v) (a)

11. (i) (b) : Initial contact with an antigen causes primary immune response. In primary immune response, no antibodies are present initially. Then, a slow rise in the antibody titer occurs, first IgM and then IgG, followed by a gradual decline in antibody titer. In secondary immune response, the antibody formation is accelerated and more intense. This is also called booster response. It mainly consists of IgG antibodies.
(ii) (b) : Vaccine is a preparation or extract of an inactivated/attenuated (weakened) pathogen of a disease which on inoculation into a healthy person provides immunity by inducing antibodies production.
(iii) (c) : IgG is the only class of antibody to cross the placenta from mother to foetus.
(iv) (d)
(v) (a)

12. (i) (a) : Aditya most probably had developed some sort of allergy due to pollens of grasses, trees and other plants.
(ii) (a) : Allergies mainly involve IgE antibodies and chemicals like histamine and serotonin from mast cells. IgE antibodies are produced in response to an antigen, coat mast cells and basophils.
(iii) (a) : The allergy which Aditya developed is characterised by inflammation of membrane lining the nose and conjunctiva leading to running nose, watering eyes and constant sneezing.
(iv) (c)
(v) (b)

13. (i) (c) : Addison's disease is an autoimmune disorder affecting adrenal cortex. Rheumatoid arthritis is autoimmune disorder of joints and Hashimoto's thyroiditis is autoimmune disorder affecting thyroid gland.
(ii) (c) : Addison's disease is characterised by under-secretion of adrenal cortex hormone, weakness, nausea, weight loss, low blood sodium, low blood volume and pressure, darkened skin pigmentation, etc.
(iii) (d) : In rheumatoid arthritis, the cells of immune system mistakenly send antibodies to the lining of joints where they attack the tissue surrounding joints. This causes thin layers of cells (synovium) covering joints to become sore and inflammed, releasing chemicals that damage nearby bones, cartilage, tendons, ligaments. These chemical gradually cause the joints to lose shape and alignment consequently fusing the bones.
(iv) (d)

(v) (b) : Immunosuppressive drugs like, corticosteroid, azathioprine and cyclophosphamide are often given to reduce the severity of autoimmune disorders. But this treatment suppress overall immune response so the patients are at great risk of having other diseases. Monoclonal antibodies may be used in the treatment of autoimmune diseases.

14. (i) (d) : Carcinogen in tobacco smoke include polynuclear aromatic hydrocarbons, β-napthylamine, benzo(a)pyrene, nitrosamines, hydrazine, etc.

(ii) (d) : A CT scan can reveal small lesion in lungs. Examination of sputum under microscope reveals the presence of lung cancer cells. A sample of lung tissue is obtained through some invasive procedure and careful analysis of cancer cells is done in lab to reveal the type of lung cancer.

(iii) (b)

(iv) (a) : Chemotherapy involves administration of certain anticancer drugs which kill cancer cells. Monoclonal antibodies coupled to appropriate radioisotopes can detect cancer specific antigens and hence cancer.

(v) (a) : Cancer cells have lost the ability of contact inhibition and so proliferate in an uncontrolled manner. They detach from their source organ and invade fresh sites, this is called metastasis.

15. (i) (d) : Every year, December 1 is designated as World AIDS Day.

(ii) (d)

(iii) (a) : ELISA test, also called EIA for enzyme immunoassay is used to detect HIV antibody. It checks for certain proteins that the body makes in response to HIV.

(iv) (d)

(v) (c) : HIV is spherical with a diameter of 90-120 nm. Its genome consists of single stranded RNA. The envelope consists of a lipid bilayer derived from host cell membrane and projection knob like glycoproteins. It contains two protein coats.