CHAPTER › 08

Human Health and Diseases

NEET KEY NOTES

- **Health** is a state of complete physical, mental and social well-being rather than only physical fitness or the absence of disease.
  - Health is affected by genetic disorders, infections and life style.
  - Balanced diet, personal hygiene, regular exercise, rest and thinking are very important to maintain good physical and mental health.
- Awareness about diseases and their effect on different body functions, vaccination against infectious diseases, proper disposal of wastes, control of vectors, maintenance of hygienic food and water resources all are necessary for health.
- Disease is the condition of improper functioning or any condition which interferes with the normal functioning of one or more organs of the body and causes disorder of mind or body. It is characterised by various signs and symptoms. Diseases can be broadly classified into
  - **Congenital diseases** These diseases are present in human since birth (genetic disorders) or are caused due to mutation, e.g. Down's syndrome, sickle-cell anaemia, etc.
  - **Acquired diseases** These diseases develop after birth and are not transferred from parents to offspring. These diseases are further categorised into
    - **Infectious diseases or Communicable diseases** These diseases are easily transmitted from a diseased person to a healthy person. The infectious diseases are very common, e.g. AIDS, common cold, etc.
    - **Non-infectious diseases or Non-communicable diseases** These diseases cannot be transmitted from a diseased person to a healthy person. These diseases are caused by agents other than pathogens, e.g. cancer, diabetes, etc.

Common Diseases in Humans

- **Pathogen** is an organism which can cause disease in human. These can belong to bacteria, viruses, fungi, protozoans, helminths, etc.
- Most parasites are therefore pathogens as these cause harm to the host by inhabiting them.
- The pathogens can enter our body by various means, multiply and interfere with normal vital activities and cause morphological and functional damage.
- Pathogens have to adapt to life within the environment of the host, e.g. the pathogens that enter the gut must know a way of surviving in the stomach at low pH and resisting the various digestive enzymes.
- **Vectors**, on the other hand, do not cause disease themselves, but act as carriers to transmit the pathogen from an infected person to a healthy person, i.e. spread the disease, e.g. famale *Anopheles* mosquito.
- Some common diseases and their pathogenic members are discussed as follows

Bacterial Diseases

Some common bacterial diseases are as follows

1. **Typhoid** is caused by a bacterium called *Salmonella typhi*.
   - *S. typhi* enters the small intestine through contaminated food and water and migrate to other organs through food and blood.
   - **Symptoms** are high fever (39-40°C), weakness, stomach pain, constipation, headache and loss of appetite. Intestinal perforation and in severe cases death may occur.
   - **Widal test** is the confirmatiory test for diagnosis of typhoid.

2. **Pneumonia** is caused by *Streptococcus pneumoniae* and *Haemophilus influenzae*.
   - These bacteria infect alveoli of the lungs. The alveoli get filled with a fluid which causes decrease of respiratory efficiency of the lungs.
   - Pneumonia spreads by inhaling droplets/aerosol from infected individuals, sharing glasses and utensils with an infected person.
   - **Symptoms** of pneumonia are fever, chills, cough, headache, etc. In severe cases, the lips and finger nails may turn grey bluish in colour.
3. **Plague** is caused by *Pasteurella/Yersinia pestis* and is also called **black death**.
4. **Diphtheria** is caused by *Corynebacterium diphtheriae* and is characterised by difficulty in breathing due to infection in the mucous membrane of upper respiratory tract.

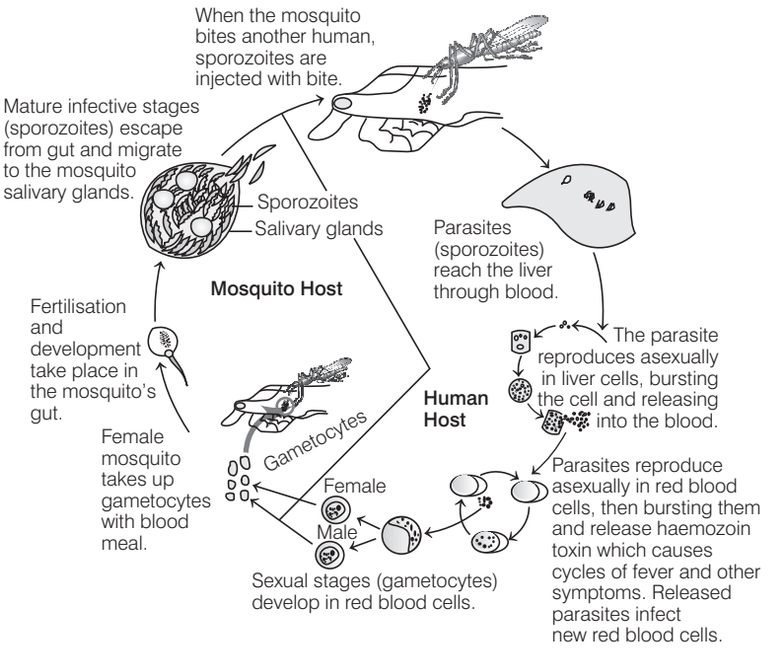
Viral Diseases

- **Common cold** occurs due to a group of viruses called **rhino viruses**.
- These viruses infect the nose and the respiratory passage, but not the lungs.
- **Symptoms** include nasal congestion and discharge, sore throat, hoarseness, cough, headache, tiredness, etc., which generally last for 3-7 days.
- The infection occurs when droplets from cough or sneeze of an infected person are either inhaled directly or transmitted through contaminated objects such as pen, books, cups, computer's keyboard or mouse, etc.

Protozoan Diseases

Some common protozoan diseases are as follows

1. **Malaria** is caused by different species of the protozoan *Plasmodium* (*vivax*, *malariae* and *falciparum*).
   - *P. falciparum* causes most serious kind of malaria which can be fatal.
   - Female *Anopheles* mosquito is the vector of *Plasmodium* which transfers the sporozoites (infectious form).
   - Life cycle of *Plasmodium* is given in the figure below



Stages in the life cycle of *Plasmodium*

   - Thus, malarial parasite requires two hosts to complete its life cycle, i.e. human and mosquito.
2. **Amoebiasis** (amoebic dysentery) is caused by an intestinal endoparasite, *Entamoeba histolytica*, which is a protozoan parasite of the large intestine of humans.
   - Carrier of pathogens is housefly. It transmits the parasite from faeces of an infected person to the food.
   - Infection takes place through the contaminated food and water.
   - **Symptoms** are abdominal pain, constipation, cramps, faeces with excess mucus and blood clots.

Helminthic Diseases

Some common helminthic diseases are as follows

1. **Ascariasis** is caused by an intestinal endoparasite of human, *Ascaris lumbricoides* commonly called as **roundworm**.
   - Infection occurs as the eggs of parasite excreted along with faeces of infected person, contaminate water and soil.
   - Infection reaches human beings through contaminated vegetables, fruits and water.
   - **Symptoms** of disease are abdominal pain, indigestion, muscular pain, fever, anaemia, nausea, headache and the blockage of intestinal passage.

2. **Filariasis/Elephantiasis** is caused by filarial worms *Wuchereria bancrofti* and *Wuchereria malayi*.
   - *Culex* mosquito (female) is the vector.
   - **Symptoms** are chronic inflammation of organs in which they live, blockage of lymph vessels of lower limbs resulting in swelling.
   - Genital organs also get affected leading to their deformation.

Fungal Diseases

Ringworm is caused by fungi of the genera–*Microsporum*, *Trichophyton* and *Epidermophyton*.

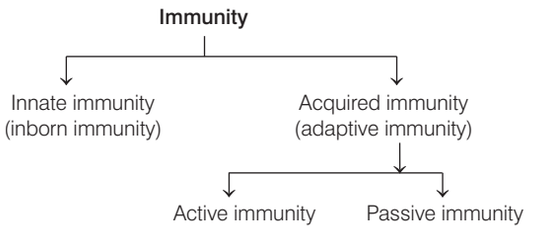
- Infection occurs through contact with an infected person or from soil, through the use of towels, clothes, combs, etc., of an infected person.
- **Symptoms** of ringworm are appearance of dry, scaly lesions on various parts of the body such as skin, nails and scalp accompanied by intense itching.
- Heat and moisture help these fungi to grow in regions like folds as in groin or between the toes.

Prevention and Control of Infectious Diseases

- Maintenance of personal and public hygiene is very important for prevention and control of many infectious diseases. **Personal hygiene** includes keeping the body clean, consumption of clean drinking water, food, etc. **Public hygiene** includes proper disposal of waste and excreta, periodic cleaning of water reservoirs, etc.
- Other preventive measures include
  - Eradication of vectors and destroying their breeding sites.
  - Use of mosquito nets and repellants.
  - Introducing fishes like *Gambusia* in pond that feed on mosquito larva.
  - Vaccination and immunisation programmes for diseases.
  - Use of antibiotics and other drugs can significantly and effectively treat infectious diseases.

Immunity

It is the ability of the body (host) to fight against disease causing agents. Immunity is of two types.



1. Innate Immunity

It is present from birth and is inherited from the parents. It is non-specific and consists of following four types of barriers

- **Physical barriers** prevent entry of microorganisms in the body. For example, skin, mucus coating of epithelium lining of respiratory, gastrointestinal and urogenital tracts.
- **Physiological barriers** prevent microbial growth in the body. For example, acid in the stomach, saliva in the mouth, tears from eyes.
- **Cellular barriers** phagocytose and destroy microbes. For example, some WBCs like Polymorpho-Nuclear Leucocytes (PMNL- neutrophils) and monocytes and natural killer cells (type of lymphocytes) in the blood as well as macrophages in tissues.
- **Cytokine barriers** Virus-infected cells secrete proteins called **interferons**, which protect non-infected cells from further viral infection.

2. Acquired Immunity

- The immunity acquired after birth is called acquired immunity.
- Acquired immunity is pathogen specific.
- It is characterised by memory. This means when our body encounters a pathogen for the first time it produces a response called **primary response** which is of low intensity.
- Subsequent encounter with the same pathogen elicits a highly intensified **secondary** or **anamnestic response**. This is ascribed to the fact that our body appears to have memory of the first encounter.
- The primary and secondary immune responses are carried out with the help of two special types of lymphocytes present in our blood, i.e. **B-lymphocytes** and **T-lymphocytes**.
- The B-lymphocytes produce an army of proteins in response to pathogens into our blood to fight with them. These proteins are called **antibodies**.
- The T-cells themselves do not secrete antibodies but help the B-cells to produce them.
- The acquired immunity may be **active** or **passive**.
- **Active immunity** is generated by the body on exposure to antigen. Active immunity can also be achieved through vaccination, e.g. polio vaccine, tetanus vaccine, etc., (artificially acquired). On the basis of action of responding cell, active immunity is of two types
  - **Cell-mediated immunity** This immunity is due to T-lymphocytes, which mature in thymus. The graft rejection during organ transplantation is due to the ability of the T-cells to differentiate between self and non-self is cell-mediated immunity.

- **Humoral immunity** This is due to B-lymphocytes, which secrete specific antibody when exposed to a particular antigen. These antibodies flow into the body fluids and neutralise the antigen.

- **Passive immunity** develops due to direct transfer of actively formed antibodies. For example, the yellowish fluid **colostrum** secreted by mother during the initial days of lactation has abundant antibodies (IgA) to protect the infant. The foetus also receives some antibodies from their mother, through the placenta during pregnancy.

Antibodies

- These are the proteins (immunoglobulin) produced within the body by the plasma cells against antigens.
- The basic structure of all antibody/ Immunoglobulin (Ig) molecule consists of four polypeptide chains linked by disulphide bonds. Two small chains called **light chain** and two longer chains called **heavy chain** are present.
- Five different types of immunoglobulins are known and these are as follows

Antibody	Description
IgG	Most prevalent class of antibody, 75-80% of total antibody. It can cross placenta from mother to child and confer immune protection to newborns.
IgM	They are the first to be produced in response to encounter with a pathogen. Responsible for blood transfusion reactions in ABO blood system.
IgA	Found in colostrum, i.e. breast milk for newborns to provide passive immune protection.
IgE	It is involved in allergic reactions.
IgD	It resembles IgG structurally and serves as a recognition receptor for antigen. It activates and suppresses lymphocyte activity.

Vaccination and Immunisation

- The process of introduction of inactivated or weakned pathogen into the body to provide protection against a disease is called **vaccination.**
- **Immunisation** is the process by which the body produces antibodies against the vaccine (primary response) and develops the ability to neutralise pathogens during actual infection in the body (secondary response).
- Vaccine generates B and T-cells that recognise the pathogens on subsequent exposure and produce an intense immune response.
- In case of requirement of quick immune response like tetanus or snake bite infection, pre-formed antibodies or antitoxin (a preparation containing antibodies to the toxin) are injected into the patient. This is called **passive immunisation**.
- Recombinant DNA technology has produced antigenic polypeptides of pathogen in bacteria or yeast. This allowed large scale production of vaccines, e.g. hepatitis-B vaccine from yeast.

Allergy

- It is the exaggerated response of the immune system to certain antigens present in the environment known as **allergens**.
- These can be pollen grains, animal dander, dust, feathers, penicillin drugs, etc.
  - IgE antibodies are produced in response to allergens.
  - **Causes of allergy** are histamine and serotonin released from the mast cells.
  - **Symptoms of allergy** are sneezing, watery eyes, running nose, difficulty in breathing.
  - **Treatment of allergy** include doses of antihistamine, adrenaline and steroids.

Autoimmunity

- Higher vertebrates' immune system can distinguish foreign molecules as well as foreign organisms and mount a response to destroy them.
- But sometimes, due to genetic and other unknown reasons, the body attacks self cells. This results in damage to the body this is called **autoimmunity** and the disease is called **auto-immune disease**.
- Rheumatoid arthritis which affects many people in our society, myasthenia gravis, etc. are some examples of auto-immune diseases.

Immune System in the Body

- The human immune system consists of lymphoid organs, tissues, cells and soluble molecules like antibodies.
- The immune system also plays an important role in allergic reactions, auto-immune diseases and organ transplantation.

Lymphoid Organs

- These are the organs where origin and/or maturation and proliferation of lymphocytes occur. The **primary lymphoid organs** are **bone marrow** and **thymus** where immature lymphocytes differentiate into antigen-sensitive lymphocytes.
- After maturation, the lymphocytes migrate to **secondary lymphoid organs** like **spleen, lymph nodes, tonsils, Peyer's patches** of small intestine and appendix. The secondary lymphoid organs provide the sites for interaction of lymphocytes with the antigen, which then proliferate to become effector cells.

- The bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced.
- Both bone marrow and thymus provide micro-environments for the development and maturation of T-lymphocytes.
- The spleen is a large bean-shaped organ. It mainly contains lymphocytes and phagocytes. It acts as a filter of blood by trapping blood-borne microorganisms. It is also called the graveyard of RBCs.
- The lymph nodes are small solid structures located at different points along the lymphatic system. Lymph nodes serve to trap microorganisms or other antigens, which happen to get into the lymph and tissue fluid.
- A lymphoid tissue is also located within the lining of the major tracts (respiratory, digestive and urogenital tracts) called **Mucosal Associated Lymphoid Tissue** (MALT). It consititutes about 50 per cent of the lymphoid tissue in the human body.

AIDS

- It refers to the deficiency of the immune system, acquired during the life-time of an individual, indicating that it is not a congenital disease. It was first reported in 1981 in USA.
- The causative agent is Human Immunodeficiency Virus (HIV). It belongs to the group of viruses called **retro virus**. It has single-stranded RNA genome enclosed in an envelope.
- HIV is transmitted by
  - Sexual contact with an infected person.
  - Transfusion of contaminated blood.
  - Sharing infected needles.
  - Infected mother to unborn child through placenta.
- Individuals who are susceptible to infection are
  - Drug addicts due to intravenous drug injections.
  - Involved with multiple sexual partners.
  - Require repeated blood transfusion.
  - Children born to HIV positive mother.
- HIV/AIDS spreads only through body fluids. There is always a time-lag between the infection and appearance of AIDS symptoms, i.e. it varies from a few months to many years (usually 5-10 years).

Mode of HIV Infection

- Virus enters the macrophage after entering the body of a person.
- RNA gets replicated to form viral DNA by enzyme reverse transcriptase.
- Viral DNA gets incorporated into the host cell DNA and directs the infected cells to produce viruses.
- Macrophages continue to produce virus particles and act like HIV factory.
- These virus particles enter helper T-lymphocytes (T_H cells) in the blood, where they continue to replicate and produce viral progeny.
- The number of helper T-lymphocytes progressively decreases in the body of the infected people.
- As the number of T-cells decrease, immunity also decreases. As a result, the person cannot produce any immune response even against common bacteria like *Mycobacterium*, parasites like *Toxoplasma* viruses and fungi. During this period, person suffers from fever, diarrhoea and weight loss.

Treatment and Diagnosis

- **Enzyme Linked Immuno-Sorbent Assay** (ELISA) is used as a diagnostic test for AIDS.
- Treatment of AIDS with anti-retroviral drugs is only partially effective. These can only prolong the life of the patient, but cannot prevent death.

Prevention of AIDS

- As AIDS has no cure, prevention is the best option. Preventive measures for HIV infection are
  - National AIDS Control Organisation (NACO) (1991) and other NGOs educate peoples about AIDS.
  - Role of WHO to prevent HIV infection.
- Making blood (from blood banks) safe from HIV.
  - Ensure use of disposable syringes and needles.
  - Ensure keeping blood banks safe from HIV.
  - Free distribution of condoms.
  - Prevention of drug abuse.
  - Discouraging unsafe sex and encouraging regular checkups.

Cancer

- It is the major cause of death all over the globe. It is caused by the breakdown of normal regulatory mechanisms of cell growth.
- Normal cells show a property called **contact inhibition** by virtue of which contact with other cells inhibits their uncontrolled growth.
- Cancer cells, however lose this property and continue to divide giving rise to masses of cells called **tumours**.
- Tumours are of two types–**benign** and **malignant**.
  - **Benign tumours** normally remain confined to their original location and do not spread to other parts of the body and cause little damage.
  - **Malignant tumours** are a mass of proliferating cells called neoplastic or tumour cells. These cells grow very rapidly, invading and damaging the surrounding normal tissues.

- As these cells actively divide and grow, these also starve the normal cells by competing for vital nutrients.
- Cells sloughed from malignant tumours reach distant sites through blood and wherever they get lodged in the body, they start a new tumour there. This property is called **metastasis**.

Causes of Cancer

Carcinogens are cancer-causing agents. These are

- **Chemicals** Cigarette smoke (cause lung cancer) benzopyrene, dyes, paints, etc.
- **Biological** Oncogenic viruses, some parasites, etc. Cancer causing viruses called **oncogenic viruses** have genes called **viral oncogenes**. Normal cells have genes called **cellular oncogenes** (C-one) or **proto-oncogenes** which are present in inactive state, but under certain conditions (like mutation) get transferred to cancer-causing oncogenes.
- **Physical** Ionizing radiation like X-rays and γ-rays, non-ionizing radiations like UV-rays (cause DNA damage leading to neoplastic transformation).

Cancer Detection and Diagnosis

Cancer can be detected by the following methods

- Blood and bone marrow tests to know number of cell counts.
- **Biopsy** of a piece of suspected tissue done by cutting in thin sections, stained and examined under microscope.
- **Radiography** by X-rays to detect cancer of the internal organs.
- **Computed tomography** using X-rays to generate a 3D image of internal tissue.
- **Resonance imaging** involves use of non-ionizing radiation and strong magnetic field to detect pathological and physiological changes in living tissue.
- **Monoclonal antibodies** against cancer-specific antigens are also used for cancer detection.
- **Molecular biology** technique to detect genes in individual with inherited susceptibility to certain cancers.

Treatment of Cancer

Treatment of cancer involves the following methods

- **Surgery** Tumours are removed by surgery to check further spread of cancer cells.
- **Radiation therapy** Tumour cells are irradiated by a lethal dose of radiation by protecting the surrounding normal cells.
- **Chemotherapy** Several chemotherapeutic drugs are used to kill cancer cells. But, their side effects like hair loss, anaemia is also reported.
- **Immunotherapy** biological modifiers like α-interferons are used to activate the immune system and help in destroying the tumour.

Drugs and Alcohol Abuse

The use of drugs and alcohol has risen especially among the youth. This is a cause of concern as it results in many harmful effects. The drugs which are commonly abused are as follows

- **Opioids** are the drugs which binds to specific opioid receptors present in our central nervous system and gastrointestinal tract.
  Heroin is a common opioid and is also called as **smack**. It is chemically diacetylmorphine, white, odourless, bitter crystalline compound.
  - Heroine is obtained from the acetylation of morphine, which is extracted from the latex of poppy plant, *Papaver somniferum.*
  - It is taken either by snorting or through injection.
  - Heroine is a depressant which slows down the body functions.
  - Morphine is an effective sedative, pain killer and very useful in patients who have undergone surgery.
- **Cannabinoids** are a group of chemicals which interact with cannabinoid receptors present mainly in brain.
  - Cannabinoids are obtained from the inflorescence of the plant *Cannabis sativa*.
  - Leaves, flower tops, resins of *C. sativa* in various combinations produce hashish, charas, marijuana and ganja.
  - These are inhaled or ingested orally.
  - These drugs affect cardiovascular system of the body.
- **Coca alkaloids** or **Cocaine** has a potent stimulating action on the central nervous system, producing a sense of euphoria and increased energy.
  - Cocaine is derived from the leaves and young branches of a South American plant called *Erythroxylum coca.*
  - Its mode of intake is either sniffting or snorting.
  - It is a strong stimulant and when taken in overdose causes headache, convulsions, hallucination and death due to cardiovascular or respiratory failure.
- **Hallucinogens** are psychedelic drugs because of their effect on the cerebrum and sense organs.
  - These are obtained from plants like *Atropa belladonna* and *Datura* species.
  - Lysergic acid diethyl amide (LSD) is derived from the fungus *Claviceps purpurea.*
  - Effect of these drugs occurs on thoughts, feelings and perceptions of an individual. Drugs like barbiturates, comphetamines, benzodiazepines, etc., normally used as medicines.

- **Tobacco** contains nicotine which stimulates the adrenal gland to release adrenaline and nor-adrenaline which in turn increases the blood pressure and heart rate.
  - It is obtained from tobacco plant.
  - Its mode of intake is smoking, chewing or can be used as a snuff.
  - Tobacco can induce lung cancer, bronchitis, emphysema, coronary heart disease, cancer of throat, oral cancer, urinary bladder cancer, etc.
  - Smoking of tobacco leads to increase in carbon monoxide content of blood and reduces the concentration of haem-bound oxygen. This leads to oxygen deficiency in the body.

Adolescence and Drug/Alcohol Abuse

Adolescence is the period during which a child becomes mature in terms of his/her attitudes and beliefs for independent participation in the society.

- Age between 12-18 years is called **adolescent period**.
- Adolescence is accompanied by several biological and behavioural changes. It is a vulnerable phase of mental and psychological developemnt of an individual.
- In this age use of drugs or alcohol occurs out of curosity or experimentation which later turns to addiction.

Addiction and Dependence

- **Addiction** is the psychological attachment to certain effects-such as euphoria and a temporary feeling of well-being associated with drugs and alcohol.
- **Dependence** on drug/alcohol is the tendency of the body to manifest a characteristic and unpleasant **withdrawl syndrome**, if regular dose of drugs/alcohol is discontinued abruptly. Withdrawl symptoms are characterised by anxiety, shakiness, nausea and sweating.

Effects of Drug/Alcohol Abuse

The common warning signals of drug/alcohol addiction are

- Drop in academic performance.
- Isolation from family and friends.
- Lack of interest in personal hygiene.
- Aggressive and rebellious behaviour.
- Reckless behaviour, vandalism and violence.

Prevention and Control

The preventive measures are

- Avoid undue peer pressure.
- Accept failures and disappointments as part of life.
- Seek help from parents and peers.
- Seek professional and medical help for deaddiction.
- Look for danger signs.

Mastering NCERT

MULTIPLE CHOICE QUESTIONS

TOPIC 1 ~ *Human Health and Common Diseases in Humans*

1 Which of the following adversely affects human health?
(a) Change in lifestyle (b) Genetic disorders
(c) Rest and exercise (d) Both (a) and (b)

2 Health is a combination of
I. physical fitness
II. presence of disease
III. mental and social well-being
Which of the options given above are correct?
(a) I and II (b) I and III
(c) II and III (d) I, II and III

3 Human health cannot be maintained by
(a) maintaining personal hygiene
(b) consuming a diet rich in carbohydrate only
(c) regular physical exercise
(d) None of the above

4 Necessary steps for achieving good health are
I. awareness about diseases.
II. vaccination.
III. proper disposal of wastes.
The correct combination having necessary steps are
(a) I, II and III (b) II, III and IV
(c) I, III and IV (d) II and IV

5 Measures for personal hygiene include.
(a) Intake of clean drinking water
(b) Keeping the body clean
(c) Disinfection of water resources
(d) Both (a) and (b)

6 A disease which can easily transmit from one person to another is called
(a) non-infectious disease (b) infectious disease
(c) viral disease (d) bacterial disease

7 Which one of the following disease is non-infectious as well as the major cause of death in humans?
(a) Cancer (b) AIDS
(c) Asthma (d) Typhoid

8 Identify the correct pair representing the causative agent of typhoid fever and the confirmatory test for typhoid. ***NEET 2019***
(a) *Streptococcus pneumoniae*/Widal test
(b) *Salmonella typhi*/Anthrone test
(c) *Salmonella typhi*/Widal test
(d) *Plasmodium vivax*/UTI test

9 *Salmonella typhi* generally enters the small intestine through .....*A*..... and migrates to other body parts through .....*B*..... .
The most appropriate combination to fill the blanks is
(a) A–contaminated food and water; B–blood
(b) A–contaminated food; B–blood
(c) A–skin; B–blood
(d) A–air; B–blood

10 Common symptoms of typhoid are
(a) high fever 39°C to 40°C and weakness
(b) stomach pain and constipation
(c) headache and loss of appetite
(d) All of the above

11 The name of Mary Mallon is related with the disease
(a) typhoid (b) pneumonia
(c) dengue (d) AIDS

12 Pneumonia is an infection of the .....*A*..... . The most common cause of pneumonia is a type of bacteria known as .....*B*.... and .....*C*..... .
Most suitable combination to fill the blanks is
(a) A–liver, B– *Salmonella typhi,* C–*Streptococcus pneumoniae*
(b) A–lungs, B–*Streptococcus pneumoniae,* C–*Haemophilus influenzae*
(c) A–blood, B–*Streptococcus pneumoniae,* C–*Haemophilus influenzae*
(d) A–heart, B–*Salmonella typhi,* C–*Haemophilus influenzae*

13 Which of the following health disorder includes symptoms of fever, chills, cough, headache, grey to bluish lips and fingers nails?
(a) Filariasis (b) Typhoid
(c) Pneumonia (d) Malaria

14 Infection of pneumonia occurs due to
(a) droplets released from an infected person
(b) released droplets/aerosols inhaled by healthy person
(c) sharing contaminated objects such as glasses and utensils with an infected person
(d) All of the above

15 Which of the following sets of diseases are caused by bacteria? ***NEET 2016***
(a) Cholera and tetanus (b) Typhoid and smallpox
(c) Tetanus and mumps (d) Herpes and influenza

16 Rhinovirus causes
(a) common cold (b) malaria
(c) AIDS (d) pneumonia

17 Common cold differs from pneumonia in, that ***CBSE-AIPMT 2012***
(a) pneumonia is a communicable disease, whereas the common cold is a nutritional deficiency disease
(b) pneumonia can be prevented by a live attenuated bacterial vaccine, whereas the common cold has no effective vaccine
(c) pneumonia is caused by a virus, while the common cold is caused by the bacterium *Haemophilus influenzae*
(d) pneumonia pathogen infects alveoli whereas the common cold affects nose and respiratory passage but not the lungs

18 Which of the following viruses is not transferred through semen of an infected male? ***CBSE-AIPMT 2015***
(a) Hepatitis-B virus
(b) Human immunodeficiency virus
(c) Chikungunya virus
(d) Ebola virus

19 Female *Anopheles* mosquito is a vector of
(a) filariasis (b) malaria
(c) typhoid (d) AIDS

20 Malaria is caused by
(a) *Plasmodium vivax*
(b) *Plasmodium malariae*
(c) *Plasmodium falciparum*
(d) All of the above

21 Malignant malaria is caused by
(a) *Plasmodium falciparum* (b) *Plasmodium ovale*
(c) *Plasmodium vivax* (d) *Plasmodium malariae*

22 Where will you look for the sporozoites of the malarial parasite?
(a) RBCs of humans suffering from malaria
(b) Spleen of infected person
(c) Salivary glands of freshly moulted female *Anopheles* mosquito
(d) Saliva of infected female *Anopheles* mosquito

23 Infective stage of *Plasmodium* for man is
(a) merozoites (b) ookinetes
(c) sporozoites (d) None of these

24 Which of the following toxic substances is responsible for the high malarial fever?
(a) Haemoglobin (b) Haemocyanin
(c) Haemozoin (d) Haemoriden

25 *Plasmodium* completes its life cycle in two hosts. Asexual phase in …… host and sexual phase in …… host.

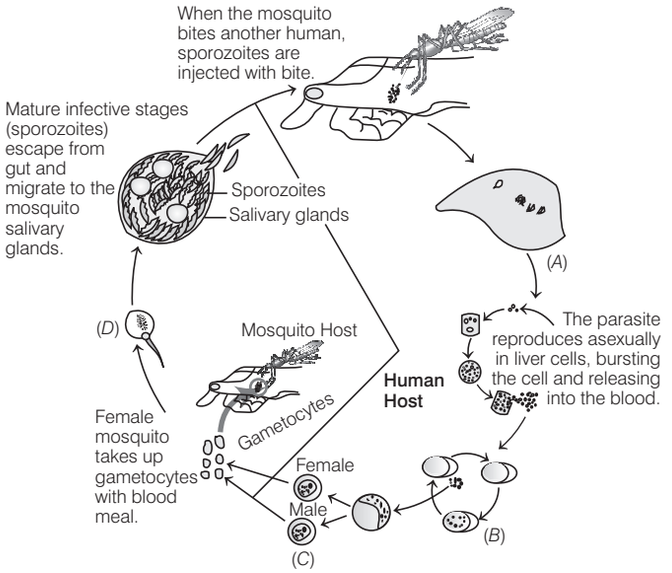
The correct option with words to fill the blanks is

(a) human; *Culex* mosquito
(b) human; female *Anopheles* mosquito
(c) human; *Aedes* mosquito
(d) human; male *Anopheles* mosquito

26 The primary host of *Plasmodium* is

(a) man (b) male *Culex*
(c) sheep (d) female *Anopheles*

27 Study the given diagram and name the labelled *A*, *B*, *C* and *D*.



(a) A–Sporozoites in spleen, B–Sexual reproduction of *Plasmodium* in RBC, C–Gametocytes in RBC, D–Fertilisation of gametocytes in mosquito's intestine
(b) A–Sporozoites in liver, B–Asexual reproduction of *Plasmodium* in RBC, C–Gametocytes in RBC, D–Fertilisation of gametocytes in mosquito's intestine (gut)
(c) A–Sporozoites in liver, B–Asexual reproduction of *Plasmodium* in RBC, C–Gametocytes in RBC, D–Fertilisation of gametocytes in mosquito's salivary glands
(d) A–Sporozoites in kidney, B–Sexual reproduction of *Plasmodium* in RBC, C–Gametocytes in RBC, D–Fertilisation of gametocytes in mosquito's intestine

28 Which one of the following diseases is spread by housefly?

(a) Dengue fever
(b) Encephalitis
(c) Filariasis
(d) Amoebiasis

29 Amoebiasis (amoebic dysentery) is caused by organism

(a) *Plasmodium* (b) *Entamoeba histolytica*
(c) houseflies (d) contaminated food and water

30 *Entamoeba histolytica* is a parasite of

(a) large intestine (b) liver
(c) lungs (d) kidney

31 Which one is not a symptom of disease caused by *E. histolytica* ?

(a) Stools with excess mucus and blood clots
(b) Constipation smacked
(c) Abdominal pain and cramps
(d) Nasal discharge

32 Which of the following is a protozoan disease?

(a) Malaria (b) Amoebiasis
(c) Sleeping sickness (d) All of these

33 Which of the following disease is caused by a protozoan? ***CBSE-AIPMT 2015***

(a) Syphilis (b) Influenza
(c) Babesiosis (d) Blastomycosis

34 Which of the following endoparasites of humans does show viviparity? ***CBSE-AIPMT 2015***

(a) *Ancylostoma duodenale*
(b) *Enterobius vermicularis*
(c) *Trichinella spiralis*
(d) *Ascaris lumbricoides*

35 Give the name of two helminths, which cause ascariasis and filariasis, respectively.

(a) *Ascaris* and *Wuchereria*
(b) *Wuchereria* and *Ascaris*
(c) Roundworm and flatworm
(d) *Plasmodium* and *Wuchereria*

36 Which of the following diseases causes internal bleeding, muscular pain, fever, anaemia and blockage of the intestinal passage?

(a) Ascariasis (b) Filariasis
(c) Amoebiasis (d) Trypanosomiasis

37 Infection of *Ascaris* usually occurs by ***NEET 2013***

(a) drinking water containing egg of *Ascaris*
(b) eating imperfectly cooked pork
(c) tse-tse fly
(d) mosquito bite

38 Elephantiasis, a chronic inflammation that results in gross deformities is caused by

(a) *Trichophyton* (b) *Wuchereria*
(c) *E. coli* (d) *Ascaris*

39 Elephantiasis causing organism belongs to

(a) Aschelminthes (b) Platyhelminthes
(c) Cnidaria (d) Porifera

40 The filariasis pathogen is transmitted to a healthy person through the bite of
(a) female *Anopheles* mosquito
(b) female *Aedes* mosquito
(c) female *Culex* mosquito
(d) None of the above

41 Adults of *Wuchereria bancrofti* attack ***AIIMS 2018***
(a) excretory system (b) digestive system
(c) lymphatic system (d) nervous system

42 In which disease does mosquito transmitted pathogen cause chronic inflammation of lymphatic vessels? ***NEET 2018***
(a) Ringworm disease (b) Ascariasis
(c) Elephantiasis (d) Amoebiasis

43 Which one of the following pairs is not correctly matched?
(a) Filariasis — *Wuchereria*
(b) Syphilis — *Trichuris trichiura*
(c) Plague — *Yersinia pestis*
(d) Dengue fever — Flavi-ribo virus

44 The group of diseases carried (transmitted) by insects are
(a) typhoid, jaundice, tuberculosis
(b) mumps, measles, smallpox
(c) scabies, ringworm, swine flu
(d) malaria, filaria, yellow fever

45 The following table shows certain diseases, their causative organisms and symptoms.

	Diseases	Causative organisms	Symptoms
I.	Filariasis	*A*	Inflammation of lymphatic vessels
II.	Typhoid	*B*	High fever, stomach pain
III.	*C*	Rhinoviruses	Nasal congestion and discharge
IV.	Ascariasis	*Ascaris*	*D*

The correct option regarding *A*, *B*, *C* and *D* is
(a) A–*Wuchereria*, B–*Salmonella typhi*, C–Common cold, D–Internal bleeding, fever, anaemia
(b) A–*Salmonella typhi*, B–*Ascaris*, C–Typhoid, D–Stomach pain, headache
(c) A–*Ascaris*, B–*Entamoeba histolytica*, C–Pneumonia, D–Constipation, fever
(d) A–*Entamoeba histolytica*, B–*Salmonella typhi*, C–Common cold, D–Nasal discharge, high fever

46 Fungi belonging to genera–*Microsporum, Trichophyton* and *Epidermophyton* are responsible for
(a) ringworm infection
(b) skin allergy
(c) amoebiasis
(d) measles

47 Ringworm is a/an
(a) air borne disease (b) infectious disease
(c) non-infectious disease (d) None of these

48 Fill up the blanks.
I. Heat and moisture help ..... fungi to grow, which makes them thrive in skin folds.
II. Maintenance of ..... and ..... hygiene is important for the prevention of many infectious diseases.
III. ..... gives the diseases its name, elephantiasis.
(a) I. *Microsporum,* II. public; personal, III. Swelling of hand
(b) I. *Trichophyton*, II. personal; public, III. Enlargement of eye
(c) I. *Epidermophyton*, II. personal; public, III. Swelling of legs
(d) I. *Wuchereria*, II. personal; public; III. Enlargement of tongue

49 *Gambusia* is a fish which can control the mosquito borne disease like
(a) dengue (b) malaria
(c) chikungunya (d) All of these

TOPIC 2 ~ *Immunity*

50 Ability of the body to fight against the disease causing organisms is called
(a) vulnerability (b) susceptibility
(c) irritability (d) immunity

51 Innate immunity is also called
(a) familiar immunity (b) inborn immunity
(c) genetic immunity (d) All of these

52 Non-specific host defence that exists prior to the exposure to an antigen is called
(a) acquired immunity (b) passive immunity
(c) innate immunity (d) active immunity

53 Except skin, other physical barriers which also help to prevent the entry of the microorganisms are mucus coating of the epithelium lining of
I. the respiratory tract.
II. the gastrointestinal tract.
III. the urogenital tract.
Choose the correct option.
(a) I and II
(b) I and III
(c) II and III
(d) I, II and III

54 Which type of barriers do saliva in the mouth, tears form eyes and acid in the stomach belong?
(a) Cytokinin barriers (b) Cellular barriers
(c) Physiological barriers (d) Physical barriers

55 Full form of PMNL is
(a) Poly Morpho-Nuclear Leucocytes
(b) Para Morpho-Nuclear Lymphocytes
(c) Penta Morpho-Nuclear Leucocytes
(d) Poly Morpho-Nuclear Lymphocytes

56 The major phagocytic cells are
(a) antibody (b) antigen
(c) lymphocytes (d) macrophages

57 Which of the following are considered as cellular barrier of the body?
(a) Lymphocytes (b) Neutrophils
(c) Macrophages (d) All of these

58 Humans have acquired immune system that produces antibodies to neutralise pathogens. Still innate immune system is present at the time of birth because it ***NEET (Odisha) 2019***
(a) is very specific and uses different macrophages
(b) produces memory cells for mounting fast secondary response
(c) has natural killer cells which can phagocytose and destroy microbes
(d) provides passive immunity

59 Which of the following is a suitable example of cytokine barrier?
(a) Interferons (b) T-lymphocytes
(c) B-lymphocytes (d) T_H cells

60 The interferons can be used as
(a) antibacterial drugs (b) antiviral drugs
(c) antibiotic drugs (d) immunosuppressive

61 Interferon is a type of protein, which can be used to counter
(a) homeostatic disorder
(b) hepatitis caused by virus
(c) common cold caused by virus
(d) Both (b) and (c)

62 A person has developed interferons in his body. He seems to carry an infection of
(a) typhoid (b) filariasis (c) malaria (d) measles

63 Note the following words.

I. Skin	II. Phagocytes
III. B-cells	IV. Neutrophils
V. Antibodies	VI. T-cells
VII. Macrophages	VIII. NK-cells

Identify the factors involved in second line of defence.
(a) II, IV, VII and VIII (b) II, III, V and VI
(c) IV, VI, VIII and VIII (d) III, V, VII and VIII

64 Antibodies are
(a) proteins produced in response to pathogens in our body
(b) secreted by the action of both T-lymphocytes and B-lymphocytes
(c) molecules that specifically interacts with an antigen
(d) Both (a) and (b)

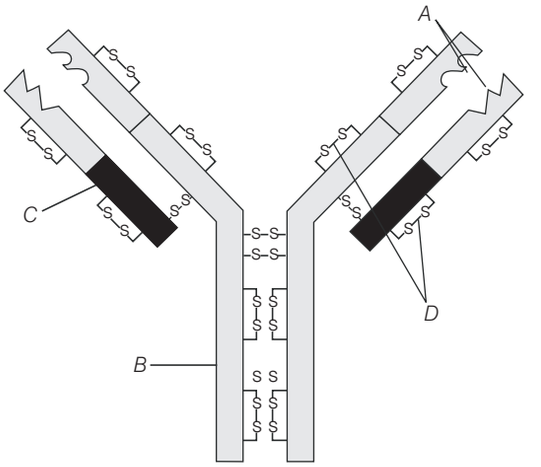
65 Each antibody has ...*A*... polypeptide chains, ..*B*.. small chains called ...*C*... chains and ....*D*... longer chains called ...*E*... chains.

The antibody, therefore, is represented as ... *F*..

Here *A* to *F* refers to
(a) A–four, B–two, C–light, D–two, E–heavy, F–H_2L_2
(b) A–six, B–three, C–light, D–three, E–heavy, F–H_3L_2
(c) A–two, B–one, C–light, D–one, E–heavy, F–H_1L_1
(d) A–five, B–two, C–light, D–three, E–heavy, F–H_2L_2

66 Antigen binding site of immunoglobulin (antibody) is
(a) variable region of heavy chain
(b) variable region of light chain
(c) constant region of light chain
(d) variable region of both heavy and light chain

67 The figure given below shows an antibody molecule. Name the parts *A, B* and *C*.



(a) A–Antigen binding site, B–Heavy chain, C–Light chain, D–Disulphide bond
(b) A–Antibody binding site, B–Light chain, C–Heavy chain, D–Phosphoester bond
(c) A–Antigen binding site, B–Short chain, C–Long chain, D–Sulphur bond
(d) A–Antibody binding site, B–Long chain, C–Short chain, D–Disulphide bond

68 The most abundant class of Immunoglobulins (Igs) in the human body is
(a) IgA (b) IgM
(c) IgG (d) IgE

69 Humoral immunity is also called as
(a) antibody mediated immunity
(b) non-specific immune response
(c) antigen mediated immunity
(d) None of the above

70 Humoral immunity is mediated by
(a) B-cells (b) T-cells
(c) macrophages (d) monocytes

71 Humoral immune system defends against viruses and bacteria is present in
(a) blood (b) lymph
(c) Both (a) and (b) (d) None of these

72 The cell-mediated immunity inside the human body is carried out by ***NEET 2013***
(a) T-lymphocytes (b) B-lymphocytes
(c) thrombocytes (d) erythrocytes

73 The process of removal and replacement of the damaged tissues or organs like heart, eye, liver, kidney with healthy ones from a donor is called as
(a) transplantation (b) repair and replacement
(c) replacement theraphy (d) transformation

74 Which of the following immune responses is responsible for rejection of kidney graft? ***NEET 2019, CBSE-AIPMT 2015***
(a) Humoral immune response
(b) Inflammatory immune response
(c) Cell-mediated immune response
(d) Auto-immune response

75 Active immunity is an immunity gained after
(a) natural infection (b) exposure to live pathogen
(c) immunisation (d) Both (a) and (b)

76 Active immunity development is related to
(a) natural killer cells (b) memory cells
(c) helper T-cells (d) suppressor T-cells

77 Passive immunisation includes
(a) transfer of lymphocyte directly
(b) transfer of maternal antibodies across placenta to the foetus
(c) introduction of antibodies directly in the body
(d) Both (b) and (c)

78 Colostrum, the yellowish fluid, secreted by mother during the initial days of lactation is very essential to impart immunity to the new born infants because it contains ***NEET 2019***
(a) monocytes (b) macrophages
(c) immunoglobulin-A (d) natural killer cells

79 Which of the following is involved in passive immunity? ***JIPMER 2018***
(a) IgA (b) IgE
(c) IgM (d) IgD

80 Choose the correct option regarding antibodies. ***JIPMER 2019***
(a) IgA - Helps in allergic reaction
(b) IgG - Cross placenta
(c) IgE - Found in secretions
(d) IgM - Exist as dimer

81 The principle of vaccination or immunisation depends on the property of ..... of the immune system. The most appropriate word to fill the blank is
(a) memory (b) antigen
(c) pathogen (d) plasma cells

82 Which form of pathogen is used in vaccination?
(a) Activated and strong pathogens
(b) Preformed antigens and antibody
(c) Inactivated and weakened pathogenic agents
(d) None of the above

83 If a quick immune response is needed as in tetanus infection, preformed antibodies or antitoxin is injected into the patient body. This type of immunisation is called …… .
(a) active immunisation (b) passive immunisation
(c) innate immunity (d) humoral immunity

84 Antivenom injection contains preformed antibodies while polio drops that are administered into the body contain ***NEET 2016***
(a) harvested antibodies (b) gamma globulin
(c) attenuated pathogens (d) activated pathogens

85 Hepatitis-B vaccine is produced from
(a) yeast (b) bacteriophage
(c) bacteria (d) All of these

86 A substance that causes an allergic reaction is called
(a) allergen (b) pollen
(c) foreign substance (d) dander

87 Which of the following mediates allergic reaction? ***JIPMER 2018***
(a) IgA (b) IgG (c) IgE (d) IgD

88 Common examples of allergens are
(a) dust (b) pollen grains
(c) animal dander (d) All of these

89 An allergic response appears at the site of infection causes sneezing, watery eyes, running nose, pain and heat due to the certain chemicals (allergens), they are
(a) histamine and serotonin (b) histamine and cerumen
(c) cerumen and serotonin (d) mucus and cerumen

90 What is injected into the patient's body for determining the cause of allergy?
(a) Allergen to which the patient is allergic
(b) IgG
(c) IgE
(d) Steroids

91 Which of the following drugs can be used to quickly reduce the symptoms of allergic reaction?

I. Anti-histamine
II. Adrenaline
III. Steroids

(a) I and II (b) I and III
(c) II and III (d) I, II and III

92 Asthma may be attributed to ***NEET 2016***

(a) allergic reaction of the mast cells in the lungs
(b) inflammation of the trachea
(c) accumulation of fluid in the lungs
(d) bacterial infection of the lungs

93 In higher vertebrates, the immune system can distinguish self and non-self cells. If this property is lost due to the genetic abnormality and it attacks self-cells, then it leads to ***NEET 2016***

(a) graft rejection
(b) autoimmune disease
(c) active immunity
(d) allergic response

94 Which of the following diseases is an autoimmune disorder? ***NEET (Odisha) 2019***

(a) Myasthenia gravis (b) Arthritis
(c) Osteoporosis (d) Gout

95 Which of the following is not an autoimmune disease? ***NEET 2018***

(a) Alzheimer's disease
(b) Rheumatoid arthritis
(c) Psoriasis
(d) Vitiligo

96 The site where immature lymphocytes differentiate into antigen sensitive lymphocytes are

(a) primary lymphoid organs
(b) secondary lymphoid organs
(c) lymph nodes
(d) tonsils

97 Which of the given sets include the primary lymphoid organs?

(a) Thymus, lymph nodes and spleen
(b) Bone marrow and thymus
(c) Bone marrow, Peyer's patches and thymus
(d) Thymus, liver and tonsils

98 Surgical removal of thymus of a newborn shall result in the failure to produce

(a) Allergens (b) Interferons
(c) B-lymphocyte (d) T-lymphocytes

99 Thymus is a lobed organ located near the..... *A* ..... and beneath the ....*B*.... . The most appropriate combination for *A* and *B* is

(a) A–heart; B–breast bone
(b) A–liver; B–ribs
(c) A–heart; B–ribs
(d) A–intestine; B–ribs

100 What is the main lymphoid organ where all blood cells including lymphocytes are produced?

(a) Bone marrow (b) Tonsils
(c) Liver (d) Spleen

101 T-lymphocytes mature in the ..... while B-lymphocyte mature in the ..... .

Most appropriate combination of words to fill the blanks is

(a) thymus; bone marrow
(b) bone marrow; thymus
(c) thyroid; bone marrow
(d) yellow bone marrow; red bone marrow

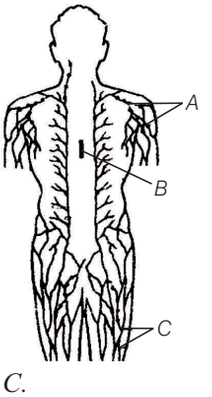
102 Full form of MALT is

(a) Mucosal Associated Lymphoid Tissue
(b) Memory Associated Lymphoid Tissue
(c) Memory Associated Lymphocyte Tissue
(d) Mucosa Associated Lymphocyte Tissue

103 MALT constitutes about ..…… per cent of the lymphoid tissue in human body. ***NEET 2017***

(a) 50% (b) 20%
(c) 70% (d) 10%

104 Given below the diagrammatic representation of lymph nodes.



Label *A, B* and *C*.

(a) A–Lymph nodes, B–Thymus, C–Lymphatic vessels
(b) A–Lymphatic vessels, B–Thyroid, C–Lymph nodes
(c) A–Tonsils, B–Peyer's patchs, C–Lymphatic vessels
(d) A–Tonsils, B–Thymus, C–Peyer's patches

TOPIC 3 ~ *AIDS (Acquired Immuno Deficiency Syndrome)*

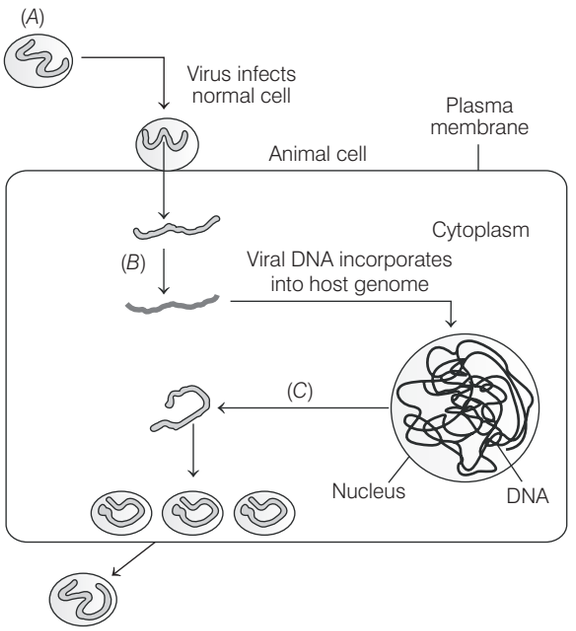
105 Human immunodeficiency virus causes
(a) Acquired Immuno Deficiency Syndrome
(b) *Anthrax*
(c) tuberculosis
(d) polio

106 Genetic material found in Human Immunodeficiency Virus (HIV) is
(a) double-stranded RNA
(b) single-stranded RNA
(c) double-stranded DNA
(d) single-stranded DNA

107 AIDS virus contains
(a) RNA with protein
(b) DNA with protein
(c) RNA without protein
(d) Only DNA

108 Transmission of HIV infection from infected mother to her child occurs through
(a) liver
(b) placenta
(c) skin
(d) None of these

109 In the given flow chart, the replication of retrovirus in a host cell is shown. Observe it carefully and fill up the blank *A*, *B* and *C*.



(a) A–Bacteriophage, B–Viral DNA is produced, C–New viral RNA is produced
(b) A–Transcriptase, B–Bacterial RNA is produced, C–New viral DNA is produced by the infected cell
(c) A–Bacteriophage, B–Viral DNA is produced, C–New viral RNA is produced by the infected cell
(d) A–Retrovirus, B–Viral DNA is produced by reverse transcriptase, C–New viral RNA is produced by the infected cell

110 HIV is a ....*A*..... and has genetic material composed of ...*B*...., HIV replicates inside the host cells. It is considered a retrovirus because it uses an enzyme, ...*C*.... , to convert ..... *D*..... into .....*E*..... . Here *A* to *E* refers to
(a) A–retrovirus, B–RNA, C–reverse transcriptase, D–RNA, E–DNA
(b) A–retroviral, B–DNA, C–reverse transcriptase, D–DNA, E–RNA
(c) A–rhinovirus, B–DNA, C–reverse transcriptase, D–DNA, E–RNA
(d) A–adenovirus, B–RNA, C–reverse transcriptase, D–RNA, E–DNA

111 In an infected human body the 'HIV factory' is
(a) sperm (b) ova
(c) macrophages (d) spleen cells

112 At which stage of HIV infection does one usually show symptoms of AIDS? ***CBSE-AIPMT 2014***
(a) Within 15 days of sexual contact with an infected person
(b) When the infected retrovirus enters host cells
(c) When HIV damages large number of helper T-lymphocytes
(d) When the viral DNA is produced by reverse transcriptase

113 A patient is suspected to be suffering from Acquired Immuno Deficiency Syndrome (AIDS). Which diagnostic technique will you recommend for its detection?
(a) ELISA (b) MRT (c) Ultrasound (d) WIDAL

114 The word NACO stands for
(a) National AIDS Control Organisation
(b) Non-governmental AIDS Control Organisation
(c) National Agrochemical Organistation
(d) Both (b) and (c)

TOPIC 4 ~ Cancer

115 The property of normal cells by virtue of which contact with other cells inhibits their uncontrolled growth is called
(a) contact inhibition (b) metastasis
(c) benign tumour (d) metagenesis

116 Cell division or mitosis is a normal process in living cells but sudden and abnormal mitosis in an organ will frequently result in
(a) zygote (b) cancer
(c) new organ (d) gastrula

117 The uncontrolled proliferation of cancerous cells produces masses of cells, called
(a) tumours (b) neoplastic cells
(c) protooncomass (d) Both (a) and (b)

118 Which form of tumour remains confined to their original location and do not spread to other parts of the body?
(a) Malignant tumour (b) Benign tumour
(c) Both (a) and (b) (d) Leukaemia

119 Which of the following properties is possessed by malignant tumours?
(a) Metastasis
(b) Uncontrolled cell division
(c) Both (a) and (b)
(d) Controlled cell division

120 Which one of the following is not a property of cancerous cells, whereas the remaining three are?
CBSE-AIPMT 2012
(a) They compete with normal cells for vital nutrients
(b) They do not remain confined in the area of formation
(c) They divide in an uncontrolled manner
(d) They show contact inhibition

121 Transformation of normal cell into cancerous cell is induced by
(a) carcinogens (b) lipids
(c) proteins (d) All of these

122 Physical carcinogens, e.g. UV-ray, X-ray and γ-rays cause
(a) DNA damage (b) RNA damage
(c) Both (a) and (b) (d) Protein damage

123 Chemical carcinogens present in tobacco smoke have been identified as a major cause of
(a) lung cancer (b) liver cancer
(c) oral cancer (d) None of these

124 Cancer causing viruses are called
(a) oncogenic viruses (b) retroviruses
(c) adenoviruses (d) poxviruses

125 The genes which can lead to the oncogenic transformation of the cells in which these are present, are called
(a) oncogenes (b) proto-oncogenes
(c) cellular oncogenes (d) Both (b) and (c)

126 Normal cell have genes called .....*A*..... which are present in inactivated state but under certain conditions like .....*B*... they get transformed to ...*C*.... Here *A*, *B* and *C* refers to
(a) A–cellular oncogenes, B–mutation, C–cancer causing oncogenes
(b) A–viral oncogenes, B–mutation, C–disease causing genes
(c) A–viral oncogenes, B–mutation, C–tumour causing genes
(d) None of the above

127 Characteristics of cancer are ***AIIMS 2018***
(a) All viruses are oncogenic
(b) All tumours are cancers
(c) Cancerous cells show property of contact inhibition
(d) Cancer cells show metastasis

128 Which of the following techniques is used to detect the of cancer of internal organs?
(a) Magnetic Resonance Imaging (MRI)
(b) Radiography (X-ray)
(c) Computed Tomography (CT) scan
(d) All of the above

129 Cancer cells are more easily damaged by radiation than normal cells because they are
(a) starved of mutation
(b) undergoing rapid division
(c) different in structure
(d) non-dividing

130 Treatment and detection of cancer can be done by
(a) radiography (b) chemotherapy
(c) surgery (d) All of these

131 Alpha-interferons
(a) activate the immune system
(b) help in destroying the tumour
(c) Both (a) and (b)
(d) None of the above

TOPIC 5 ~ *Drug and Alcohol Abuse*

132 Opioids are the drugs, which bind to specific opioid receptors present in our
(a) central nervous system
(b) gastrointestinal tract
(c) Both (a) and (b)
(d) urinogenital system

133 Smack is chemically .....*A*..... which is white and odourless and crystalline in nature. This is obtained by ....*B*.... . Here *A* and *B* refers to
(a) A–diacetylmorphine; B–acetylation of morphine
(b) A–morphine; B–acetylation of hashish
(c) A–stimulant; B–acetylation of morphine
(d) A–hallucinogen; B–acetylation of hashish

134 Durg called 'heroin' is synthesised by
(a) acetylation of morphine ***NEET 2019***
(b) glycosylation of morphine
(c) nitration of morphine
(d) methylation of morphine

135 Which part of poppy plant is used to obtain the drug smack? ***NEET 2018***
(a) Roots (b) Latex
(c) Flowers (d) Leaves

136 A drug called heroin is obtained from
(a) *Rauwolfia serpentina*
(b) *Cannabis sativa*
(c) *Cajanus cajan*
(d) *Papaver somniferum*

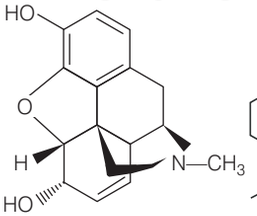
137 Cannabinoid are the group of chemicals, which interact with cannabinoid receptors present principally in
(a) brain (b) neuron
(c) nephron (d) dendron

138 Cannabinoids are obtained from
(a) inflorescence of the plant *Cannabis sativa*
(b) fruits of the plant *Papaver somniferum*
(c) latex of the plant *Cannabis sativa*
(d) plant *Papaver somniferum* inflorescence

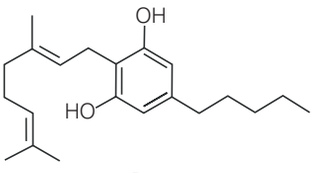
139 The flower tops, leaves and the resin of *Cannabis sativa* are used to produce
(a) marijuana (b) hashish
(c) charas (d) All of these

140 The drug that produces profound cardiovascular effects in human beings is
(a) cocaine (b) ganja
(c) benzodiazepine (d) insulin

141 Observe the molecules *A* and *B* given below and select the right option giving their use and source.



A
Morphine



B
Cannabinoid

	Molecules	Uses	Taken by
(a)	A–Morphine	Sedative and pain killer	Snorting and injection
(b)	B–Morphine	Product marijuana	Oral ingestion
(c)	A–Cannabinoid	Produces hallucinations	inhalation
(d)	B–Cannabinoid	Accelerates the transport of dopamine	injection

142 Coca alkaloid or cocaine is obtained from ***NEET (Odisha) 2019***
(a) *Papaver sonmiferum* (b) *Atropa belladonna*
(c) *Erythoxylum coca* (d) *Datura*

143 Cocaine is commonly called as
(a) coke (b) crack
(c) Both (a) and (b) (d) smack

144 Traditional anesthesia is obtained from ***JIPMER 2019***
(a) *Datura* (b) poppy
(c) *Cannabis* (d) *Erythoxylum*

145 Which one of the following is a stimulant?
(a) LSD (b) Cocaine (c) Opium (d) Heroin

146 Plants with hallucinogenic properties are
(a) *Atropa belladonna* (b) *Datura*
(c) Both (a) and (b) (d) *Papaver*

147 Identify the pictures *A*, *B* and *C*.


A


B


C

(a) A–Opium poppy, B–*Cannabis sativa*, C–*Datura*
(b) A–*Cannabis sativa*, B–Opium poppy, C–*Datura*
(c) A–*Datura*, B–Opium poppy, C–*Cannabis sativa*
(d) A–Opium poppy, B–*Datura*, C–*Cannabis sativa*

148 Which is the particular type of drug that is obtained from the plant whose one flowering branch is shown below? ***CBSE-AIPMT 2014***



(a) Hallucinogen (b) Depressant
(c) Stimulant (d) Pain killer

149 Drugs, that are normally used as medicines to help the patients cope with mental illness are
(a) barbiturates (b) amphetamines
(c) benzodiazepines (d) All of these

150 LSD is derived from
(a) *Claviceps purpurea* (b) *Pseudomonas putida*
(c) *Cannabis indica* (d) *Cannabis sativa*

151 Which one of the following is a correct matching pair of a drug and its category?
(a) Amphetamines — Stimulant
(b) Lysergic acid diethylamide — Narcotic
(c) Heroin — Psychotropic drug
(d) Benzodiazepies — Pain killer

152 Which one of the following fungi contains hallucinogens? ***CBSE-AIPMT 2014***
(a) *Morchella esculenta* (b) *Amanita muscaria*
(c) *Neurospora* sp. (d) *Ustilago* sp.

153 Nicotine is
(a) an alkaloid (b) a steroid
(c) a stimulant (d) Both (a) and (c)

154 Nicotine intake stimulates the ....*A*... to release ...*B*.... and ....*C*.... into blood circulation. This lead to increase in ...*D*... and an increase.... *E* .... .
Identify *A* to *E*.
(a) A–adrenal gland, B–adrenaline, C–nor-adrenaline, D–blood pressure, E–heart rate
(b) A–thyroid gland, B–thyroxine, C–parathyroxine, D–blood pressure, E–heart rate
(c) A–adrenal gland, B–thyroxine, C–nor-adrenaline, D–blood pressure, E–heart rate
(d) A–gonads B–adrenaline, C–nor-adrenaline, D–blood pressure, E–heart rate

155 Smoking addiction is harmful because smoke produces polycyclic aromatic hydrocarbons, which cause
(a) reduction in oxygen transport
(b) increase in blood pressure
(c) cancer
(d) retardation of growth of foetus

156 In heavy smokers, the alveoli of the lungs are enlarged and damaged, which reduces the surface area for the exchange of respiratory gases. This condition is called
(a) asthma
(b) silicosis
(c) emphysema
(d) insomnia

157 Carcinogen present in cigarette smoke is
(a) benzopyrene (b) nicotine ***JIPMER 2019***
(c) carbon monoxide (d) All of these

158 Those who take drugs intravenously develop a risk of
(a) AIDS (b) hepatitis-B
(c) Both (a) and (b) (d) malaria

159 Cirrhosis of liver is caused by the chronic intake of ***CBSE-AIPMT 2012***
(a) opium (b) alcohol
(c) tobacco (chewing) (d) cocaine

160 Fill up the blanks.
I. The period between ....*A*....years of age may be thought of as adolescence period.
II. Adolescence is a bridge linking ....*B* .... and ....*C*....
III. The chronic use of drug and alcohol damages ...*D*.... and ...*E*...
IV. Alcoholism during ....*F*.... adversely affects the foetus.
(a) A–12-18, B–childhood, C–adulthood, D–nervous system, E–liver, F–pregnancy
(b) A–10-15, B–adulthood, C–childhood, D–heart, E–stomach, F–adulthood
(c) A–15-20, B–adulthood, C–childhood, D–liver, E–kidney, F–pregnancy
(d) A–20-28, B–adulthood, C– childhood, D–liver, E–nervous system, F–pregnancy

161 Which part of the brain is involved in the loss of control over speech when a person consumes excessive alcohol?
(a) Cerebellum
(b) Medulla oblongata
(c) Cerebrum
(d) Pons varoli

162 Side effects of anabolic steroids in females include
I. masculinisation.
II. aggressiveness.
III. mood swings, depression.
IV. abnormal menstrual cycle.
V. excessive facial and body hair.
Choose the correct option.
(a) I, II and III
(b) I, II, III and IV
(c) II, III, IV and V
(d) I, II, III, IV and V

NEET

SPECIAL TYPES QUESTIONS

I. Assertion and Reason

■ **Direction** (Q. No. 163-177) *In each of the following questions, a statement of Assertion (A) is given followed by corresponding statement of Reason (R).*
Of the statements, mark the correct answer as

(a) If both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

163 **Assertion** (A) *Escherichia coli*, *Shigella* sp. and *Salmonella* sp. are all responsible for diarrhoeal diseases.
Reason (R) Dehydration is common to all types of diarrhoeal diseases and adequate supply of fluids and electrolytes should be ensured.

164 **Assertion** (A) Interferons help to eliminate the viral infections.
Reason (R) Interferons released by infected cells, reach the nearby uninfected cells and make them resistant to viral infection.

165 **Assertion** (A) Interferons are a type of antibodies produced by body cells infected by bacteria.
Reason (R) Interferons interferes with viral replication at the site of injury.

166 **Assertion** (A) Antibody mediated immune response is provided by B-cells.
Reason (R) B-cells work chiefly by secreting substances called antibodies into the body fluids.

167 **Assertion** (A) A person who has received a cut and is bleeding needs to be given anti-tetanus treatment.
Reason (R) Anti-tetanus injection stimulates the production of antibodies for tetanus.

168 **Assertion** (A) Mast cells in the humans release excessive amount of chemicals like histamine, which cause allergy.
Reason (R) Allergens in the environment on reaching human body stimulate mast cells.

169 **Assertion** (A) Many visitors of hills suffer from skin and respiratory allergy problems.
Reason (R) *Pinus* trees produce a large quantity of wind-borne pollen grains.

170 **Assertion** (A) AIDS is a disorder caused by HIV.
Reason (R) HIV is a virus that damages immune system of its host.

171 **Assertion** (A) Cancer cells are virtually immortal until the body in which they reside dies.
Reason (R) Cancer is caused by damage to genes regulation of the cell division cycle.

172 **Assertion** (A) Metastasis is the phenomenon in which tumour cells detach and migrate to other parts of the body where they give rise to secondary tumours.
Reason (R) Abnormal antigens on the surface of cell and unusual number of chromosomes cause metastasis.

173 **Assertion** (A) Cannabinoids are known for their effects on cardiovascular system of the body.
Reason (R) Cannabinoids is a class of diverse chemical compounds that activates cannabinoid receptors present principally in brain.

174 **Assertion** (A) Alcohol consumption during pregnancy is harmful.
Reason (R) Alcohol causes physical and mental defects in the offspring called Foetal Alcohol Syndrome (FAS).

175 **Assertion** (A) Dope test is used to estimate the level of alcohol by analysing the breathe of alcohol drinking person.
Reason (R) Athletes undergo dope test before major tournaments or a match.

176 **Assertion** (A) Repeated use of drugs, increases the tolerance level of receptors in our body.
Reason (R) Addiction occurs as receptors respond only to higher doses of drugs.

177 **Assertion** (A) Pork should be properly cooked to avoid *Taenia* infection.
Reason (R) Pork of pig contains hexacanth and cysticercus larvae.

II. Statement Based Questions

178 Which of the following statement(s) is/are correct regarding pathogens?

I. A pathogen or an infectious agent is a microorganism, such as a virus, bacterium, fungus that causes disease in its host.
II. Pathogens multiply in our body and interfere with the normal vital activities, resulting in morphological and functional damage.

(a) Only I (b) Only II
(c) I and II (d) None of these

179 Which one of the following statements is correct with respect to immunity? ***CBSE-AIPMT 2012***

(a) Preformed antibodies need to be injected to treat the bite by a viper snake

(b) The antibodies against smallpox pathogen are produced by T-lymphocytes

(c) Antibodies are protein molecules, each of which has four light chains

(d) Rejection of a kidney graft is the function of B-lymphocytes

180 Which of the following is correct regarding AIDS causative agent HIV? ***NEET 2016***

(a) HIV is enveloped virus containing one molecule of single-stranded RNA and one molecule of reverse transcriptase

(b) HIV is enveloped virus that contains two identical molecules of single-stranded RNA and two molecules of reverse transcriptase

(c) HIV is unenveloped retrovirus

(d) HIV does not escape but attacks the acquired immune response

181 Consider the following statements.

I. Adolescence is a very vulnerable phase of mental and psychological developments of individual.

II. Adolescence is marked by accelerated physical growth, development of reproductive organs and changes in functioning of the neuroendocrine system.

(a) Both statements I and II are correct

(b) Both statements I and II are incorrect

(c) Statement I is correct, but II is incorrect

(d) Statement I is incorect, but II is correct

182 Choose the correct statements.

I. Innate immunity is accomplished by providing different types of barriers.

II. Acquired immunity is present from the birth and is inherited from parents.

III. Acquired immunity can be divided into antibody mediated and cell-mediated immunity.

IV. Innate immunity is also called specific immunity.

V. Acquired immunity consists of specialised cells (T-cell and B-cell) and antibodies that circulate in the blood.

Codes

(a) I, II and V (b) II, III, IV and V

(c) I, III and V (d) I, II, III, IV and V

183 Consider the following statements.

I. People should get vaccination to avoid infection.

II. Vaccination is available against polio, cholera, typhoid, tuberculosis and many other diseases.

III. Eradication of vectors are necessary in diseases like malaria and filariasis.

IV. Dengue and chikungunya, both are spread by *Culex* mosquitoes.

Which of the statements given above are correct?

(a) I, II and III (b) I, II and IV

(c) I, III and IV (d) III and IV

184 Which of the following statements given below is/are correct?

I. Secondary lymphoid organs includes lymph nodes, spleen and small masses of lymph tissue such as Peyer's patches, appendix and tonsils.

II. The secondary lymphoid organs provide the site for interaction of lymphocyte with the antigens.

(a) Only I (b) Only II

(c) I and II (d) None of these

185 The lymph nodes

I. are small solid structures along the lymphatic system.

II. filter lymph fluid as it flows through them, trapping bacteria, viruses and other antigens, which are then destroyed by lymphocytes.

Which of the statements given above is/are corrcet?

(a) Only I (b) Only II

(c) I and II (d) None of these

186 Read the statements about a certain organ and choose the correct option.

I. It is a large bean-shaped organ.

II. It mainly contains lymphocytes and phagocytes.

III. It acts as a filter of the blood by trapping blood-borne microorganisms.

IV. It is a large reservoir of erythrocyte.

V. It is a secondary lymphoid organ.

(a) Thymus (b) Tonsils (c) Appendix (d) Spleen

187 Select the true statements.

I. Cancer detection is based on biopsy and histopathological study of the suspected tissue.

II. In biopsy, the suspected tissue is cut into thin sections, stained and examined under microscope.

III. Certain chemotherapeutic drugs are used to kill the cancerous cells, but majority of the drugs have side effects like hair loss, anaemia, etc.

IV. MRI uses strong magnetic fields and ionising radiations to accurately detect pathological and physiological changes in the living tissues.

V. Techniques like radiography (use of X-rays), CT (Computed Tomography) scan and MRI are very useful to detect cancers of the internal organs.

(a) I and II (b) I and III

(c) II and III (d) All statements are true

188 Which of the following statements given below is/are correct?

I. Growing number of people are taking LSD and other drugs like barbiturates and amphetamines to help themselves to cope with mental illness.

II. Several plants, fruits and seeds having hallucinogenic properties have been used in folk-medicine.

(a) Statement I is true, but II is false
(b) Stetement I is false, but II is true
(c) Both statements I and II are true
(d) Both statements I and II are false

189 Warning signs of drug and alcohol abuse include

I. drop in academic performance.
II. absence from school/college.
III. lack of interest in personal hygiene.
IV. isolation, depression, fatigue, aggresssive and rebellious behaviour.

Which of the statements given above are correct?

(a) I, II and III (b) I, III and IV
(c) II, III and IV (d) All of these

190 Reasons for alcohol abuse in adolescents are

I. social pressure.
II. curiosity and need for adventure, excitement and experiment.
III. to escape from stress, depression and frustration.
IV. to overcome hardships of daily life.

Which of the statements given above are correct?

(a) I, II and III (b) I, III and IV
(c) II, III and IV (d) All of these

191 Read the following statements and select the incorrect one.

(a) When the functioning of one or more organs or systems of the body is adversely affected, characterised by appearance of various signs and symptoms, i.e. we have a disease
(b) Some of the infectious diseases like AIDS are fatal
(c) Pathogens cause harm to the host by living in (or on) them
(d) None of the above

192 Read the following statements and select the correct statements.

I. Subsequent encounter with the same pathogen for the second time elicits a highly intensified secondary immune response.
II. The vaccines generate B and T-cells that recognise the pathogen quikly on subsequent exposure and overwhelm the invaders with massive production of antibodies.

(a) Both statements I and II are correct
(b) Statement I is correct, but II is incorrect
(c) Statement I is incorrect, but II is correct
(d) Both statements I and II are incorrect

193 Which of the following statements are correct?

I. The exaggerated response of the immune system to certain antigens present in the environment is called allergy.
II. The allergic tendency is genetically passed from the parents to the offspring and is characterised by the presence of large quantities of IgG antibodies in the blood.
III. Bone marrow and thymus are the organs where origin and/or maturation and proliferation of lymphocytes occur.
IV. Immunisation is the process by which the body produces antibodies against the vaccine preventable diseases through administration of specific vaccines.

(a) I and II (b) II and IV
(c) I, III and IV (d) All of these

194 Select the correct statements.

I. The word AIDS stands for Acquired Immuno Deficiency Syndrome. This means deficiency of immune system, acquired during the lifetime of an individual.
II. AIDS was first reported in 1981 and the word 'syndrome' in this, means a group of symptoms.
III. There is always a time-lag between the infection and appearance of AIDS symptoms, i.e. vary from a few months to many years (usually 5-10 years).
IV. During HIV infection, the macrophages cells of body continues produce virus and in this way acts like a HIV factory.

(a) I, II and III (b) I, III and IV
(c) I, and IV (d) All of these

195 Read the given statements carefully.

I. In India, NACO and other NGOs are doing a lot to educate people about AIDS.
II. To prevent HIV infections, use of disposable needles and syringes in hospitals, use of condoms during sex, control of drug abuse is necessary.
III. Ist December is celebrated as World AIDS Day.
IV. AIDS is characterised by decrease in the number of killer T-cells.

Which of the above statements are correct?

(a) I, II and IV (b) I, II, III and IV
(c) I and III (d) I and IV

196 Read the following statements and select the correct answer.

I. Psychoactive drugs have the ability to alter the activity of the nervous system.
II. Addiction is a psychological attachment to certain effects such as euphoria and temporary feeling of well-being associated with drugs and alcohol.
III. When the drugs are taken for a purpose other than medicinal use or in amounts/frequency that impairs one's physical, physiological or psychological functions, it constitutes drug abuse.
IV. Smoking increases carbon monoxide content in blood and reduces the concentration of oxygen. This causes oxygen deficiency in the body.

(a) I and II (b) III and IV
(c) I, II and IV (d) I, II, III and IV

197 Read the following statements and select the correct option.

I. Dependence is the tendency of the body to manifest a characteristic and unpleasant withdrawal syndrome if regular dose of drugs/alcohol is abruptly discontinued.

II. Excessive doses of drugs may lead to coma and death due to respiratory failure, heart failure or cerbral hemorrhage.

III. Education about harmful effects of drugs and alcohol, counselling professional and medical help would relive the individuals from the drug and alcohol abuse.

IV. Sports persons often misuse drugs to enhance their performance.

(a) I and II (b) II and IV
(c) I, II and III (d) All of these

III. Matching Type Questions

198 Match the following columns.

	Column I (Diseases)		**Column II** (Causative organisms)
A	Dysentery	1.	*Entamoeba histolytica*
B.	Malignant malaria	2.	*Plasmodium falciparum*
C.	Common cold	3.	Rhinovirus
D.	Ringworm	4.	*Trichophyton*

Codes

	A	B	C	D		A	B	C	D
(a)	1	2	3	4	(b)	2	3	4	1
(c)	3	4	1	2	(d)	4	1	2	3

199 Match the causative organisms with their diseases.

	Column I		**Column II**
A.	*Haemophilus influenzae*	1.	Malignant malaria
B.	*Entamoeba histolytica*	2.	Elephantiasis
C.	*Plasmodium falciparum*	3.	Pneumonia
D.	*Wuchereria bancrofti*	4.	Typhoid
E.	*Salmonella typhi*	5.	Amoebiasis

Codes

	A	B	C	D	E
(a)	1	5	3	2	4
(b)	3	5	1	2	4
(c)	5	1	3	4	2
(d)	1	3	2	5	4

200 Match the diseases in Column I with the appropriate items (pathogen/prevention/treatment) in Column II.

	Column I		**Column II**
A.	Amoebiasis	1.	*Treponema pallidum*
B.	Diphtheria	2.	Use only sterilised food and water
C.	Cholera	3.	DPT vaccine
D.	Syphilis	4.	Use of oral rehydration therapy

Codes

	A	B	C	D		A	B	C	D
(a)	1	2	3	4	(b)	2	4	1	3
(c)	2	1	3	4	(d)	2	3	4	1

201 Column I lists the components of body defence and Column II lists the corresponding descriptions. Match the two column, choose the correct option from those given.

	Column I		**Column II**
A.	Active natural immunity	1.	Injection of gamma globulins
B.	First line of defence	2.	Complement proteins and interferons
C.	Passive natural immunity	3.	Direct contact with the pathogens that have entered inside the body
D.	Second line of defence	4.	Surface barriers
		5.	Antibodies transferred through the placenta

Codes

	A	B	C	D		A	B	C	D
(a)	4	3	5	2	(b)	3	4	2	5
(c)	3	4	5	2	(d)	5	3	2	1

202 Match the following columns.

	Column I (Cancer causing agents)		**Column II** (Examples)
A.	Chemical agent	1.	Benzopyrene in cigarette smoke
B.	Physical agent	2.	X-rays
C.	Biological agent	3.	Oncogenic viruses

Codes

	A	B	C		A	B	C
(a)	1	2	3	(b)	3	2	1
(c)	3	1	2	(d)	1	3	2

203 Match the following columns.

	Column I (Biomedical techniques)		**Column II** (Features)
A.	Biopsy	1.	Uses X-rays to generate a three- dimentional image of the internals of an object
B.	Radiography	2.	Leukaemia
C.	Blood or Bone marrow test	3.	X-rays are used to detect cancer of the internal organs
D.	Computed tomography	4.	A piece of the suspected tissue cut into thin sections, stained and examined under microscope

Codes

	A	B	C	D		A	B	C	D
(a)	4	2	1	3	(b)	4	3	2	1
(c)	3	2	1	4	(d)	2	1	4	3

NCERT & NCERT Exemplar

MULTIPLE CHOICE QUESTIONS

NCERT

204 Which one of the following diseases causes dry, scaly lesions on skin, nails and scalp?
(a) Ringworm disease (b) Skin allergy
(c) Botulism (d) None of these

205 Which one of the following pairs of diseases are viral as well as transmitted by mosquitoes?
(a) Elephantiasis and dengue
(b) Malaria and yellow fever
(c) Ringworm and dengue
(d) Yellow fever and dengue

206 Eradication of smallpox has been possible due to the following facts except
(a) use of highly effective vaccine
(b) immunisation programmes
(c) elimination of animal reservoir
(d) international cooperation

NCERT Exemplar

207 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

208 Transplantation of tissues/organs fails often due to the non-acceptance by the patient's body. Which type of immune-response is responsible for such rejections?
NEET 2018
(a) Autoimmune response
(b) Cell-mediated immune response
(c) Hormonal immune response
(d) Physiological immune response

209 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

210 The organisms which cause diseases in plants and animals are called
(a) pathogens (b) vectors
(c) insects (d) worms

211 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
Codes
(a) I and II (b) II and III (c) III and IV (d) II and IV

212 The clinical test that is used for diagnosis of typhoid is
(a) ELISA test (b) ESR test
(c) PCR test (d) Widal test

213 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 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

214 The disease chikungunya is transmitted by
(a) house flies (b) *Aedes* mosquitoes
(c) cockroach (d) female *Anopheles*

215 The sporozoites that cause infection when a female *Anopheles* mosquito bites a person, are found in
(a) liver of the person
(b) RBCs of mosquito
(c) salivary glands of mosquito
(d) gut of masquito

216 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

217 Haemozoin is a
(a) precursor of haemoglobin
(b) toxin released from *Streptococcus* infected cells
(c) toxin released from *Plasmodium* infected cells
(d) toxin released from *Haemophilus* infected cells

218 Which of the following is not the causal organism for ringworm?
(a) *Microsporum* (b) *Trichophyton*
(c) *Epidermophyton* (d) *Macrosporum*

219 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

220 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

221 Antivenom against snake poison contains
(a) antigens (b) antigen-antibody complexes
(c) antibodies (d) enzymes

222 Which of the following are the reasons for rheumatoid arthritis?
I. The ability to differentiate pathogens or foreign molecules from self cells increases.
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.
Choose the correct option.
(a) I and II (b) II and IV
(c) III and IV (d) I and III

223 Which of the following is not a secondary lymphoid tissue?
(a) Spleen (b) Tonsils (c) Appendix (d) Thymus

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

225 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

226 The genes causing cancer are
(a) structural genes
(b) expressor genes
(c) oncogenes
(d) regulatory genes

227 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

228 'Smack' is a drug obtained from the
(a) latex of *Papaver somniferum*
(b) leaves of *Cannabis sativa*
(c) flowers of *Datura pinata*
(d) fruits of *Erythroxylum coca*

229 Tobacco consumption is known to stimulate secretion of adrenaline and nor-adrenaline. The component causing this could be
(a) nicotine (b) tannic acid
(c) curcumin (d) catechin

Answers

› *Mastering NCERT with MCQs*

1 (d)	**2** (b)	**3** (b)	**4** (a)	**5** (d)	**6** (b)	**7** (a)	**8** (c)	**9** (a)	**10** (d)	**11** (a)	**12** (b)	**13** (c)	**14** (d)	**15** (a)
16 (a)	**17** (d)	**18** (c)	**19** (b)	**20** (d)	**21** (a)	**22** (d)	**23** (c)	**24** (c)	**25** (b)	**26** (d)	**27** (b)	**28** (d)	**29** (b)	**30** (a)
31 (d)	**32** (d)	**33** (c)	**34** (c)	**35** (a)	**36** (a)	**37** (a)	**38** (b)	**39** (c)	**40** (c)	**41** (c)	**42** (c)	**43** (b)	**44** (d)	**45** (a)
46 (a)	**47** (b)	**48** (c)	**49** (d)	**50** (d)	**51** (d)	**52** (c)	**53** (d)	**54** (c)	**55** (a)	**56** (d)	**57** (d)	**58** (c)	**59** (a)	**60** (b)
61 (d)	**62** (d)	**63** (a)	**64** (d)	**65** (a)	**66** (d)	**67** (a)	**68** (c)	**69** (a)	**70** (a)	**71** (c)	**72** (a)	**73** (a)	**74** (c)	**75** (d)
76 (b)	**77** (d)	**78** (c)	**79** (a)	**80** (b)	**81** (a)	**82** (c)	**83** (b)	**84** (c)	**85** (a)	**86** (a)	**87** (c)	**88** (d)	**89** (a)	**90** (a)
91 (d)	**92** (a)	**93** (b)	**94** (a)	**95** (a)	**96** (a)	**97** (b)	**98** (d)	**99** (a)	**100** (a)	**101** (a)	**102** (a)	**103** (a)	**104** (a)	**105** (a)
106 (b)	**107** (a)	**108** (b)	**109** (d)	**110** (a)	**111** (c)	**112** (c)	**113** (a)	**114** (a)	**115** (a)	**116** (b)	**117** (d)	**118** (b)	**119** (c)	**120** (d)
121 (a)	**122** (a)	**123** (a)	**124** (a)	**125** (d)	**126** (a)	**127** (d)	**128** (d)	**129** (b)	**130** (d)	**131** (c)	**132** (c)	**133** (a)	**134** (a)	**135** (b)
136 (d)	**137** (a)	**138** (a)	**139** (d)	**140** (b)	**141** (a)	**142** (c)	**143** (c)	**144** (d)	**145** (b)	**146** (c)	**147** (a)	**148** (a)	**149** (d)	**150** (a)
151 (a)	**152** (b)	**153** (d)	**154** (a)	**155** (c)	**156** (c)	**157** (a)	**158** (c)	**159** (b)	**160** (a)	**161** (c)	**162** (d)			

› *NEET Special Types Questions*

163 (b)	**164** (a)	**165** (d)	**166** (a)	**167** (a)	**168** (a)	**169** (a)	**170** (a)	**171** (b)	**172** (a)	**173** (b)	**174** (a)	**175** (d)	**176** (b)	**177** (c)
178 (c)	**179** (a)	**180** (b)	**181** (a)	**182** (c)	**183** (a)	**184** (c)	**185** (c)	**186** (d)	**187** (d)	**188** (c)	**189** (d)	**190** (d)	**191** (d)	**192** (a)
193 (c)	**194** (d)	**195** (b)	**196** (d)	**197** (d)	**198** (a)	**199** (b)	**200** (d)	**201** (c)	**202** (a)	**203** (b)				

› *NCERT & NCERT Exemplar Questions*

204 (a)	**205** (d)	**206** (c)	**207** (c)	**208** (b)	**209** (c)	**210** (a)	**211** (d)	**212** (d)	**213** (a)	**214** (b)	**215** (c)	**216** (c)	**217** (c)	**218** (d)
219 (c)	**220** (b)	**221** (c)	**222** (b)	**223** (d)	**224** (c)	**225** (c)	**226** (c)	**227** (b)	**228** (a)	**229** (a)				

Answers & Explanations

6 (*b*) A disease, which can be easily transmitted from one person to another is called infectious disease. Infectious diseases are also known as transmissible disease or communicable disease.

8 (*c*) Typhoid fever is caused by the bacterium *Salmonella typhi* and widal test is the confirmatory test for typhoid, which is based on antigen-antibody interaction. Typhoid fever or Enteric fever has the incubation period of 1 to 2 weeks.

11 (*a*) Mary Mallon (nick named Typhoid Mary, born on September 23, 1869, Cookstown, Country Tyrone, Ireland). She was a cook by profession and was a famous typhoid carrier who allegedly gave rise to multiple outbreaks of typhoid fever through the food she prepared.

12 (*b*) The correct option is (b) as

Bacteria like *Streptococcus pneumoniae* and *Haemophilus influenzae* are responsible for the disease pneumonia in humans, which infects the alveoli (air sacs) of the lungs.

15 (*a*) Cholera and tetanus are diseases caused by bacteria.

Cholera is caused by a bacterium *Vibrio cholerae* and tetanus is caused by a bacterium *Clostridium tetani*.

Mumps, influenza, herpes and smallpox are viral diseases. Typhoid is a bacterial disease but, it is not paired with a bacterial disease.

Hence, option (a) is correct.

16 (*a*) Rhinoviruses represent one such group of viruses, which cause one of the most infectious human ailments–the common cold.

17 (*d*) Pneumonia is caused by the bacteria *Streptococcus pneumoniae* and *Haemophilus influenzae* which infect the alveoli of lungs.

On the other hand, common cold is caused by a variety of viruses, most commonly by rhinovirus (RNA virus) and affects the upper respiratory tract, but not the lungs.

18 (*c*) HIV, hepatitis-B and ebola virus spread through direct contact between individuals. Direct transmission of vectors or disease occurs through sexual contact, exchange of body fluids like blood, semen, etc. Chikungunya is caused by the bite of *Aedes aegypti* mosquito, which requires no direct contact with body fluids like blood, semen or saliva for its transmission.

20 (*d*) Different species of *Plasmodium* (*P. vivax, P. malariae*, *P. falciparum* and *P. ovale*) are responsible for causing different types of malaria.

21 (*a*) Malignant malaria is caused by *Plasmodium falciparum*, which is the most serious type of malaria as it can even be fatal.

22 (*d*) When an infected female *Anopheles* bites a healthy person, *Plasmodium* in the form of 'sporozoites' are transmitted from saliva of mosquito into the human body. Thus, one can look for the sporozoites of the malarial parasite in the saliva of the infected female *Anopheles* mosquito.

23 (*c*) Infective stage of *Plasmodium* for man is sporozoite. *Plasmodium* enters the human body as sporozoites (infectious form) through the bite of infected female *Anopheles* mosquito.

The sporozoites mature into schizonts in the liver cells and releases merozoites upon rupture. These merozoites infect RBCs. Ookinete is the motile zygote of the parasite of the malarial mosquito that forms an oocyst in the mosquito's gut.

24 (*c*) Haemozoin is the toxic substance which is responsible for the high malarial fever. It is released due to the rupture of RBCs in the liver of human by the malarial parasite.

26 (*d*) Female *Anopheles* is the primary host of the malarial parasite (*Plasmodium*). It is called primary host, as it serves as the place where *Plasmodium* lives and reproduces sexually. Human is called the secondary host of *Plasmodium*.

30 (*a*) *Entamoeba histolytica* causes amoebiasis. It is a parasite of the large intestine of humans and is commonly contracted by ingesting contaminated water or food.

32 (*d*) Malaria, amoebiasis and sleeping sickness all are protozoan diseases caused by the species of the protozoan *Plasmodium, Amoeba* and *Trypanosoma*, respectively.

33 (*c*) Babesiosis is a malaria-like parasitic disease caused by infection with *Babesia bigemina,* a genus of protozoan piroplasms.

The diseases in the other options and their causative agents are as follows

Syphilis	—	*Treponema pallidum* (bacterium)
Influenza	—	Influenza virus
Blastomycosis	—	*Blastomyces dermatitidis* (fungus)

34 (*c*) *Trichinella spiralis*, a nematode parasite copulates in the intestine, after which males dies and females produce larvae which enter into the blood circulation to reach the muscles. The production of larvae indicates vivipary.

Ancylostoma, Enterobius and *Ascaris* are all egg laying endoparasites.

35 (*a*) Ascariasis is caused by an intestinal endoparasite of human, *'Ascaris lumbricoides,'* commonly called roundworm.

Filariasis is caused by filarial worms, *Wuchereria bancrofti* and *Wuchereria malayi*.

Both of these causative agents are helminths.

36 (*a*) Symptoms of ascariasis includes internal bleeding, muscular pain, fever, anaemia and blockage of the intestinal passage. Ascariasis is caused by an endoparasite of human, *Ascaris lumbricoides* commonly called roundworm.

37 (*a*) Infection of *Ascaris* occurs in a healthy person due to the drinking of water contaminated with eggs of *Ascaris*, vegetables (raw or uncooked), fruits, etc.

40 (*c*) The filariasis pathogens are transmitted to a healthy person through the bite of female of the pathogen mosquito *Culex* vectors. Which also serves as intermediate host.

42 (*c*) Elephantiasis is a helminthic disease caused by *Wuchereria bancrofti* and *W. malayi.* The infestation is transmitted by female *Culex* mosquitoes from one individual to the others. The worms live in the lymphatic system and slowly develops chronic inflammation.

For the other options

- Ringworm is a fungal skin disease.
- Ascariasis pathogen affects small intestine of human beings.
- Amoebiasis pathogen affects the large intestine of humans.

43 (*b*) Pair in option (b) is not correctly matched and can be corrected as

Syphilis is caused by bacteria *Trypanosoma pallidum*.

Rest of the other pairs show correct match.

44 (*d*) The group of diseases carried (transmitted) by insects are

Malaria transmitted by by *Anopheles* mosquito (female).

Filariasis transmitted by by *Culex* (female).

Yellow fever transmitted by *Aedes* (female).

46 (*a*) Fungi parasitic on the skin, usually belong to the genera of *Microsporum, Epidermophyton* or *Trichophyton*. Such fungi are responsible for ringworm infection and are also called cutaneous fungus.

47 (*b*) Ringworm is an infectious disease. It is a skin infection caused by a fungus that can affect the scalp, skin, fingers, toes, nails or foot.

49 (*d*) *Gambusia* is a fish which can control mosquito borne diseases like dengue, chikungunya, malaria, etc. These fishes feeds on larvae and pupae of certain mosquitoes and help in eradication of various insect borne diseases.

51 (*d*) Innate immunity is also known as inborn/familiar/natural or genetic immunity. Innate immunity is the non-specific type of defence that is present in an individual at the time of birth.

56 (*d*) The major phagocytic cells are macrophages. These cells perform phagocytosis, i.e. the process of engulfing a solid particle by a phagocyte.

57 (*d*) Option (d) is correct as

Cellular barrier of the body includes certain types of leucocytes (WBC) of the body like Poly Morpho-Nuclear Leucocytes (PMNL-neutrophils) . Monocytes and natural killer (type of lymphocytes) in the blood as well as macrophages in tissues which can phagocytose and destroy microbes.

58 (*c*) Innate immunity is the non-specific type of defence that is present at the time of birth because it has natural killer cells which can phagocytose and destroy microbes (cellular barriers). Other forms of innate immunity are physical, physiological and cytokine barriers.

59 (*a*) Interferon is a suitable example of cytokine barrier. These are the proteins secreted by virus-infected cells and protect non-infected cells from further viral infection.

61 (*d*) Interferon (a kind of protein) is a polypeptide produced by a T-cell infected with a virus that diffuses to surrounding cells and stimulates them to manufacture biochemicals that hinder viral replication. Thus, interferons can be used to encounter diseases caused by virus, i.e. hepatitis and common cold.

62 (*d*) Interferons block viral reproduction in healthy cells and measles is caused by the measles virus.Thus, a person will develop interferons in his body, for the infection of measles.

63 (*a*) Option (a) represents the cells involved in second line of defence. The second line of non-specific defence is primarily dependent upon neutrophils and macrophages, phagocytic white cells (phagocytes) in blood and lymph. Second line of defence also includes the functioning of interferons and the proteins of the complement system.

64 (*d*) Option (a) and (b) both are correct as

Antibodies are proteins produced in our body in response to antigens (pathogens).

Antibody molecule specifically interacts with an antigen to produce an immune response. These are secreted by the action of both B-lymphocytes and T-lymphocytes.

68 (*c*) IgG is the most abundant class of immunoglobulins in the human body. IgA, IgM, IgE, IgG, etc., are some of the different types of structurally related proteins (immunoglobulins) that act as antibodies.

69 (*a*) Humoral immunity is also called as antibody mediated immunity. It refers to immunity provided by substances in the body fluid. Since, antibodies are found in the blood, therefore antibody mediated immunity is also referred to as humoral immunity.

70 (*a*) Humoral immunity consists of antibodies in the blood and lymph. B-lymphocytes secrete antibodies. Thus, humoral immunity is mediated by B-cells or B-lymphocytes.

72 (*a*) The cell-mediated immunity is one of the type of acquired immunity of human body which is carried out by the T-lymphocytes.

74 (*c*) Cell-mediated immune response is responsible for the rejection of kidney graft. It is conferred by sensitised T-lymphocytes and here, antibodies are not produced.

T-cells confer a long term memory and are able to discriminate between self and non-self. These cells sometimes consider graft as non-self and attack it, which causes its rejection.

75 (*d*) Active immunity is an immunity, which is gained after natural infection and on exposure to live pathogens. In this type of immunity, the body produces antibodies as a response to specific pathogens or antigens.

76 (*b*) Active immunity development is related to memory cells formed when B-cells and T-cells are activated by a

pathogen. These cells recognise the pathogen quickly on subsequent exposure and overwhelm the invaders with a massive production of antibodies.

77 (*d*) Passive immunity results when antibodies are directly given to an individual to protect the body against foreign agents. The acquisition of the antibodies in colostrum by an infant and the crossing of the placenta by maternal antibodies are examples of naturally acquird passive immunity.

78 (*c*) Colostrum, the yellowish fluid, secreted by mother during the initial days of lactation is very essential to impart immunity to the newborn infants because it contains immunoglobulin-A. As IgA is secreted in mother's milk, it is also called secretory immunoglobulin.

79 (*a*) IgA antibody is involved in passive immunity. In this type of immunity, antibodies are directly given to protect the body against foreign agents. It is short lived.

80 (*b*) Option (b) represents the correct information regarding antibodies. IgG antibody can cross placenta and provide natural passive immunity to the developing foetus. Other options are incorrect and can be corrected as follows

- IgA is a dimer found in body secretions such as sweat, tears, saliva, mucus, colostrum , etc. It provides localised protections from pathogens.
- IgE is involved in hypersensitive reactions and presents in mast cells and basophill cells.
- IgM is found in pentamer form not as dimer.

81 (*a*) The principle of vaccination or immunisation is based on the property of memory of the immune system. The memory cells recognise the pathogen quickly and control the invaders by producing a large number of antibodies.

82 (*c*) The pathogens used in vaccines are weakened and inactivated pathogenic agents. This stimulates the body to produce enough antibodies to protect against the disease.

83 (*b*) Passive immunity refers to when antibodies are directly injected into the body to generate immune response. Thus, if a person is infected with some deadly microbes to which quick immune response is required as in tetanus, we directly inject the preformed antibodies or antitoxin into the body of the infected person. This is passive immunisation.

84 (*c*) Oral polio vaccine consists of attenuated pathogens. Attenuated pathogens are living microorganisms or viruses cultured under adverse condition which leads to the loss of their virulance.

But these organisms have the ability to induce lifelong immunity. The oral vaccine of polio contains three live polio strains in attenuated forms.

85 (*a*) Human hepatitis-B virus vaccine was prepared by using antigen produced by recombinant strain of the yeast, *Saccharomyces cerevisiae*.

86 (*a*) An allergen is any substance (antigen), most often eaten or inhaled, that is recognised by the immune system and causes an allergic reaction.

87 (*c*) IgE is an antibody which mediates allergic reactions. It plays a pivotal role in response to allergens such as anaphylactic drugs, bee stings, etc. They are synthesised by plasma cells and are found in only mammals.

88 (*d*) Allergens such as pollen grains, animal dander, dust, feathers, drugs like penicillin, etc., are non-infectious foreign substances, which induce allergic reaction in the body.

90 (*a*) For determining the cause of allergy, the patient is exposed to or injected with very small doses of possible allergens and the reactions displayed or observed.

92 (*a*) Asthma may be attributed to allergic reaction of the mast cells in the lungs. It is an allergic reaction characterised by spasm of bronchi muscles because of the effect of histamine released by mast cells in the lungs.

93 (*b*) In autoimmune disorder, the immune cells are unable to distinguish between self-cells and non-self cells and attack the self-cells. This occurs due to some genetic abnormality, e.g. rheumatoid arthritis.

94 (*a*) Myasthenia gravis is a chronic autoimmune neuromuscular disorder that causes fatigue, weakening and paralysis of skeletal muscles. In this, neuromuscular junctions are affected as the body produces antibodies which block the muscle from receiving signal from the nerve cells.

95 (*a*) Alzheimer's disease is not an automimmune disease. It is caused due to the destruction of a large number of neurons in the hippocampus. It occurs due to a combination of genetic factors, environmental or lifestyle factors and the ageing process.

In this, there is loss of neurotransmitter acetylcholine. Individuals with this disease have trouble remembering recent events.

Rest all are autoimmune diseases.

97 (*b*) The primary lymphoid organs are bone marrow and thymus.

The secondary lymphoid organs are spleen, lymph nodes, tonsils, Peyer's patches of small intestine and appendix.

98 (*d*) Thymus provides the micro-environment for the development and maturation of T-lymphocytes. Thus, surgical removal of thymus of a newborn shall result in failure to produce T- lymphocytes.

99 (*a*) The thymus is a lobed gland located near the heart and beneath the breast bone, consisting mainly of lymphatic tissues and serving as the site of T-cell differentiation.

103 (*a*) MALT is Mucosal Associated Lymphoid Tissue located within the lining of the major tracts like respiratory, digestive and urinogenital tracts. It constitutes nearly 50% of the total lymphoid tissue in the human body.

105 (*a*) Human Immunodeficiency Virus (HIV) is a retrovirus (slowly replicating) that causes Acquired Immuno Deficiency Syndrome (AIDS).

111 (*c*) Macrophages are known as 'HIV' factory in a person infected by AIDS. This can be explained as after entering the body of a healthy person, the HIV enters into macrophages where RNA genome of the virus replicates to form viral DNA with the help of the enzyme reverse transcriptase.

112 (*c*) When HIV damages a large number of helper T-lymphocytes, the infected person starts showing symptoms of AIDS like bouts of fever, diarrhoea and weight loss.

116 (*b*) In our body, cell growth and differentiation is highly controlled and regulated. But abnormal mitosis in an organ results in cancer.

119 (*c*) The properties possessed by malignant tumour are uncontrolled cell division and metastasis, i.e. they do not remain confined in the area of formation and reach distant sites through blood, and wherever they get lodged in the body, these start the formation of a new tumour there.

120 (*d*) Option (d) is not a property of cancerous cells. Contact inhibition involves major histocompatibility complex and is the natural process of arresting cell growth when two or more cells come in contact with each other. It is a property of normal cells. Cancer cells divide in uncontrolled manner and do not show contact inhibition.

Remaining three are the properties of cancerous cells.

121 (*a*) Transformation of normal cell into cancerous neoplastic cells is induced by carcinogens. These carcinogens can be physical, chemical or biological agents.

122 (*a*) Physical carcinogens include a wide range of agents, e.g. ionising radiations like X-rays and γ-rays and non-ionising radiations like UV rays. These cause DNA damage leading to neoplastic transformation.

124 (*a*) Tumour virus or cancer causing viruses are called oncogenic viruses. These viruses have oncogenes. An oncogene is a gene that has the potential to cause cancer. In tumour cells, these are often mutated or expressed at high levels.

127 (*d*) Cancer cells show metastasis. Cancerous cells are actively dividing cells which starve the normal cells by competing for vital nutrients. These cancerous cells reach distant sites through blood and get lodged in the body and start a new tumours (masses of cells). This property of cancer cells is called metastasis.

129 (*b*) Cancer is caused by loss of control over cell's reproductive capacity. They undergo rapid division and therefore, they are more easily damaged by radiations than normal cells.

131 (*c*) Tumour cells have been shown to avoid detection and destruction by immune system. Therefore, the patients are given substances called biological response modifiers such as α-interferon, which activates their immune system and helps in destroying the tumours.

134 (*a*) The drug 'heroin' is synthesised by the acetylation of morphine. Chemically heroin is diacetylmorphine and commonly it is called smack. It is an opium derivative which is used as a medicine. However, its excessive use causes addiction.

135 (*b*) The latex of poppy plant (*Papaver somniferum*) is used to obtain 'smack'. It is a white, crystalline, odourless, bitter compound, which acts as a depressant and slows down the body functions.

138 (*a*) Natural cannabinoids are obtained from the leaves, resin and inflorescence of *Cannabis sativa*.

140 (*b*) Cannabinoids such as ganja, charas, merijuana and hashish are effect cardiovascular system of the body.

141 (*a*) Option (a) is correct.

Fig A represents morphine a potent opiate analgesic drug that is used as sedative and to relieve severe pain. It is given to patients who have undergone surgery. It is taken by snorting and injection.

The other options can be corrected as

Fig B represents cannabinoids are known for its effect on cardiovascular system of the body. These are taken by inhalation and oral ingestion.

142 (*c*) Coca alkaloid or cocaine is obtained from the coca plant *Erythroxylum coca*, native to South America. It is a natural stimulant and interferes with the transport of the neurotransmitter dopamine.

143 (*c*) Cocaine, is commonly called coke or crack. It is usually snorted. Excessive dosage of cocaine causes hallucinations.

144 (*d*) Traditionally, *Erythroxylum* (cocaine) was used to obtain anesthesia. It has an anesthetic and analgesic property which can alleviate the pain of headache, rheumatism, wounds and sores, etc. It was also used for broken bones, childbirth and during performing trepanning operations on the skull.

145 (*b*) Cocaine is a potent stimulant drug as it directly affects the central nervous system by producing a sense of euphoria and increased energy.

148 (*a*) The plant shown in the given picture is *Datura*, which produces natural hallucinogens. These drugs induce behavioural abnormalities by changing thoughts, feelings and perceptions without any actual sensory stimulus.

149 (*d*) Drugs like barbiturates, amphetamines, benzodiazepines, Lysergic Acid Diethylamide (LSD) and other similar drugs, are normally used as medicines to help patients cope with mental illnesses like depression and insomnia.

150 (*a*) Lysergic Acid Diethylamide (LSD) is an extremely potent psychedelic ergot alkaloid derived from the fungus, *Claviceps purpurea*. LSD is one of the most powerful hallucinogenic drugs known. It was invented in 1938 by the Swiss chemist, Albert Hoffman, who was interested in developing medicines from compounds in ergot, a fungus that attacks rye.

151 (*a*) Option (a) shows the correctly matched pair of drug with its category.
Others matching pairs are incorrect and can be corrected as
- Lysergic acid diethylamide–Psychedelic drug.
- Heroin–Analgesic
- Benzodiazepines–Psychotropic drug.

152 (*b*) *Amanita muscaria,* is a fungus which is known for containing hallucinogenic (profound misinterpretation in a person's perceptions of realty) properties.

153 (*d*) Nicotine is both an alkaloid and a steroid and it is extracted from the leaves of tobacco plant. An alkaloid is a nitrogenous organic compound of plant origin which has physiological actions on humans and steroids are synthetic drugs that closely resemble, cortisol, a hormone of adrenal gland.

155 (*c*) Smoking addiction is harmful because smoke produces polycyclic aromatic hydrocarbons, currently classified as human carcinogens as these cause cancer.

156 (*c*) Emphysema is a type of Chronic Obstructive Pulmonary Disease (COPD) involving damage to the air sacs (alveoli) in the lungs.

157 (*a*) Benzopyrene is the carcinogen present in cigarette smoke. It is a polycyclic aromatic hydrocarbon formed as a result of incomplete combustion of organic matter such as coal, tar, tobacco, etc. It is a potential carcinogenic compound listed as Group 1 carcinogen by the IARC or International Agency for Research on Cancer. It reacts and binds to DNA, resulting in mutation and eventually leads to cancer.

158 (*c*) Those who take drugs intravenously (direct injection into the vein using a needle and syringe), are much more likely to acquire serious infections like AIDS and hepatitis-B.

This is because the viruses, which are responsible for these diseases, are transferred from one person to another by sharing of infected needles and syringes.

159 (*b*) Cirrhosis of liver is caused by chronic intake of alcohol, which may be fatal for an individual. On intake, a part of alcohol is changed to acetaldehyde which causes hangover. Acetaldehyde stimulates formation of fat which is deposited on artery walls (causing coronary ailments) and in the liver (causing fatty liver syndrome). Gradually, the liver hardens and dries up as its cells are replaced by fibrous tissue. This kind of liver degeneration is called liver cirrhosis (Laennec's cirrhosis). Excessive use of alcohol may also lead to liver failure, liver cell carcinoma, etc.

161 (*c*) Cerebrum is involved in the loss of control over speech when a person consumes excessive alcohol. It attacks Broca's area which is related to speech production. When a person consumes alcohol, it interferes with the brain's communication pathways and thus, affects the brain's information processing system and speech.

162 (*d*) Option (d) is correct. The side effects of the use of anabolic steroids in females include masculinisation (features like males), increased aggressiveness, mood swings, depression, abnormal menstrual cycles, excessive hair growth on the face and body, enlargement of clitoris, deepening of voice.
In males, the side effects include acne, increased aggressiveness, mood swings, depression and reduction of size of the testicles, decreased sperm production, potential for kidney and liver dysfunction, breast enlargement, premature baldness, enlargement of the prostate gland. These effects may be permanent with prolonged use.

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

Shigella sp., *Salmonella* sp. and *Escherichia coli* are quite closely related genera of pathogenic bacteria that are responsible for diarrhoeal diseases. Dehydration is common symptom to all types of diarrhoeal diseases and adequate supply of fluids and electrolytes that provide ions, should be ensured.

164 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Virus infected cells secrete proteins called interferons, which protect non-infected cells from further viral infection.

165 (*d*) Assertion is false, but Reason is true. Assertion can be corrected as

Interferon is a glycoprotein, production of which is induced within viral infected cells. Interferon induces an antiviral state within adjacent cells by interfering with viral replication.

166 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Antibody mediated immune response occurs due to antibodies produced in the blood. These antibodies are chiefly secreted by B-cells into the body fluids. When an antigen (pathogen) enters the body the B-cells produce antibodies (immunoglobulins) in response to it.

167 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Tetanus is bacterial disease which is caused by an exotoxin produced by *Clostridium tetani*. The wound anoxic conditions allows the germination of endospores and growth of the microorganism. So, a person with a bleeding wound needs anti-tetanus treatment. Anti-tetanus injection or antitoxin is a preparation of modified bacterical toxin that has been made non-toxic, but retains the capacity to stimulate the formation of antitoxins. It is usaually made in horses.

168 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

The exaggerated response of the immune system to certain antigens present in the environment is called allergy. The substances to which such an immune response is produced are called allergens (antigens). Allergens in the environment on reaching human body stimulate mast cells, which release excessive amount of chemicals like histamine. These chemicals

cause marked dilation of all the peripheral blood vessels and the capillaries become highly permeable, so that large amounts of fluid leak out from the blood into the tissues thereby causing allergy.

169 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Gymnosperms like *Pinus* usually grow on the slopes of hills and form dense forests of evergreen trees. The pollination of these plants takes place through wind and during peak hours, the microspore of *Pinus* are liberated as clouds of yellow dust (sulphur shower). On inhalation, these microspores (pollens) cause various allergies like dermatitis, asthma, allergic rhinitis, hay fever, etc., in human beings.

170 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

HIV or Human Immunodeficiency Virus is the causative agent of AIDS. AIDS arises due to the deficiency of the immune system acquired during the life time of a host. HIV causes AIDS by damaging the immune system of the human body.

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

Cancer is caused by damage to genes regulation of the cell division cycle. It is an uncontrolled proliferation of the cells. These cancerous cells become immortal because of the breakdown of the cell growth and differentiation regulatory mechanisms and the loss of a property called contact inhibition.

172 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

Metastasis is the phenomenon in which tumour cells detach and migrate to other parts of the body where they give rise to secondary tumours (i.e. masses of cells produced at different locations in the body). Metastasis is the property of cancerous cells, which have abnormal antigens on their surface and unusual number of chromosome in their nucleus thereby causing metastasis.

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

Cannabinoids are chemicals known for their effects on cardiovascular system of the body, as these increase the heart rate, blood pressure, etc. Cannabinoids interact with cannabinoid receptors present in the brain and cause hallucinogenic effects.

174 (*a*) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

High alcohol consumption is harmful during pregnancy. This is because Foetal Alcohol Syndrome (FAS) is the name given to a group of physical and mental defects caused by foetal exposure to alcohol in the womb.

175 (*d*) Assertion is false, but Reason is true. Assertion can be corrected as

Dope test is the blood test used to estimate whether a person taking part in a competition used any drug to make their performance better. Dope test is not related with alcohol. Thus, athletes undergo dope test major tournaments or a match.

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

Repeated use of drugs, increase the tolerance level of receptors in our body because consumption or use of drugs for a longer period of time increases the number of receptors at neural junction which inturn, increases the tolerance level. Consequently, receptors respond only to higher doses of drugs thereby causing addiction.

177 (*c*) Assertion is true, but Reason is false. Reason can be corrected as

Pork does not contain hexacanth larva as it gets converted into cysticercus form in the voluntary muscles of the pig.

Humans get *Taenia* infection through direct or oral means. It occurs by eating raw or undercooked measly pork (pig muscle with cysticercus larvae of *Taenia*). Infection in vegetarians occurs through improperly washed vegetables. So, proper cooking of pork and properly washed vegetables can help to avoid *Taenia* infection.

179 (*a*) The statement in option (a) is correct with respect to immunity.

Rest of the statements are incorrect and can be corrected as

- The antibodies against smallpox pathogen are produced by memory cell is B-lymphocytes.
- Antibody is a protein molecule having two light chains and two heavy chains.
- Rejection of kidney graft is the function of T-lymphocytes.

180 (*b*) The statement in option (b) is correct. Rest of the statements are incorrect and can be corrected as

- HIV is an enveloped retrovirus.
- HIV escapes the immune cells and attacks helper T-cells of immune system.

182 (*c*) Statements I, III and V are correct. Statements II and IV are incorrect and can be corrected as

- Acquired immunity is not present from the birth and develops during an individual's lifetime. It is pathogen specific. Thus, it is called specific immunity.
- Innate immunity is non-specific immunity.

183 (*a*) Statements I, II and III are correct, but statement IV is incorrect and can be corrected as

- Dengue and chikungunya both are spread by *Aedes* mosquitoes.

193 (*c*) Statements I, III and IV are correct, but statement II is incorrect. It can be corrected as

Allergic tendency can be genetically passed from the parents to their offspring and is characterised by the presence of large quantities of IgE antibodies in the blood.

204 (*a*) Ringworm disease causes symptoms like dry, scaly and lesions on skin, nails and scalp. These lesions also are also accompanied by intense itching.

206 (*c*) Option (c) is incorrect and can be corrected as Animal reservoir of the smallpox does not exist.

Rest all options contain facts which led to smallpox eradication.

208 (*b*) Transplantation of tissue/organs may fail, when that tissue is rejected by the recipient's immune system leading to its destruction. Tissue rejection is a function of cell-mediated immune response that involves T-cells.These cells have the ability to distinguish between self and non-self cells. After the recognition of non-self tissue the killer T-cells induces apoptosis of the target tissue.

209 (*c*) Health can be defined as a state of complete physical, mental and social well-being. So, when an apparently healthy person is diagnosed as unhealthy by a psychiatrist, the reason could be that the patient shows behavioural and social maladjustment due to the mental discomfort.

210 (*a*) A wide range of organisms including bacteria, viruses, fungi, protozoans, helminths, etc., cause diseases in plants and animals. Such disease causing organisms are called pathogens. On the other hand, vectors are the carriers of pathogens which may be insects or worms.

211 (*d*) Influenza (commonly known as the 'flu') and smallpox are infectious diseases.These diseases can get transmitted from an unhealthy person to a healthy person by physical means diseases.

Whereas, cancer and allergy are non-infectious and non-transferable disease.

213 (*a*) Option (a) represents the group of symptoms which are indicative of pneumonia. Rest of the symptoms and their respective diseases are given below

- Constipation, abdominal pain, cramps and blood clots indicate amoebiasis.
- Nasal congestion and discharge, cough, sore throat and headache indicate common cold influenza.
- High fever, weakness, stomach pain, loss of appetite and constipation indicate typhoid.

215 (*c*) Sporozoites enter the female *Anopheles* mosquito when they bite an infected person where these sporozoites fertilise and multiply in the stomach wall of the female *Anopheles*. These then get stored in the salivary glands of the mosquito till it is again transferred to the human body by a mosquito bite.

216 (*c*) People suffering from sickle-cell anaemia are less prone to malarial parasite as RBC of sickle-cell anaemic patients is distorted in shape. The membrane of the sickle-cells are stretched due to their distorted shape and thus, become porous. The cells leak all the nutrients needed by the parasite to survive and the faulty cells along with the parasite eventually get eliminated.

217 (*c*) Haemozoin is a toxin released by *Plasmodium* infected cells. This substance is responsible for producing chills and high fever recurring every three to four days.

218 (*d*) Ringworm infections are caused by fungi belonging to the genera–*Microsporum*, *Trichophyton* and *Epidermophyton*.

Macrosporum is not a causal organism for ringworm.

219 (*c*) The cytokine-barriers include interferons. These are the proteins secreted by virus infected cells, which protect non-infected cells from further viral infection.

220 (*b*) The yellowish fluid colostrum secreted by mother during the initial days of lactation, has abundant antibodies (IgA) to protect the infant from several diseases during the initial six months.

221 (*c*) Antivenom against snake poison contains antibodies. It is a biological product that typically consists of venom neutralising antibodies derived from a host animal, such as a horse or sheep. It is not considered as antigen or antigen-antibody complex or enzyme.

222 (*b*) Statements II and IV show the correct reasons for rheumatoid arthritis. It is an autoimmune disorder. Autoimmunity is an abnormal immune response in which the immune system of the body starts rejecting its own body cells or 'self' cells and molecules.

This happens as the body loses its ability to differentiate the pathogen or foreign molecules from self cell and attacks self-cells damaging them.

223 (*d*) Thymus is not a secondary lymphoid tissue rather it is a primary lymphoid organ in which origin and/or maturation and proliferation of lymphocytes occur.

The secondary lymphoid organs such as spleen, tonsils, appendix, lymph nodes provide sites for interaction of lymphocytes with the antigen, which then proliferate to becomes effector cells.

224 (*c*) The thymus is a lobed organ located near the heart and beneath the breastbone. The thymus is quite large at the time of birth but keeps on reducing in size with age and by the time puberty is attained it reduces to a very small size.

225 (*c*) Shaking hands with infected people is not a mode of transmission of HIV. Rest of the other options all indicate different modes of HIV transmission.

226 (*c*) The genes which cause cancer are called oncogenes. Normal cells have genes called cellular oncogenes or proto-oncogenes, which are present in inactivated state, but under certain conditions (like mutation) these get transformed to cancer causing oncogenes.

228 (*a*) 'Smack' is obtained by acetylation of morphine, extracted from the latex of poppy plant (*Papaver somniferum*). Smack (also called heroin) is chemically diacetyl morphine and is a white, odourless, bitter, crystalline compound.

229 (*a*) Tobacco has nicotine, which stimulates the adrenal gland to release adrenaline and nor-adrenaline which in turn increases the blood pressure and heart rate. For rest of the other options.

Tannic acid is a type of polyphenol used as a modrant.

- Curcumin is a pain reliever.
- Catechin derived from catechu is an antioxidant.