

Chapter 8.2

Common Human Diseases

Diseases are classified into three main types :
Communicable diseases, non-communicable and genetic disorders.

Communicable Diseases

Meaning : The diseases which are caused by pathogens (viruses and living organisms) and readily spread from the infected to the healthy persons are called **communicable or infectious diseases**.

A German physician, Robert Koch, listed the following four conditions to establish that a specific pathogen causes a particular disease –

(1) The suspected pathogen should be invariably present in the animals suffering from the disease and should not be found in healthy individuals.

(2) The pathogens isolated from the diseased animal should be grown in a pure culture.

(3) When this culture is inoculated into a healthy host, the latter should develop the disease and show its characteristic symptoms.

(4) The pathogen should be recoverable from the experimental host, and it should be the same as the original one.

Koch's postulates proposed for animal diseases, hold good for human diseases also. However, his conditions do not apply to viruses because they cannot be cultured on artificial media.

Classification of communicable Diseases : The communicable diseases are classified into seven types according to the nature of their causative agent.

(1) **Viral Diseases** : These are caused by viruses. They include chickenpox, smallpox, influenza, common cold, measles, mumps, polio, rabies, yellow fever, and sinus infections. The viruses are named after the disease they cause.

(2) **Rickettsial Diseases** : These are caused by rickettsias, the obligate intracellular parasitic organisms. They include Rocky Mountain spotted fever, typh's fever, trench fever and Q fever.

(3) **Bacterial Diseases** : These are caused by bacteria. They include diphtheria, scarlet fever, tetanus, typhoid fever, tuberculosis, anthrax, cholera, food poisoning, and meningitis.

(4) **Spirochaetal Diseases** : These are caused by spirochaetes, the long, spiral, corkscrew-shaped bacteria. They cause syphilis.

(5) **Protozoan Diseases** : These are caused by protists. They include amoebic dysentery, malaria, kala-azar, oriental sore and sleeping sickness.

(6) **Fungal Diseases** : These are caused by fungi, the non-green heterotrophic organisms. They include ringworm and athlete's foot.

(7) **Helminthes Diseases** : These are caused by helminthes, i.e., flatworms and roundworms. They include liverrot, schistosomiasis, taeniasis and cysticercosis produced by flatworms; and ascariasis, enterobiasis, filariasis (elephantiasis), trichinosis, Guinea worm disease and hookworm disease caused by roundworms.

Important diseases caused by Viruses :

(1) **Influenza** : Influenza, commonly called flu, is a highly infectious disease, which has still not been conquered. It is caused by many kinds of viruses, such as myxovirus. The latter affect the mucus membrane of nose, throat and upper respiratory tract. The common symptoms are discharge from the nose, sneezing, fever, body aches, coughing and general weakness. Influenza generally lasts for 4 or 5 days. Rest quickens the recovery.

Influenza tends to occur in epidemic or pandemic form with varying virulence.

(2) **Chickenpox** : It is a common, relatively mild, highly contagious disease of children, generally under 10 years of age. It is caused by a virus called **chickenpox virus** (varicella zoster). Fever, aches and general discomfort are the symptoms. Dewdrop-like sores appear in successive crops, first on the trunk. The sores open and a fluid seeps out a short time later. The disease spreads by direct contact with skin sores or with clothes and other articles soiled with discharges from sores. Incubation period is 2-5 weeks. The sores heal without leaving scars. Preventive measure is isolation of the patient till all crusts fall off. One attack of chickenpox ordinarily gives permanent immunity to the disease. Chickenpox is rarely fatal, but in adults attack could be severe.

(3) **Smallpox** : Smallpox is an acute, highly communicable disease. It is caused by a virus named **variola virus**. It starts as a sudden onset of high fever accompanied by headache, backache, and pains all over the body. Rash appears on the 3rd or 4th day of illness. The rash gradually changes into pustules (pimples) containing clear fluid. The pustules finally form scabs which fall off by the 3rd week.

Its incubation period is about 12 days. It is very serious, disfiguring and highly fatal disease. It has now been largely controlled through vaccination. Smallpox vaccine was first prepared by Edward Jenner in 1798.

(4) **Measles** : Measles is one of the most prevalent and serious diseases of children, generally 3-5 years old. It is caused by a virus named **rubeola virus**. It is characterized by fever, inflammation of nasal mucus membrane, red watery eyes sensitive to light, flushed face, loss of appetite, followed by a typical rash, i.e., eruption of small red spots (rubeola). Infection spreads by discharges from nose and throat (droplet infection). The incubation period is about 10 days. One attack of measles gives life-long immunity. Vaccine which produces active immunity is available.

Patients of measles are likely to catch secondary infection of pneumonia.

(5) **Rabies (Hydrophobia)** : Rabies is a 100% fatal disease. It is caused by a **rabies virus**. The virus enters the human body with saliva of an infected (rabid) animal, generally by the bite of a dog but also of cat. Virus induces biting behaviour in its victim. Fear of water is the main symptom, hence hydrophobia. Incubation period is commonly 1-3 months, but may vary from 10 days to one year. This long period of incubation makes it possible for a rabies vaccination after a bite to develop immunity and prevent the appearance of the disease. The pet should be watched for 10 days after it has bitten someone to make sure that it does not have rabies. Symptoms of rabies in dogs are madness, changed voice and excessive salivation. Rabid dogs should be immediately killed. Treatment of rabies was discovered by Louis Pasteur. It involves a series of 14 injections given after the bite of a dog.

(6) **Mumps (Infectious Perotitis)** : Mumps is an acute communicable disease, generally of children. It is caused by a paramyxo virus, which has preference for salivary glands but may attack other glands of the body also. It is characterized by painful enlargement of one or both the parotid glands. The latter lie below

the pinnae. The patient has high fever and difficulty in opening mouth. The virus spreads by discharges from the throat of an infected person (droplet infection) and by direct contact. The incubation period varies from 12-26 days. In adults testes and ovaries may also become inflamed. Infection of testes may cause sterility. One attack of mumps gives life-long immunity.

(7) **Poliomyelitis or Polio (Infantile Paralysis)** : Polio is most prevalent in hot, dry weather. Its common name is inappropriate as it is not necessarily a disease of infants nor does it always cause paralysis. It is caused by a virus known as polio virus. This virus causes inflammation of nervous system and stiffness of the neck. It also destroys motor nerve cells in the spinal cord. Muscles fail to work and shrink due to lack of nerve impulses. This may cause paralysis of limbs in some cases. The virus enters the digestive tract with contaminated food and water and multiplies in the intestinal cells. It then passes into blood stream and lymphatic system, and finally reaches the spinal cord where it starts multiplication. Incubation period is 7-14 days. A patient who recovers from polio has a life time immunity. Now oral vaccine of polio is available.

The polio virus may attack the respiratory centres in the brain. This may stop nerve impulses to the diaphragm and breathing may stop. Then artificial breathing with 'iron lung' becomes necessary.

Oral vaccines are developed by Jonas Salk and Albert Sabin in 1940. Public pulse polio immunization programme is organized in India for eradicating polio in 1996.

(8) **Trachoma** : Trachoma is a chronic inflammatory disease of the eyes all over the world. It is caused by a pathogen formerly considered a virus, now regarded an agent occupying a position intermediate between rickettsiae and viruses and named *Chlamydia trachomatis*. The latter affects eyelids, conjunctiva and cornea. It causes granules and may lead to blindness. The common symptoms are inflammation, discomfort and discharge from the eyes. Infection spreads by direct contact, by use of towels, pillows and handkerchiefs of the patients and by flies. The incubation period is 5-12 days. Trachoma can be controlled with antibiotics in early stages. Severe infection needs operation-involving scrapping of granules. Trachoma accounts for 5 percent of the blind cases in India.

(9) **Dengue Fever (Breakbone fever)** : Dengue fever is a tropical viral disease spread by the tiger mosquito *Aedes aegypti*. Dengue fever/Dengue Haemorrhagic Fever (DF/DHF), one of the dangerous diseases, can be detected by **tourniquet test**. The symptoms of this disease include high fever, severe frontal headache, pain behind eyes, muscles and joint pain, loss of appetite, Measles-like rashes over chest and upper limbs, nausea and vomiting. Dengue can be prevented through elimination of mosquito breeding places.

(10) **Yellow fever** : Yellow fever, caused by an **arbovirus** is a **haemorrhagic** disease transmitted by the infected *Aedes aegypti*.

Symptoms of yellow fever are headache, fever, vomiting, rupture of veins in kidneys, spleen, liver etc.

In severe cases, the skin of sufferer becomes yellow from jaundice— hence the name yellow fever.

Max Theiler in 1951 got Nobel Prize for the development of vaccine for yellow fever.

Table : 8.2-1 Viral Diseases in Humans

S.No.	Disease	Pathogen	Habitat	Main Symptoms	Mode of Infection	I.P.
1.	Influenza	Myxo viruses	Mucus membrane of respiratory tract	Nasal discharge, sneezing, coughing	By droplets from nose & throat	24 to 72 hours
2.	Smallpox	Variola virus		Skin rash changing to pustules, then to scabs	By contact, droplets and fomite	12 days
3.	Chicken pox	Varicella zoster		Skin sores that open & emit fluid	By contact and fomite	2 to 5 weeks
4.	Measles	Rubeola virus		Red watery eyes, skin rash	By droplets from nose & throat	10 days
5.	Rabies (Hydrophobia)	Rabies virus	Brain & spinal cord cells	Biting behaviour, fear of water, inability to swallow	Bite by rabid dog	1 to 3 months
6.	Mumps (Infectious parotitis)	Paramyxo virus	Salivary glands	Painful enlargement of parotid glands, difficulty in opening mouth	By contact and droplets from throat	12 to 26 days
7.	Poliomyelitis (polio)	Polio virus	Nerve cells	Inflammation of nervous system, muscle shrinkage, limb paralysis	By contaminated food & water	7 to 14 days
8.	Trachoma	Chlamydia trachomatis	Eyelids, conjunctiva & cornea of eye	Granules on inner surface of eyelids, watery eyes	By contact and fomite	5 to 12 days
9.	Acquired immune deficiency syndrome (AIDS)	Human immunodeficiency virus		Infections, cancer, brain damage, WBC destruction	By contact with blood	28 months average,
10.	Hepatitis viral (Epidemic jaundice)	Infectious & serum hepatitis viruses	Liver	Jaundice due to damaged liver cells	By contaminated food and water	20-35 days

(11) **Hepatitis** : It is a liver inflammation caused by virus, use of many drugs, chemicals and alcohol. Hepatitis may be of following types :

(i) **Hepatitis A** : It is caused by *Hepatitis A* virus. It is transmitted through infected food, water, clothes and faeces. It may occur in epidemic form especially in areas where hygiene is poor. This virus does not damage liver cells.

(ii) **Hepatitis B** : It is caused by *Hepatitis B* virus. It is transmitted by infected food and blood products; such as plasma or by medical instruments contaminated with infected blood. It results in the swelling of liver cells.

Hepatitis is also caused by poisonous chemicals, alcohol, as a side effect of certain drugs and from severe amoebiasis.

Important Diseases caused by Bacteria

(1) **Cholera** : Cholera is an acute diarrhoeal disease. It is caused by a comma-shaped, motile bacterium called *Vibrio comma* or *Vibrio cholerae*. The organisms live in the intestine. Infection occurs with contaminated food and water. Incubation period varies from a few hours to 2-3 days. The symptoms of the disease are sudden onset of severe diarrhoea and vomiting. The stools are watery and give rice-water appearance. If the disease is not checked early, it leads to dehydration, loss of minerals,

muscular cramps, suppression of urine and death. Rapid replacement of fluid and electrolytes is needed by **oral rehydration therapy**. Cholera epidemics are common in our country during fairs and floods and other natural calamities when water supply and sanitation go out of gear. Preventive measures include proper community sanitation, personal cleanliness, and taking boiled water and heated food. Cholera vaccine is useful during epidemic and visit to a fair. It, however, provides immunity for a short period, about 6 months. Visits to cholera affected places and families should be avoided. *Vibrio cholerae* was first isolated by Robert Koch in 1883.

(2) **Pneumonia** : Pneumonia is a serious disease of the lungs. Lymph and mucus collect in the alveoli and bronchioles. With the result, the lungs do not get sufficient air to support life. The disease is caused by a bacterium *Diplococcus pneumoniae*. It usually follows lowered body resistance due to exposure or infection of some other disease such as influenza. Infection spreads by sputum of the patient. Incubation period is just 1-3 days. Pneumonia commonly occurs in old people.

(3) **Typhoid** : Typhoid is characterized by constant fever. It is caused by a rod-like, motile bacterium named *Salmonella typhi*. The organisms live in the intestine and cause lesions in the intestinal wall. The disease spreads by contaminated food and

water. Intestinal discharges of the patient contain the parasites. Incubation period varies from 1-3 weeks, average 2 weeks. Preventive measures include proper community sanitation, screening of water supply and food from contamination by flies, and personal cleanliness. Natural calamities like floods and hurricanes may cause epidemic of the disease. Typhoid vaccine provides immunity for about three years. Georges Fernand I. Widal (1896) devised the Widal Test for Diagnosis of Typhoid.

(4) **Tetanus (Lockjaw)** : It is caused by anaerobic bacillus *Clostridium tetani*. The bacillus enters the body through wounds and burns, and also by use of improperly sterilized surgical instruments. Incubation period varies from four days to three weeks. Tetanus results in painful muscular spasms and paralysis, which usually begins with jaw and neck muscles. This has led to the name "lock jaw". The disease is often fatal.

Tetanus organisms live in the intestine of horses and other animals without doing any harm. The spores are, therefore, abundant in the soil manured with animal dung. They are also present in the road and street dust because the animals pass out dung as they move about. Spores may survive for 60 or more years in the contaminated soil. On entering the body by way of wounds, the spores release active bacteria.

It is advisable to have tetanus toxoid injection in case of an injury in a road accident or a cut contaminated with street dust or animal dung. This will prevent tetanus. All of us should have toxoid immunization as a safe preventive measure against this dangerous disease. Tetanus toxoid gives active immunity. Anti tetanus serum (A.T.S.) produces passive immunity. It is now a practice to immunize the infants against diphtheria, whooping cough (pertussis) and tetanus simultaneously by DPT or triple vaccine.

(5) **Diphtheria** : Diphtheria is a serious disease of 2-5 years old children. It may attack adults also. It tends to occur in an epidemic form. It is caused by a rod-shaped bacterium named *Corynebacterium diphtheriae*. It commonly attacks the mucus membrane of nose, throat and tonsils. A semisolid material oozes from the affected region and forms a tough membrane over it. It may block the air passage. An acute case may need throat surgery. The bacteria may invade the heart, causing fatal heart blockage. The disease spreads by discharges from the affected regions (droplet infection). Incubation period is 2-5 days. Diphtheria antitoxin rids the victim of infection fully if given within 24 hours of the appearance of the symptoms. The symptoms include high fever, sore throat, difficulty in breathing due to choking. After 24 hour the antitoxin is not effective. Babies should be immunised with DPT vaccine within the first six weeks of birth. Immunity or susceptibility of diphtheria is determined by performing the schick test.

(6) **Whooping Cough (Pertussis)** : Whooping cough is primarily a disease of children. It is usually not serious in older children, but is often fatal in infants. It affects the respiratory tract. It is caused by a bacterium *Bordetella pertussis*. It spreads by discharges from the throat of infected person (droplet infection) and direct contact. Incubation period is 10-16 days. Fever, severe

coughing, vomiting and characteristic gasping "whoop" (loud, crowing inspiration) are common symptoms. Infants strangle from accumulation of mucus. Whooping cough vaccine (DPT) can immunize the infants.

(7) **Tuberculosis** : Tuberculosis, commonly called T.B., is a very serious disease. About half a million people die of this disease each year in our country. It is especially common among poor people living in dingy, ill-ventilated, congested localities of big cities. It is caused by a rod-shaped bacterium named *Mycobacterium tuberculosis*. Tuberculosis (TB) or "consumption" is a bacterial disease caused by *Mycobacterium tuberculosis*. It commonly affects the lungs, where small tubercles are formed but may attack any part of the body, including the brain. The bacteria damage tissues and release a toxin named **tuberculin** which produces the disease. Symptoms of pulmonary tuberculosis are fever, cough, blood-containing sputum, pain in the chest and loss of weight. Contrary to common belief, tuberculosis is curable. Treatment in early stages of the disease yields best results. It includes rest, good diet, drugs, surgery, health education and rehabilitation. BCG vaccine gives considerable protection against tuberculosis, but it should be used as a supplemental measure rather than to replace other measure of control. World T.B. Day is celebrated on 24 March.

(8) **Plague** : Plague is essentially a disease of the rats, and is one of nature's methods of periodically reducing the rat population. Man is affected incidentally. The disease is caused by a rod-shaped, nonmotile bacillus, *Pasteurella pestis*. It is carried from rat to rat by rat fleas, chiefly, *Xenopsylla cheopis*. The rat fleas leave the rats that die of plague, and bite human beings, thus infecting them with the disease. Death of the rats in a house may indicate the onset of plague. Plague is normally not spread from man to man. The incubation period of plague is 2-6 days. The disease is characterized by high fever, prostration (extreme weakness), and painful bubo (enlargement) of lymph nodes, generally in the groin or armpit. Plague has high mortality. A plague epidemic in Europe in 1348 reduced the population to one-third. Plague reached India in 1895 with ships from Hong Kong. Bubonic plague is caused by *Yersinia pestis* (formerly *pasteurella pestis*) wayson stain test is used for susceptibility of plague. Bubonic plague is basically a blood disease.

Preventive measures include killing the rats, having rat-proof ships and houses, killing the rat fleas when plague outbreak is suspected and immunization with plague vaccine.

(9) **Leprosy (Hansen's Disease)** : Leprosy is a chronic infectious disease, endemic in warmer climates. It is caused by a bacillus named *Mycobacterium leprae*, which was discovered by Hansen. It primarily affects the skin, mucous membrane and peripheral nerves, but may affect internal organs also. Its symptoms include hypopigmented skin patches, partial or total loss of sensation in the affected areas, lesions, ulcers, nodules, scales, deformity of fingers and toes, wasting of body parts, and thickened nerves. Infection occurs by prolonged and close contact with the leprosy patients. Babies isolated from leper parents early in life

grow into normal healthy individuals. The bacilli leave the body in nasal discharge, from the throat during coughing, sneezing and even speaking, and through broken skin lesions. Incubation period is not exactly known. It is common between 2 to 5 years, but may vary from a few months to 30 or 40 years. Some 10.7 million people suffer from leprosy in Asia and Africa (WHO report).

Leprosy has a special position among the communicable diseases because of the long duration of the disease, the frequency of disabilities and the social stigma it carries. It is a curable disease and the public should be educated about it and about the rehabilitation of the cured patients in society. Wayson stain test is used for susceptibility of plague.

Table : 8.2-2 Bacterial Disease in Human

S.No.	Disease	Pathogen	Habitat	Main Symptoms	Mode of Infection	I.P.
1.	Cholera	<i>Vibrio comma (V.cholerae)</i>	Intestine	Severe diarrhoea and vomiting	By contaminated food and water	2 to 3 days
2.	Pneumonia	<i>Diplococcus pneumoniae</i>	Lungs	Difficulty in breathing	By patient's sputum	1 to 3 days
3.	Typhoid	<i>Salmonella typhi</i>	Intestine	Constant fever	By contaminated food and water	1 to 3 weeks
4.	Tetanus (Lockjaw)	<i>Clostridium tetani</i>	Tissues	Painful muscular spasms and paralysis	Through wounds and burns	4 days to 3 weeks
5.	Diphtheria	<i>Corynebacterium diphthiae</i>	Mucus membrane of nose, throat & tonsils	Sore throat, difficulty in breathing	By oral & nasal discharges	2 to 5 days
6.	Whooping cough (pertusis)	<i>Bordetella pertussis</i>	Respiratory tract	Severe coughing characteristic gasping 'whoop'	By throat discharges and contact	10 to 16 days
7.	Tuberculosis	<i>Mycobacterium tuberculosis</i>	Lungs	Cough, bloody sputum, chest pain	By patient's sputum	Variable
8.	Plague	<i>Pasteurella pestis</i>	Blood and lymph	Painful bubo of lymph nodes	By rat-flea bite	2 to 6 days
9.	Leprosy	<i>Mycobacterium leprae</i>	Skin mucus membranes, peripheral nerves	Hypopigmented skin patches, ulcers, deformity of digits	Long and close contact with patients	2 to 5 years
10.	Syphilis	<i>Treponema pallidum</i>	Oral, genital, rectal mucosa	Lesions	By contact	3 weeks
11.	Gonorrhoea	<i>Neisseria gonorrhoeae</i>	Urinogenital mucosa	Burning sensation in micturition	By sexual contact	2 to 5 days
12.	Diarrhoeal diseases	<i>Shigella dysenteriae</i> , <i>Salmonella</i> , <i>Escherichia coli</i> , <i>Campylobacter</i>	Intestine	Diarrhoea	By contaminated food, water, hands, fomite	

(10) **Sexually Transmitted Diseases (STD)** : The sexually transmitted diseases, also called **venereal diseases** (VD), spread by sexual intercourse with infected persons. The major venereal diseases are syphilis and gonorrhoea. These are international diseases. There are about 50 million cases of syphilis and 150 million cases of gonorrhoea in the world. However, the reported cases are merely a fraction of the actual prevalence of these diseases. The venereal diseases constitute a major medical problem in India.

(i) **Syphilis** : Syphilis is caused by spirochaete bacterium, *Treponema pallidum*. It affects the mucus membranes in genital, rectal and oral regions, and causes lesions. Infection occurs by contact. Incubation period is about 3 weeks. The mothers may transmit the disease to their new-born babies. Syphilis is an easily curable disease. Syphilis is commonly known as "French

disease" or "French pox". The patients of syphilis develop characteristic "points" on teeth called 'Hutchison's teeth'. Serological tests for early diagnosis of syphilis are TPI (Treponema Pallidum Immobilization test) VDRL (Venereal Disease Research Laboratory test), FAT-ABS (Fluorescent Treponemal Antibody test) and Wassermann test.

(ii) **Gonorrhoea** : Gonorrhoea is caused by a diplococcus bacterium, *Neisseria gonorrhoeae*. The victim feels burning sensation during urination. Incubation period is 2 to 5 days. The disease affects the mucus membrane of the urinogenital tract, and spreads by sexual contact. The infection may spread to other parts of the body and cause arthritis and female sterility. The children born to afflicted mothers often suffer from eye infection (gonococcal ophthalmia). Gonorrhoea is also easily curable.

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Table : 8.2-3 Sexually Transmitted Diseases (STD) in Human

S.No.	Disease	Causative organism	Nature of Disease	Symptoms – Treatment
1.	AIDS (Acquired Immuno deficiency Syndrome)	Retrovirus – HIV	Viral	Enlarged lymph nodes, long fever, weight loss – Nil
2.	Genital Herpes	Herpes simplex virus	Viral	Painful ulcer on genitals – Nil
3.	Genital warts	Human papilloma virus (HPVs)	Viral	Tumor of the vulva, vagina, anus and penis – Nil
4.	Gonorrhoea	<i>Neisseria gonoerrheae</i>	Bacterial	Infection of all genital organs or PID – Penicillin
5.	Chlamydiais	<i>Chlamydia trachomatis</i>	Bacterial	White patches on vagina or PID – Nystatin
6.	Syphilis	<i>Treponema pallidum</i>	Bacterial	Cancer and skin eruption – Benzene and Penicillin
7.	Trichomoniasis	<i>Trichomonas vaginalis</i>	Protozoan	Greenish-yellow vaginal discharge – Metronidazole.
8.	Chancroid	<i>Haemophilus ducreyi</i>		Foul discharge and ulcer Drug : Sulphonamide
9.	Lymphogranuloma venereum	<i>Lymphogranuloma psittacosis bacteria</i>		Inguinal lymphadenopathy Drug : Tetracycline

(11) Diarrhoeal Diseases : These are a group of intestinal infections, including food poisoning. The prominent symptom of all such infections is diarrhoea. Infections spread through contaminated food, water, drinks, hands, clothes, bed sheets and utensils. The causative agents are mainly bacteria such as *Escherichia coli*, *Shigella dysenteriae*, *Campylobacter* and *Salmonella*. The protozoans *Giardia intestinalis* and *Balantidium coli* and some viruses also act as causative agents. Toxins released by *E. coli* cause mild diarrhoea (loose and frequent evacuation of bowels) to severe dehydration. Shigellosis caused by *Shigella* is characterised by frequent passage of stools with blood and mucus and abdominal cramps. All diarrhoeal diseases caused dehydration, which can be countered with **oral rehydration therapy**, i.e., intake of adequate fluid and electrolytes.

(12) Anthrax : Anthrax is a common disease of domesticated animals; human may acquire infection through contact with spore-containing animals.

Anthrax is caused by a bacterium *Bacillus anthracis* which produces spores that can remain dormant for many years in the soil. The most common form of anthrax in humans is cutaneous anthrax; other is pulmonary anthrax.

(13) Scarlet Fever : Scarlet fever is caused by the infection of *Streptococcus pyogenes* in upper respiratory tract or pharynx. A toxin-produced rash develops as small “goose pimples” on the skin within 12 to 24 hours. The Dick test is performed to determine the presence of an immunity to scarlet fever.

(14) Botulism (Food poisoning) : *Clostridium botulinum* is a Gram-positive anaerobic bacillus responsible for food poisoning known as botulism. The bacilli release exotoxin to the environment, which is one of the most potent neurotoxic substance produced by microbes. Main symptoms of botulism are swollen tongue, double vision, vomiting, diarrhoea, fatigue and respiratory failure.

Table : 8.2-4 Insect carrying diseases

S.No.	Common name	Zoological name	Causative organism	Disease
1.	Mosquitoes	Anopheles spp Culicine spp Stegomyia spp Aedes aegypti	<i>Plasmodium</i> <i>Wuchereria bancrofti</i> <i>Flavovirus fibricus</i> <i>Dengue virus</i>	Malaria
2.	Rat flea	Xenopsylla cheopsis	<i>Pasteurella pestis</i>	Bubonic plague
	Flies	Xenopsylla spp Musca spp	<i>R. typhi</i> 1. <i>Shigella spp</i> 2. <i>Salmonella typhi</i> 3. <i>Salmonella paratyphi</i> 4. <i>Hepatitis type – A virus</i>	Endemic typhus Bacillary dysentery Typhoid fever Paratyphoid fever Infectious hepatitis
3.	Sand fly	Phlebotomus papatasii	<i>virus</i> <i>Leishmania donovani</i>	Sand fly fever Kala azar
4.	Body louse	Phlebotomus	<i>Rickettsia prowazekii</i>	Trench fever
5.	Mite	Pediculus	<i>R. Quintana</i>	
6.	Itch mite	Trombicula akamushi	<i>R. Tsutsugamushi</i>	Scrub typhus (Tsutsugamushi fever)
7.	Tick fever,	Sarcopetes scabiei	–	Scabies
8.	House fly	Amblyomma spp	<i>R. rickettsiae</i>	Rocky mountain spotted theileriosis
9.	Bed bug	Musca domestica	<i>Vibrio cholerae</i>	Cholera
10.	Tse-tse fly	Cimex	<i>E.coli</i>	Infantile diarrhoea
		Glossina palpalis	–	Relapsing fever
			<i>Trypanosoma gambiense</i>	Sleeping sickness

Important Diseases Caused by Protozoans :

(1) Amoebiasis (Amoebic Dysentery, Enteritis) :

Amoebiasis is widespread in India due to poor sanitary conditions and polluted drinking water. The disease is caused by **Entamoeba histolytica** all over the world. The parasites live in the large intestine and lower part of the small intestine of humans. Infection occurs by ingesting cysts with food and drinks.

The parasites secrete a proteolytic enzyme, **cytolysin**, that erodes the mucous membrane of the intestine. This may form bleeding ulcers that produce dysentery. In this disease, the patient passes out blood and mucus with the stools. He also experiences severe gripping pain in the abdomen, fever, nausea, exhaustion and nervousness. In chronic cases, the intestinal wall is punctured. This may prove fatal. The parasites that invade the intestinal mucus membrane may be carried by the blood stream to the liver, lungs and brain. In these organs, the parasites, feed on cells and produce severe lesions and abscesses. The latter may cause death.

(2) Diarrhoea : Diarrhoea is caused by a flagellate protozoan named *Giardia intestinalis*. *Giardia* was discovered by Leeuwenhoek in his own stools in 1681. It is the first human parasitic protozoan known. It is found all over the world. It inhabits the upper parts (duodenum and jejunum) of human small intestine. It lives firmly attached to the intestinal mucus membrane by adhesive disc, each perched on a separate cell. Nutrition is saprozoic, i.e., fluid food is absorbed through the body surface. Reproduction occurs by longitudinal binary fission. At intervals the parasites change into cysts which escape with the host's faeces. Infection occurs by taking cysts with food and drinks. By covering the mucous membrane of the intestine, the parasites check or reduce the absorption of food, particularly fats. This causes **diarrhoea or giardiasis** (very loose and frequent stools).

Preventive Measures : Properly washing hands, fruits and vegetables before eating, and protecting the food articles from dust, flies, ants and cockroaches can check human infection.

(3) **Malaria** : Malaria has been for thousands of years a very serious disease of the tropical and temperate regions. It was almost eliminated a few years back with the efforts of World Health Organization (WHO) and our National Malaria Eradication Programme (NMEP), but unfortunately, it has appeared again.

The attack of malaria is preceded by yawning, tiredness, headache and muscular pain. During the fever, the patient feels chilly and shivers, and has acute headache, nausea and high temperature. After a few hours, the body perspires freely and the temperature becomes normal. The cycle is repeated if no medicine is taken. Blood smear made during fever shows the malarial parasites. No parasites are seen at other times. In chronic cases,

there is general weakness and anaemia (paleness) due to large-scale destruction of red blood corpuscles. This is also accompanied by enlargement of spleen and liver.

Malaria is caused by the toxins produced in the human body by the malarial parasites, *Plasmodium*.

The malarial parasites are carried from the infected to the healthy persons by the female *Anopheles* mosquito. The mosquito picks up the parasites with the blood, when it bites an infected person. When this infected mosquito bites a healthy person, parasites migrate into his blood with the saliva, which the mosquito injects before sucking up blood to prevent its clotting.

Types : There are four species of *Plasmodium*, which cause different kinds of human malaria –

(i) *P. Vivax* : It causes **benign tertian malaria**, which attacks every third day, i.e., after 48 hours. The fever is mild and seldom fatal. This species is wide-spread in the tropical and temperate regions.

(ii) *P. ovale* : It also causes benign tertian malaria, which recurs every 48 hours. This species is found only in West Africa and South America.

(iii) *P. malariae* : It causes **quartan malaria**, which recurs every fourth day, i.e., after 72 hours. This species is found in both tropical and temperate regions, but it is not very common.

(iv) *P. falciparum* : It alone is capable of causing three types of malaria, viz.,, quotidian malaria, which attacks almost daily, malignant tertian malaria, which occurs every 48 hours, but is very severe and often fatal; and irregular malaria. This species is found only in the tropical region.

(4) **Ciliary Dysentery** : Ciliary dysentery is caused by a ciliate protozoan named *Balantidium coli*. The latter inhabits the human large intestine (colon) all over the world. It feeds on tissue fragments, red blood corpuscles, bacteria and faecal matter. It reproduces asexually by transverse binary fission and sexually by conjugation. The latter is followed by cyst formation. Cysts pass out in the host's faeces. Infection occurs by ingesting cysts with food and drinks. *Balantidium coli* causes ulcers in the colon and invades mucous membrane by secreting **cytolysin**. This generally results in diarrhoea, but may lead to severe or fatal dysentery.

(5) **Trypanosomiasis** : It is most serious protozoan disease caused by a flagellate protozoan, *Trypanosoma*, found firstly in the blood, then in the lymph and finally in the cerebrospinal fluid of man (primary host). Secondary host is a blood sucking insect, *Glossina* (Tse-tse fly), so the life cycle of *Trypanosoma* is digenetic.

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Table : 8.2-5 Pathogenic Protozoa

S.No.	Class and name of parasite	Host and site of parasite in its body	Diseases caused	Method of transmission
1.	Class Rhizopoda <i>Entamoeba histolytica</i>	In the colon of man, sometimes in dogs and cats also. It may reach liver, spleen, lungs and brain etc. In the colon of man.	Amoebic dysentery. It also causes ulcers in the Intestine. Gastro-intestinal disturbances.	By contaminated food and water. By contaminated food and water.
2.	<i>Entamoeba coli</i>	In the buccal cavity of man.	Bleeding gums.	By mouth contact.
3.	<i>Entamoeba gingivalis</i>			
4.	Class Mastigophora <i>Trypanosoma gambiense</i>	In the blood of Africans.	African sleeping sickness.	By the bite of the fly, <i>Glossina palpalis</i> .
5.	<i>Trypanosoma rhodesiense</i>	In the blood of Africans.	Rhodesian sleeping sickness.	By the bite of the fly, <i>Glossina morsitans</i> .
6.	<i>Trypanosoma cruzi</i>	In early stages, it is found in the muscles, heart, brain, spinal cord and gonads of children but in later stages in the blood	Chaga's disease.	By a bug.
7.	<i>Leishmania donovani</i>	In the liver, lymph glands and leucocytes of man, dog and cat.	Kala-azar fever.	By sand fly, <i>Phlebotomus supp.</i>
8.	<i>Leishmania infantum</i>	In the spleen of children	Enlargement of spleen.	By sand fly, <i>Phlebotomus supp.</i>
9.	<i>Leishmania tropica</i>	In endothelium of blood capillaries of skin of man	Oriental sore.	By sand fly, <i>Phlebotomus supp.</i>
10.	<i>Leishmania brasiliensis</i>	In the infected man, dog and cat.	Skin disease (Espundia in man).	By sand fly, <i>Phlebotomus</i> and contact.
11.	<i>Trichomonas buccalis</i>	In the infected gums of man.	Associated with pyorrhoea.	By infected food.
12.	<i>Trichomonas hominis</i>	In colon of man and other vertebrates.	Associated with dysentery.	By contaminated eatables and water.
13.	<i>Trichomonas vaginalis</i>	In urinogenital tract of women.	Vaginitis.	During sexual intercourse.
14.	<i>Giardia intestinalis</i>	In small intestine of man	Diarrhoea.	By contaminated food.
15.	Class Sporozoa <i>Plasmodium vivax</i>	In erythrocytes and liver of man.	Different types of malaria fever.	By the bite of female <i>Anopheles</i> mosquito.
16.	<i>Plasmodium falciparum</i>			
17.	<i>Plasmodium malariae</i>			
18.	<i>Plasmodium ovale</i>			
19.	<i>Babesia bigemina</i>	In erythrocytes of cattle.	Taxas fever and diarrhoea.	By the bite of fleas.
20.	<i>Isospora hominis</i>	In small intestine of man.	Diarrhoea and other gastric troubles.	By contaminated food.
21.	<i>Eimeria stiedae</i>	In cells of mucus membrane of hepatic ducts and liver of rabbit.	Diarrhoea and liver disorders.	By their oocysts.
22.	Class Ciliata <i>Balantidium coli</i>	In colon of human beings.	Ulcers in colon and diarrhoea.	By spores.

Important Diseases Caused by Helminthes

(1) **Taeniasis** : Taeniasis is caused by the pork tapeworm *Taenia solium*. This tapeworm lives in the human intestine, firmly anchored by hooks and suckers. It lacks mouth and absorbs host's digested food through its skin (saprozoic nutrition). It is hermaphrodite and undergoes self-fertilization. There is normally a single worm in one host. This worm has enormous power of reproduction.

(2) **Ascariasis** : Ascariasis is caused by the roundworm *Ascaris lumbricoides*. This roundworm lives in the human small

intestine. It lies free, having no organs for attachment. It takes host's digested food by sucking through the mouth (holozoic nutrition). It is more common in the children. The food of the worm consists of semi-digested food of the host, the blood and the fluid of the alimentary canal of the host. There is no secondary host in the life cycle of this parasite. The disease can best be treated by administering antihelminthic drugs such as oil of chenopodium, Alcopar, Bendex, Dewormis, Zental, etc.

(3) **Filariasis (Elephantiasis)** : Filariasis is caused by the filarial worm, *Wuchereria bancrofti*. This disease is characterised

by the swelling of the legs, scrotum and of some other parts of the body. The disease is, therefore, commonly known as elephantiasis due to its resemblance to a leg of an elephant. The infestation is transmitted by Culex mosquitoes from one individual to the others. The worms live in the lymphatic system and produce young ones called "microfilaria". Once the swelling appears, there is no other treatment except surgical operation. A drug, Diethylcarbamazine has been shown to kill the microfilaria.

(4) **Ancylostomiasis (Hookworm Disease)** : Ancylostomiasis is caused by the hookworm, *Ancylostoma duodenale*. It lives in the small intestine firmly attached to its wall. It

feeds on blood and bits of mucus membrane. A secretion from its pharyngeal gland prevents clotting of blood while the worm is feeding and causes considerable loss of blood after the worm has left the wound. Eggs laid by the female worm in the host's intestine escape with the faeces and hatch in the moist soil. The larvae feed on organic debris and get into the human body by boring through the skin of the feet, causing "ground itch." They enter the veins, and passing through the heart, lungs, trachea, pharynx and oesophagus, reach the intestine. Here, they mature. Adult worms live for about 5 years. Male worm is 8-11 mm. long, and female 10-13 mm.

Table : 8.2-6 Important Helminth Diseases in Humans

S.No.	Disease	Pathogen	Habitat	Mode of Infection
1.	Taeniasis & Cysticercosis	<i>Taenia solium</i> – the pork tapeworm	Intestine	By taking raw or undercooked mealily pork
2.	Ascariasis	<i>Ascaris lumbricoides</i>	Small intestine	By taking eggs with food and water
3.	Filariasis (Elephantiasis)	<i>Wuchereria bancrofti</i> – the filarial worm	Lymphatics and connective tissue	By bites of <i>Culex</i> mosquitoes
4.	Ancylostomiasis (Hookworm disease)	<i>Ancylostoma duodenale</i> – the hookworm	Small intestine	By boring through the skin, usually of feet.

Non communicable diseases

The main non-communicable diseases are diabetes, inflammatory diseases of joints such as arthritis, gout, cardiovascular diseases and cancer.

(1) Diabetes Mellitus

(i) Diabetes is characterised by chronic hyperglycemia which is excessive concentration of glucose in the blood.

(ii) Diabetes is primarily a result of relative or complete lack of insulin secretion by the β cells of islets of Langerhans in pancreas.

(iii) Diabetes is established by blood and urine sugar levels.

(2) Arthritis

(i) Arthritis is any inflammatory condition of the joints characterised by pain and swelling.

(ii) Two kinds of arthritis are : rheumatoid arthritis and osteoarthritis.

(iii) There is no cure for arthritis; drugs are available which relieve pain.

(iv) Rheumatoid arthritis is characterised by inflammation of the synovial membrane.

(v) A kind of rheumatoid arthritis that occurs in younger people is Still's disease.

(vi) Osteoarthritis is a disease common among the elderly persons resulting from erosion of articular cartilage.

(vii) Paraplegia refer to weakness or paralysis of both legs, often accompanied by loss of sensation.

(viii) Paraplegia is usually caused by a motor vehicle accident, sports accident, fall or gunshot wounds.

(3) Gout

(a) Gout results from accumulation of uric acid crystals in the synovial joints.

(b) Gout is a disease associated with an inborn error of uric acid metabolism that increases production or interferes with the excretion of uric acid.

(4) Cardiovascular Diseases

(a) Cardiovascular diseases refer to a number of diseases associated with the blood vascular system.

(b) Some major cardiovascular diseases are rheumatic heart disease, hypertensive heart disease and coronary heart disease.

(i) Rheumatic heart disease

Rheumatic heart disease is an autoimmune disease, most common in children after a severe throat infection by certain strain of *Streptococcus* bacteria.

An antigen on the surface of these bacteria is very similar to an antigen on the surface of myocardium.

The antibodies against *Streptococcus* may react with myocardium and cause heart difficulties.

(ii) Hypertensive heart disease

Hypertensive heart disease are caused by hypertension, i.e., increased blood pressure.

Serious hypertension is a common cause of chronic heart failure particularly in older people.

(iii) Coronary heart diseases

Coronary heart diseases are characterised by impaired heart function due to inadequate blood flow to the heart. Angina pectoris is the chest pain caused most often by myocardial anoxia. Attacks of angina pectoris are often related to exertion, emotional disturbance and exposure to excess cold. Myocardial infarction is commonly called coronary or heart attack.

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Coronary heart disease may be due to raised serum cholesterol, cigarette smoking, high blood pressure, physical inactivity, obesity and diabetes.

Cyanosis refers to a bluish colouration of the skin and mucus membranes due to too much deoxygenated haemoglobin in the blood.

(5) **Cancer** : Cancer is an abnormal and uncontrolled division of cells, known as cancer cells, that invade and destroy the surrounding tissues. Generally **Cancer is defined as uncontrolled proliferation of cells without any differentiation**. Cancer cells are different from normal cells in some aspects. They do not remain confined to one part of the body. They penetrate and infiltrate into the adjoining tissues and dislocate their functions. Some of the cancer cells get detached from the main site of origin and travel by blood and lymph to sites distant from the original tumour and form fresh colonies, called metastasis or secondary growth.

Oncology : (G. *onkos* – mass, tumour; *logos* – study of) is the field of biomedicine devoted to the study and treatment of tumours.

Types of Tumours : There are two types of tumours : benign and malignant.

(1) **Benign Tumour – (=Nonmalignant Tumour)** : It remains confined to the site of its origin and does not spread to other parts of the body. It causes limited damage to the body. It is non-cancerous.

(2) **Malignant Tumour (= Cancerous Tumour)** : It first grows slowly. No symptoms are noticed. This stage is called the latent stage. The tumour later grows quickly. The cancer cells go beyond adjacent tissue and enter the blood and lymph. Once this happens, they migrate to many other sites in the body where the cancer cells continue to divide. It is **metastasis**. Only malignant tumours are properly designated as cancer.

Table : 8.2-7 Differences between Benign Tumour and Malignant Tumour

S.No.	Benign Tumour	Malignant Tumour
1.	It remains confined to the affected organ.	It also spreads to other organs of the body.
2.	Rate of growth is usually slow.	Rate of growth is usually rapid.
3.	There is no latent stage.	There is latent stage.
4.	It causes limited damage to the body.	The cancer cells migrate to other sites of the body.
5.	There is no metastasis.	There is metastasis.
6.	It is non-cancerous.	It is cancerous.

(b) **Types of Cancer (Types of Malignant Tumours)** : Malignant tumours are generally classified into three main types on the basis of cell type from which they arise.

(1) **Carcinomas** : This type is mainly derived from epithelial cells. They include cervical (cervix is part of uterus) cancer, breast cancer, skin cancer, brain cancer, lung cancers, stomach cancer, etc.

(2) **Sarcomas** : These cancers are located in connective and muscular tissues derived from mesoderm. Thus, they include the cancers of bones, cartilages, tendons, adipose tissue, lymphoid tissue and muscles. Cancer of bones is called osteoma. Cancers of adipose tissue are known as lipomas and cancers of lymphatic tissue are termed as lymphomas.

(3) **Leukaemias (Blood cancers)** : They are characterized by abnormal increase of white blood corpuscles count due to their increased formation in the bone marrow.

Characteristics of Cancer Cells

- (1) Nucleus is abnormally enlarged and irregular.
- (2) Chromatin material is also irregular.
- (3) ER are more in cancerous cells.
- (4) Ribosomes fuse together to form polyribosomes.
- (5) Golgi bodies are less developed.
- (6) Mitochondria are swollen with few cristae.
- (7) Plasma membrane often becomes irregular.
- (8) Pathological cytoplasmic inclusions are also present.

Danger Signals for Cancer

- : These are as follows:
- (1) Any wound that does not heal.
 - (2) A thickening or lump in the breast or elsewhere.
 - (3) Any change in the mole or wart.
 - (4) Unusual bleeding or discharge.
 - (5) Persistent indigestion or difficulty in swallowing.
 - (6) Persistent cough or hoarseness.
 - (7) Any change in normal bowel habits.

Causes of Cancer : The causes of cancer are not fully understood. However, many factors are known to favour cancer development. These factors are called **carcinogenic agents** or **Carcinogens**. The causes of cancer are briefly described under the following headings.

(1) **Physical irritants** : (i) Use of **Kangri** (an earthen pot containing burning coal) by Kashmiris causes abdominal skin cancer as these people keep Kangri close to their abdomen during winter. (ii) Betel and tobacco chewing causes oral cancer. (iii) Heavy smoking causes lung cancer and may also cause cancer of oral cavity, pharynx (throat) and larynx. (iv) Jagged teeth may cause tongue cancer. (v) Excessive exposure to sun light can cause skin cancer.

(2) **Chemical Agents** : Several chemicals are known to cause cancer. These are caffeine, nicotine, products of combustion of coal and oil and pesticides; constant use of artificial sweetener can cause cancer. An animal protein-rich diet is known to cause cancer of large intestine. Breast cancer has hormonal relationship. Thus, some sex hormones and steroids if secreted or given in large amounts may cause cancer. Chimney sweepers can develop cancer of scrotum. Dye workers have a high rate of bladder cancer.

Table : 8.2-8 Carcinogens and Organs Affected

S.No.	Carcinogens	Organs Affected
1.	Soot	Skin, lungs
2.	Coaltar (3, 4-benzopirene)	Skin, lungs
3.	Cigarette smoke (N-nitrosodimethylamine)	Lungs
4.	Cadmium Oxide	Prostate gland
5.	Aflatoxin (a mould metabolise)	Liver
6.	2-naphthylamine and 4-aminobiphenyl	Urinary bladder
7.	Mustard gas	Lungs
8.	Nickel and Chromium compounds	Lungs
9.	Asbestos	Lungs, pleural membrane
10	Diethylstibestrol (DES)	Vagina
11.	Vinylchloride (VC)	Liver

(3) Radiations : The X-rays, cosmic rays, ultra-violet rays, etc. can cause cancer. Japanese people exposed to radiations from World War II nuclear bombing show five times the incidence of leukemia seen in the rest of the population.

(4) **Biological Agents** : Certain viruses can cause cancer. The viruses that cause cancers are called **oncoviruses**.

Oncogens : It has now been confirmed that all cells carry some cancer-causing genes called **oncogenes**. Certain factors stimulate oncogenes to replicate rapidly, causing malignant tumour. Experts in the study of cancer are called **oncologists**.

Treatment : Three general methods of treatment for cancer are currently available.

(1) **Surgery** : It involves the removal of the entire cancerous tissue.

(2) **Radiation** : It involves the exposure of the cancerous parts of the body to X-rays, which destroy rapidly growing cells without harming the surrounding tissue.

(3) Chemotherapy : It involves the administration of certain anticancer drugs. These drugs check cell division by inhabiting DNA synthesis. These drugs may be more toxic to cancerous cells than to normal cells.

Most cancers are treated by combination of surgery, drugs and radiation therapy.

Q Ordinary Thinking

Objective Questions

Diseases caused by viruses

- 1.** Which of the following viruses is not transferred through semen of an infected male [AIPMT (Cancelled) 2015]

 - (a) Human immunodeficiency virus
 - (b) Chikungunya virus
 - (c) Ebola virus
 - (d) Hepatitis B virus

2. Which of the following is a communicable disease

 - (a) Phenylketonuria
 - (b) Cancer
 - (c) Rabies
 - (d) Alkaptonuria

3. Which of the following is a carrier of 'dengue fever'

[RPMT 1999]

Q1

Denque is transmitted by [AFMC 1997, 2009; CPMT 1998]

PMT 1993; MP PMT 2002, 06;

DUMET 2010; AFMC 2012]

- (a) A bacteriophage
(b) A virus with single strand RNA
(c) A virus with single strand DNA
(d) A virus with double strand DNA

6. Which one of the following pairs of diseases is viral as well as transmitted by mosquitoes [DUMET 2010; WB JEE 2016]

(a) Elephantiasis and Dengue
(b) Yellow fever and sleeping sickness
(c) Encephalitis and sleeping sickness
(d) Yellow fever and Denque

7. Polio immunizing vaccine was developed by

8 The jaundice is a physiological liver disease. It is seen in 11

WGET 1.0041

T Tips & Tricks

- ☞ T.B. Day-24 March.
 - ☞ World Health Day -7 April.
 - ☞ World Diabetes Day-25 July.
 - ☞ Mosquito Day-29 August.

27. The pathogen of bubonic plague is transmitted through the bite of [CPMT 1993]
 (a) *Pediculus humanis*
 (b) *Glossina palpalis*
 (c) *Aedes*
 (d) *Xenopsylla cheopis*
28. A kind of allergy is [MP PMT 1995]
 (a) Asthma (b) Yellow eyes
 (c) Typhoid (d) Mumps
29. Mumps is a [KCET 1994]
 (a) Viral disease (b) Fungal disease
 (c) Bacterial disease (d) Protozoan disease
30. A cell-coded protein that is formed in response to infection with most animal viruses is called [CBSE PMT 1994]
 (a) Antigen (b) Interferon
 (c) Histone (d) Antibody
31. Pulse-Polio programme is organised in our country [AFMC 1996]
 (a) To cure polio (b) To eradicate polio
 (c) To spread polio (d) None of these
32. Which one of the following is a pair of viral disease [CBSE PMT 1996]
 (a) Tetanus and typhoid
 (b) Syphilis and AIDS
 (c) Whooping cough and sleeping sickness
 (d) Measles and rabies
33. In human beings retrovirus is considered as a cause of cancer because [CBSE PMT 1996]
 (a) In their genome oncogene is present
 (b) Their hereditary material made up of single stranded RNA
 (c) They have a gene for reverse transcriptase
 (d) In their genome there may be cellular proto oncogene
34. AIDS day is [AFMC 2009]
 (a) June 1 (b) May 1
 (c) December 1 (d) December 20

Diseases caused by bacteria

1. 'Leprosy' is caused by [NCERT; CBSE PMT 1991; Bihar MDAT 1995; AFMC 2003]
 (a) Mycobacterium (b) Salmonella
 (c) Monocystis (d) TMV
2. Cholera patient is administrated by 'saline drip' because [CBSE PMT 1996; AIIMS 2007; BHU 2012]
 (a) Na^+ ions are essential for the transport of substances across the membrane
 (b) Na^+ ions are helpful to conserving water in the body
 (c) Cl^- ions are helpful in the formation HCl for digestion
 (d) Cl^- ions is significant component of blood plasma
3. Widal test is used for susceptibility of [NCERT; CBSE PMT (Pre.) 2010, 12; J & K CET 2012]
 (a) Malaria (b) Cholera
 (c) Yellow fever (d) Typhoid
4. 'Tuberculosis' is caused by [MP PMT 2010, 11]
 (a) Bacterium (b) Virus
 (c) Protozoan (d) Malnutrition

5. The bacterium (*Clostridium botulinum*) that causes botulism is [KECT 2001; CBSE PMT 2006]
 (a) A facultative aerobe (b) An obligate aerobe
 (c) A facultative anaerobe (d) An obligate anaerobe
6. Symptoms of diphtheria is [VITEEE 2006]
 (a) Suffocation (b) Hydrophobia
 (c) Excessive watering (d) Gum bleeding
7. Feeding jaggery with lime water is one of the first aid measure for [VITEEE 2006]
 (a) Diarrhoea (b) Milk fever
 (c) Cow Pox (d) Anthrax
8. *Vibrio cholerae* is a motile bacteria belonging to the group of [CBSE PMT 1990]
 (a) Monotrichous (b) Lophotrichous
 (c) Amphitrichous (d) Peritrichous
9. The disease due to inflammation of vermiform appendix of the digestive system is known as [NCERT; CPMT 2004]
 (a) Amoebic dysentery (b) Appendicitis
 (c) Intestinal cancer (d) Appendectomy
10. 'Plague' is transmitted by [VITEEE 2006]
 (a) House fly (b) Tse-tse fly
 (c) Rat flea (d) Mosquito
11. Tetanus disease is caused by [NCERT; CPMT 2004]
 (a) Virus (b) Bacteria
 (c) Fungi (d) Mycoplasma
12. Match the following bacteria with the diseases and choose the correct option

Column I		Column II	
A.	<i>Treponema pallidum</i>	1.	Plague
B.	<i>Yersinia pestis</i>	2.	Anthrax
C.	<i>Bacillus anthracis</i>	3.	Syphilis
D.	<i>Vibrio</i>	4.	Cholera

- [CBSE PMT 1995; AFMC 1996; Kerala PMT 2004]
 (a) A-1, B-3, C-2, D-4 (b) A-3, B-1, C-2, D-4
 (c) A-2, B-3, C-1, D-4 (d) A-4, B-3, C-1, D-2

13. Which is a water-borne disease [MP PMT 1994]
 (a) Small pox (b) Malaria
 (c) Tuberculosis (d) Cholera
14. Which one of the following options gives the correct matching of a disease with its causative organism and mode of infection [CBSE PMT (Mains) 2011]

Disease	Causative Organisms	Mode of Infection
(a) Elephantiasis	<i>Wuchereria bancrofti</i>	With infected water and food
(b) Malaria	<i>Plasmodium vivax</i>	Bite of male <i>Anopheles</i> mosquito
(c) Typhoid	<i>Salmonella typhi</i>	With inspired air
(d) Pneumonia	<i>Streptococcus pneumoniae</i>	Droplet infection

15. Pathogenicity of bacteria causing tuberculosis and leprosy is due to [Kerala PMT 2008]
 (a) Cholesterol (b) Ergosterol
 (c) Prostaglandins (d) Glycerol
 (e) Wax-D

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- 16.** Lung tuberculosis is caused by [MP PMT 1994; J & K CET 2002; DUMET 2009; WB JEE 2010]
- Pseudomonas aeruginosa
 - Mycobacterium tuberculosis
 - Streptococcus pneumoniae
 - Escherichia coli
- 17.** Which one of the following contains bacterial diseases [NCERT; CBSE PMT 1998; Pb PMT 2000; MP PMT 2000; BHU 2008; DUMET 2010]
- Cholera, typhoid, pneumonia, Diphtheria, leprosy,
 - Malaria, AIDS, cholera, mumps
 - Typhoid, tuberculosis, influenza, mumps
 - Diabetes, malaria, syphilis, mumps
- 18.** Diphtheria is caused by [AIIMS 2007]
- Poisons released by living bacterial cells into the host tissue
 - Poisons released from dead bacterial cells into the host tissue
 - Poisons released by virus into the host tissues
 - Excessive immune response by the host's body
- 19.** Diphtheria is caused by [CBSE PMT 1997; AFMC 1999; MP PMT 1999]
- Bacteria
 - Virus
 - Nematodes
 - None of these
- 20.** Biological name of insect (vector) carrying the plague [MP PMT 1997; BVP 2003]
- Xenopsylla cheopis
 - Anopheles mosquito
 - Bacillus pestis
 - Pediculus humanus
- 21.** Chancroid is a sexually transmitted disease caused by [Kerala PMT 2007]
- Treponema
 - Haemophilus
 - Nisseria
 - Chlamydia
 - Trichomonas
- 22.** Which of the following pairs is not correctly matched [CBSE PMT 1995]
- Dengue fever – Arbovirus
 - Plague – Yersinia pestis
 - Syphilis – Trichuris trichiura
 - Sleeping sickness – Trypanosoma gambiense
- 23.** 'Black death' is related with [MP PMT 1995]
- Plague
 - Cancer
 - Tuberculosis
 - Measles
- 24.** The main reason why antibiotics could not solve all the problems of bacteria mediated diseases is [CBSE PMT 1994]
- Insensitivity of the individual following prolonged exposure to antibiotics
 - Inactivation of antibiotics by bacterial enzymes
 - Decreased efficiency of the immune system
 - The development of mutant strains resistant to antibiotics
- 25.** Which of the following sets of diseases is caused by bacteria [NEET (Phase-II) 2016]
- Herpes and influenza
 - Cholera and tetanus
 - Typhoid and smallpox
 - Tetanus and mumps

Diseases caused by protozoa

- 1.** Which option is correct for the disease caused by protozoans [GUJCET 2014]
- Herpes simplex – itching in the genital or anal area
 - Treponema pallidum – white patches on the tongue or roof of the buccal cavity
 - Neisseria gonorrhoeae – pain during passing urine
 - Trichomonas vaginalis – pain during passing urine
- 2.** Japanese encephalitis is transmitted by [AFMC 2010]
- Housefly
 - Tse Tse fly
 - Sand fly
 - Mosquito
- 3.** Entamoeba gingivalis lives in the
- Intestine
 - Colon
 - Pus pockets of pyorrhoea
 - Intestines and colon
- 4.** In amoebiasis, which of the following conditions occurs [Odisha JEE 2011]
- Mild diarrhoea with alternative constipation
 - Stool with mucus
 - Stool with blood
 - All of these
- 5.** Mapacrine, chloroquine and pelludrine are used to cure which disease [CPMT 1995, 98]
- Plague
 - Malaria
 - T.B.
 - Pneumonia
- 6.** The disease caused by Entamoeba gingivalis is transmitted by
- Flies
 - Kissing
 - Using the same bowl
 - Kissing and using the same bowl
- 7.** 'Glossina palpalis' is a vector for [CBSE PMT 1992]
- Dengue
 - Filariasis
 - Gambian fever
 - Plague
- 8.** All the diseases are spread by housefly except [CBSE PMT 1992]
- Leprosy
 - Dysentery
 - Typhoid
 - Sleeping sickness
- 9.** Haemozoin is a toxic substance formed in case of malaria. It is produced by [MP PMT 1999; RPMT 1999]
- Globin protein of RBC
 - Colour pigment of RBC
 - Dead WBC
 - Cryptozoites
- 10.** 'Amoebiasis' (amoebic dysentery) is caused by [NCERT; CBSE PMT 1992; MP PMT 1993, 95; Odisha JEE 1995; RPMT 1995; CPMT 1995; BVP 2004]
- Plasmodium vivax
 - Entamoeba gingivalis
 - Entamoeba histolytica
 - Trypanosoma gambiense

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5. Louse is ectoparasite of
 (a) Fish (b) Snake
 (c) Man (d) Whale

6. Parasite which is vector host also is
 (a) House fly (b) Fasciola
 (c) Ascaris (d) Bug

7. Rocky mountain fever is caused by [AFMC 1997]
 (a) Virus (b) Fungi
 (c) Algae (d) Tick

8. Filarial larva can be collected from man's [CBSE PMT 1993]
 (a) Smears of intestinal contents
 (b) Peripheral blood at midnight
 (c) Smears of spleen
 (d) Biopsy of liver

9. Filariasis is caused by [WB JEE 2008]
 (a) Dead adult filariae
 (b) Microfilariae
 (c) Biting of filarial worm
 (d) Presence of bacteria in filarial wall

10. Infection of Ascaris usually occurs by [CPMT 1993;
 MP PMT 1996; BHU 2001; RPMT 2002; NEET 2013]
 (a) Imperfectly cooked pork
 (b) Tse-tse fly
 (c) Mosquito bite
 (d) Contaminated water and vegetables

11. Filaria germ is a kind of [JIPMER 1994]
 (a) Bacteria (b) Helminthes
 (c) Mosquito (d) Protozoa

12. 'Athlete's foot' disease is caused by [AMU (Med.) 2012]
 (a) *Taenia pedis* (b) *Taenia capitis*
 (c) *Candida albicans* (d) *Rickettsia*

13. Which of the following is a matching pair of the vector and the disease [CPMT 1998; Manipal 2001; MP PMT 2006]
 (a) Culex – Filariasis (b) Housefly – Yellow fever
 (c) Body louse – Typhoid (d) Sandfly – Plague

14. *Wuchereria bancrofti* is transmitted by [CPMT 1998; BHU 2008]
 (a) Sand fly (b) Tse-tse fly
 (c) Anopheles mosquito (d) Culex

15. Filaria is transmitted by [JIPMER 1994; BHU 1995; MP PMT 1995, 99]
 (a) Male anopheles (b) Male culex mosquito
 (c) Female anopheles (d) Female culex mosquito

16. The study of worms which cause parasitic infestations in man is called [Manipal 1995]
 (a) Helminthology (b) Herpetology
 (c) Ichthyology (d) Malacology

17. Elephantiasis (Filariasis) in man is caused by [INCERT; CBSE PMT 1993; HPMT 1993; Manipal 1995;
 CPMT 1998, 2000; Pb PMT 1999; Odisha JEE 2011]
 (a) *Ancylostoma duodenale* (b) *Ascaris lumbricoides*
 (c) *Dracunculus medinensis* (d) *Wuchereria bancrofti*

18. Which one of the following life cycle stage of *Wuchereria bancrofti* is infective to man [WB JEE 2012]
 (a) Microfilaria
 (b) 1st stage larva
 (c) 2nd stage larva
 (d) 3rd stage larva

Diabetes mellitus and Cardiovascular diseases

1. Diabetes mellitus takes place only when [DPMT 2004]
 (a) α -cells of pancreas are in excess
 (b) β -cells of pancreas are in excess
 (c) α -cells of pancreas are in hypo
 (d) β -cells of pancreas are in hypo

2. Which one of the following can help in the diagnosis of genetical basis of a disorder [BHU 2003]
 (a) ELISA (b) ABO Blood group
 (c) PCR (d) NMR

3. A patient brought to a hospital with myocardial infarction is normally immediately given [CBSE PMT (Pre.) 2012]
 (a) Penicillin (b) Streptokinase
 (c) Cyclosporin-A (d) Statins

4. The disease characterised by extreme muscular weakness and brownish pigmentation of buccal cavity and skin is
 (a) Cushing's syndrome
 (b) Addison's disease
 (c) Grave's disease
 (d) Myxoedema

5. Neurons of people suffering from diabetes insipidus do not secrete [Odisha JEE 2004]
 (a) Enzyme (b) Steroid
 (c) Fatty acid (d) ADH

6. Treatment with 'Alloxan' destroys [CPMT 1991; AIIMS 1998]
 (a) STH cells
 (b) Beta-cells of islets of Langerhans
 (c) Cells of Sertoli
 (d) Cells of Leydig

7. Cause of 'Erythroblastosis foetalis' may be
 (a) Adjoining of RBC (b) Bleeding
 (c) Diapedesis (d) Haemophilia

8. A non-infectious unnatural and unusual reaction of a person to any substance or condition for which he is hypersensitive is termed as [AIIMS 1993]
 (a) Infection (b) Immunity
 (c) Allergy (d) Toxin

9. Congenital diseases are those which [CMC Vellore 1993]
 (a) Occur during life time
 (b) Are deficiency diseases
 (c) Are present from time of birth
 (d) Are spread from man to man

10. The disease as a result of prolonged clotting time is due to the lack of plasma thromboplastin component (PTC) necessary to the formation of thromboplastin, is
 - (a) Christmas disease
 - (b) Hypoprothrombinemia
 - (c) Haemophilia
 - (d) Stuart disease
11. Examples of congenital diseases are
 - (a) Alkaptonuria, albinism
 - (b) Albinism, sickle cell anaemia
 - (c) Haemophilia
 - (d) All the above
12. Sickle cell anaemia is due to
 - (a) Deficiency of vitamin B
 - (b) Deficiency of iron in the blood
 - (c) A genetically determined defect of haemoglobin synthesis
 - (d) Increase in the number of leucocytes in the blood
13. The disease *Erythroblastosis foetalis* in human embryo is caused due to
 - (a) Disadjustment of blood groups
 - (b) Disadjustment of Rh factor
 - (c) Both of these
 - (d) None of these
14. Which of the following is a non-communicable disease

[Odisha JEE 2010]

 - (a) Cholera
 - (b) Diabetes mellitus
 - (c) Influenza
 - (d) Filariasis
15. Hereditary disease condition in which the blood fails to coagulate
 - (a) Sickle cell anaemia
 - (b) Leukemia
 - (c) Haemophilia
 - (d) Alkaptonuria
16. Coronary heart disease is due to

[KCET 2007]

 - (a) Streptococci bacteria
 - (b) Inflammation of pericardium
 - (c) Weakening of the heart valves
 - (d) Insufficient blood supply to the heart muscles

Arthritis and Cancer

1. Blood cancer is excess production of leucocytes. It is
Or
'Blood cancer' is also known as

[CBSE PMT 1995; MP PMT 1998, 2006; J & K CET 2010]

 - (a) Leucopenia
 - (b) Leucoderma
 - (c) Leucocytosis
 - (d) Leukemia
2. The process of spreading the cancerous cells to distant site is known as

[MP PMT 1997, 99, 2011]

 - (a) Hyperstasis
 - (b) Metastasis
 - (c) Parastasis
 - (d) Parasitesis
3. Which of the following is one of the direct cause of cancer

[GUJCET 2014]

 - (a) Obesity
 - (b) Inadequate O₂ supply
 - (c) Atherosclerosis
 - (d) Hypertension

4. Match column I with column II and choose the correct answer

	Column I		Column II
(A)	Neoplasm	(1)	Haematopoietic cell tumours
(B)	Benign tumour	(2)	Bone, cartilage tissue cancers
(C)	Carcinomas	(3)	Malignant tumor
(D)	Sarcomas	(4)	Cancer of epithelial tissues
(E)	Lymphomas	(5)	Non-cancerous tumor
		(6)	Initiation of new tumours

[Kerala PMT 2008, 09; WB JEE 2012]

- (a) (A) — (3), (B) — (5), (C) — (4), (D) — (2), (E) — (1)
- (b) (A) — (3), (B) — (5), (C) — (4), (D) — (1), (E) — (2)
- (c) (A) — (6), (B) — (3), (C) — (4), (D) — (2), (E) — (1)
- (d) (A) — (6), (B) — (4), (C) — (3), (D) — (2), (E) — (1)
- (e) (A) — (2), (B) — (5), (C) — (4), (D) — (3), (E) — (6)

5. Bones become fragile in

[DPMT 2007]

- (a) Gout
- (b) Osteoporosis
- (c) Arthritis
- (d) None of these

6. Benign tumour is the one which

[MH CET 2004]

- (a) Shows metastasis
- (b) Differentiated and capsulated
- (c) Undifferentiated and noncapsulated
- (d) Differentiated and noncapsulated

7. Cervical cancer can be caused by

[J & K CET 2012]

- (a) *Chlamydia* sp.
- (b) Human papilloma virus
- (c) Herpes simplex virus
- (d) *Neisseria gonorrhoeae*

8. Which of the following is not used for the treatment of cancer

[BHU 2012]

- (a) I^{131}
- (b) C_60
- (c) Taxol
- (d) Streptokinase

9. The genes concerned with the production of cancer are called

[NCERT; MP PMT 1999; BVP 2004]

- (a) Cancer genes
- (b) Carcino genes
- (c) Carcinomas
- (d) Oncogenes

10. Cancer cells are characterized by

[MP PMT 1996, 2004]

- (a) Uncontrolled growth
- (b) Invasion of local tissue
- (c) Spreading to other body parts
- (d) All the above

11. Oncogenes were discovered by

[AIEEE Pharmacy 2004]

- (a) S.B. Prussiner
- (b) F.P. Rous
- (c) A. Fleming
- (d) J.M. Bishop and H.E. Vermus

12. Which is not cancer

[MP PMT 1995]

- (a) Leukaemia
- (b) Glaucoma
- (c) Carcinoma
- (d) Sarcoma

N Q NCERT Exemplar Questions

Exemplar Questions

- 1.** A person with sickle cell anemia is [NCERT]
 (a) More prone to malaria (b) More prone to typhoid
 (c) Less prone to malaria (d) Less prone to typhoid

2. Diseases are broadly grouped into infectious and non-infectious diseases. In the list given below, identify the infectious diseases [NCERT]
 (i) Cancer (ii) Influenza
 (iii) Allergy (iv) Small pox
 Options
 (a) (i) and (ii) (b) (ii) and (iii)
 (c) (iii) and (iv) (d) (ii) and (iv)

3. The sporozoites that cause infection when a female *Anopheles* mosquito bites a person, are found in [NCERT]
 (a) Liver of the person
 (b) RBCs of mosquito
 (c) Salivary glands of mosquito
 (d) Gut of mosquito

4. The disease chikunguniya is transmitted by [NCERT]
 (a) House fly (b) *Aedes* mosquito
 (c) Cockroach (d) Female *Anopheles*

5. Many diseases can be diagnosed by observing the symptoms in the patient. Which group of symptoms are indicative of pneumonia [NCERT]
 (a) Difficulty in respiration, fever, chills, cough, headache
 (b) Constipation, abdominal pain, cramps, blood clots
 (c) Nasal congestion and discharge, cough, constipation, headache
 (d) High fever, weakness, stomach pain, loss of appetite and constipation

6. In malignant tumors, the cells proliferate, grow rapidly and move to other parts of the body to form new tumors. This stage of disease is called [NCERT]
 (a) Metagenesis (b) Metastasis
 (c) Teratogenesis (d) Mitosis

7. Which of the following are the reason(s) for Rheumatoid arthritis? Choose the correct option [NCERT]
 (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
 Options
 (a) (i) and (ii) (b) (ii) and (iv)
 (c) (iii) and (iv) (d) (i) and (iii)

8. Haemozoin is a [NCERT]
 (a) Precursor of haemoglobin
 (b) Toxin released from *Streptococcus* cells
 (c) Toxin released from *Plasmodium* infected cells
 (d) Toxin released from *Haemophilus* infected cells

9. Which of the following is not the causal organism for ringworm
 [NCERT]
 (a) *Microsporum* (b) *Trichophyton*
 (c) *Epidemophyton* (d) *Macrosporum*

Critical Thinking

Objective Questions

1. Degenerative diseases are those which develop due to
 [Kerala CET 2002]

- (a) Malfunction of hormones
- (b) Degeneration of tissues
- (c) Malfunction of certain body organs
- (d) Degeneration of the infected organs

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

Column I **Column II**

- | | |
|---------------|---|
| A. Amoebiasis | (i) <i>Treponema pallidum</i> |
| B. Diphtheria | (ii) Use only sterilized food and water |
| C. Cholera | (iii) DPT Vaccine |
| D. Syphilis | (iv) Use oral rehydration |

[CBSE PMT 2008]

- (a) A-(ii), B-(i), C-(iii), D-(iv)
- (b) A-(ii), B-(iii), C-(iv), D-(i)
- (c) A-(i), B-(ii), C-(iii), D-(iv)
- (d) A-(ii), B-(iv), C-(i), D-(iii)

3. Sickle cell anaemia is more common in South Africa. This is due to

- (a) Change in beta-chain of haemoglobin
- (b) More population of house flies
- (c) Change in alpha-chain of haemoglobin
- (d) Change in gamma-chain of haemoglobin

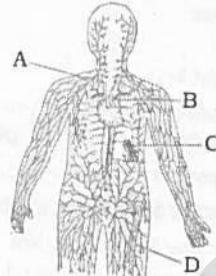
4. Match the column I, II and III

	Column I	Column II	Column III	
(P)	Trichomoniasis	(i)	<i>Herpes Simplex</i>	(x) Pain in lower abdomen
(Q)	Syphilis	(ii)	<i>Neisseria gonorrhoeae</i>	(y) Inflammation and itching in and around vagina
(R)	Gonorrhoea	(iii)	<i>Treponema Pallidum</i>	(z) Patchy hair loss
(S)	Genital herpes	(iv)	<i>Trichomonas Vaginalis</i>	(w) Feeling of uneasiness

[GUJCET 2015]

- (a) (P - iv - y) (Q - iii - z) (R - ii - x) (S - i - w)
- (b) (P - iv - y) (Q - i - z) (R - ii - x) (S - iii - w)
- (c) (P - iv - x) (Q - i - w) (R - ii - y) (S - iii - z)
- (d) (P - i - z) (Q - ii - y) (R - iv - w) (S - iii - x)

5. The following diagram shows the human lymphatic system. Identify the labelled sequences A, B, C and D [NCERT]



- (a) A - lymph nodes (primary lymphoid organ), B - thymus (secondary lymphoid organ), C - spleen (secondary lymphoid organ), D - bone marrow (secondary lymphoid organ)
- (b) A - lymph nodes (secondary lymphoid organ), B - thymus (primary lymphoid organ), C - spleen (secondary lymphoid organ), D - bone marrow (primary lymphoid organ)
- (c) A - lymph nodes (primary lymphoid organ), B - thymus (secondary lymphoid organ), C - spleen (primary lymphoid organ), D - bone marrow (primary lymphoid organ)
- (d) A - lymph nodes (primary lymphoid organ), B - thymus (primary lymphoid organ), C - spleen (secondary lymphoid organ), D - bone marrow (secondary lymphoid organ)

6. Which one of the following is a correct match [WB JEE 2012]

- (a) Filariasis – *Taenia solium*
- (b) Encephalitis – *Culex vishnui*
- (c) Malaria – *Phlebotomus sp*
- (d) Kala azar – *Anopheles stephensi*

7. Match the causative organisms with their diseases

A.	<i>Haemophilus influenzae</i>	1.	Malignant malaria
B.	<i>Entamoeba histolytica</i>	2.	Elephantiasis / Filariasis
C.	<i>Plasmodium falciparum</i>	3.	Pneumonia
D.	<i>Wuchereria bancrofti</i>	4.	Typhoid
E.	<i>Salmonella typhi</i>	5.	Amoebiasis

[NCERT; Kerala PMT 2011; MH CET 2015]

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

8. 'Asthma' is due to

- (a) Infection of trachea
- (b) Infection of lungs
- (c) Bleeding into pleural cavity
- (d) Spasm in bronchial muscles

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9. Symptoms of oedema is
 (a) Swelling of body part especially the legs
 (b) Pain in the chest
 (c) Cold
 (d) Pain in the right leg

10. Which of the following statements is not true for cancer cells in relation to mutations [NEET (Phase-I) 2016]
 (a) Mutations in proto-oncogenes accelerate the cell cycle
 (b) Mutations destroy telomerase inhibitor
 (c) Mutations inactive the cell control
 (d) Mutations inhibit production of telomerase

11. Study the following lists

List-I		List-II	
(A)	<i>Pasteurella pestis</i>	(I)	Angular leaf spot of cotton
(B)	<i>Treponema pallidum</i>	(II)	Amphoterican
(C)	<i>Mycobacterium bovis</i>	(III)	Actinomycosis of cattle
(D)	<i>Streptomyces nodosus</i>	(IV)	Syphilis
		(V)	Plague

The correct match is [EAMCET 2009]

A	B	C	D
(a) IV	I	II	III
(b) II	III	IV	V
(c) V	IV	III	II
(d) III	II	I	IV

12. In sickle cell anaemia, the death is caused when the lethal genes are present in
 (a) Heterozygous condition
 (b) Homozygous dominant condition
 (c) Homozygous recessive condition
 (d) Co-dominant condition

13. If the IIIrd nerve is damaged, it will lead to [CBSE PMT 1990]
 (a) Loss of accomodation
 (b) Dilation of pupil
 (c) Loss of ocular movements
 (d) All of these

14. A person is suffering from frequent episodes of nasal discharge, nasal congestion, reddening of eyes and watery eyes. These are the symptoms of [KCET 2009, 12]
 (a) Cyanosis (b) Bronchitis
 (c) Rhinitis (d) Bronchial carcinoma

15. Albino condition is found in which human race
 (a) All races (b) White race
 (c) Black race (d) Mongols

16. Which of the following statements is correct [MP PMT 2013]
 (a) Tse-Tse fly spreads kala-azar
 (b) Sand fly spreads sleeping sickness
 (c) Trichonympha a symbiotic protozoan is found in the gut of termite
 (d) Pediculus humanus corporis is an endoparasite

17. Which of the following organisms is known to form abscesses in human liver, lungs, brain etc. [AIIMS 1993]
 (a) *Entamoeba histolytica* (b) *Monocystis*
 (c) *Plasmodium* (d) *Fasciola hepatica*

- 19.** Match the names of disease listed under column I with meanings given under column II, choose the answer which gives the correct combination of the alphabets of the columns

Column I (Name of disease)		Column II (Meanings)	
A.	Jaundice	p.	Allergic inflammation of nose
B.	Stenosis	q.	Loss of motor functions
C.	Rhinitis	r.	Heart valve defect
D.	Paralysis	s.	Increase in bile pigments in the blood
		t.	Septal defect of heart

- (a) A = q; B = t; C = r; D = p
 (b) A = s; B = p; C = q; D = r
 (c) A = s; B = r; C = p; D = q
 (d) A = s; B = t; C = p; D = q

- 20.** Identify the wrongly matched pair

- (a) Typhoid - Widal test
 (b) Plague - Viral disease
 (c) Malignant malaria - *Plasmodium falciparum*
 (d) Common Cold - Rhinovirus
 (e) *Trychophyton* - Ringworm

- 21.** Which disease in children is caused by intensive use of nitrate fertilizer [MP PMT 1996]

- 22.** Antivenom injection contains preformed antibodies while polio drops that are administered into the body contain

- [NEET (Phase-I) 2016]**

AR Assertion & Reason

Read the assertion and reason carefully to mark the correct option out of the options given below :

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion
 - (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion
 - (c) If the assertion is true but the reason is false
 - (d) If both the assertion and reason are false
 - (e) If the assertion is false but reason is true

1. Assertion : *Escherichia coli*, *Shigella* sp. and *salmonella* sp. are all responsible for diarrhoeal diseases.

- Reason :** Dehydration is common to all types of diarrhoeal diseases and adequate supply of fluids and electrolytes should be ensured.

[AIIMS 2008]

2. Assertion : Cancer is contagious and cells can spread from one person to other.
 Reason : Cancerous cells are highly differentiated cells. [AIIMS 2000]
3. Assertion : Surgery has been found highly effective in lung cancer.
 Reason : Resection is possible after the thoracotomy.
4. Assertion : Intake of potato chips and french fries may induce cancer development.
 Reason : On heating, their carbohydrate changes into a carcinogenic chemical called acrylamide.
5. Assertion : UV – rays are carcinogenic in nature.
 Reason : UV – rays rupture DNA strands and induce mutations to cause cancers.
6. Assertion : Adenoma is a sarcoma.
 Reason : Adenoma is located in the adipose tissue.
7. Assertion : Epstein – Barr virus is an oncovirus.
 Reason : It stimulates the growth of cancer.
8. Assertion : Pork should be properly cooked to avoid *Taenia* infection.
 Reason : Pork of pig contains Hexacanth and cysticerci larvae.
9. Assertion : Dye workers generally suffer from bladder cancer.
 Reason : These are more exposed to a carcinogenic chemical benzpyrene.
10. Assertion : There is no chance of transmission of malaria to a man on the bite of a male *Anopheles* mosquito.
 Reason : It carries a non virulent strain of *Plasmodium*. [AIIMS 2009]

Diseases caused by bacteria

1	a	2	b	3	d	4	a	5	d
6	a	7	a	8	a	9	b	10	c
11	b	12	b	13	d	14	d	15	e
16	b	17	a	18	a	19	a	20	a
21	b	22	c	23	a	24	d	25	b

Diseases caused by protozoa

1	d	2	d	3	c	4	d	5	b
6	d	7	c	8	d	9	b	10	c
11	c	12	a	13	c	14	b	15	c
16	d	17	a	18	b	19	d	20	c
21	a	22	b	23	b	24	a	25	c
26	a	27	c						

Diseases caused by helminthes

1	b	2	a	3	c	4	c	5	c
6	d	7	d	8	b	9	b	10	d
11	b	12	a	13	a	14	d	15	d
16	a	17	d	18	d				

Diabetes mellitus and Cardiovascular diseases

1	d	2	c	3	b	4	b	5	d
6	b	7	a	8	c	9	c	10	a
11	d	12	c	13	b	14	b	15	c
16	d								

Arthritis and Cancer

1	d	2	b	3	b	4	a	5	b
6	b	7	b	8	d	9	d	10	d
11	d	12	b	13	c	14	a	15	d
16	a	17	b	18	b	19	c	20	c
21	d	22	d						

NCERT Exemplar Questions

1	c	2	d	3	d	4	b	5	a
6	b	7	b	8	c	9	d		

Answers**Diseases caused by viruses**

1	b	2	c	3	c	4	a	5	b
6	d	7	b	8	b	9	b	10	b
11	a	12	a	13	b	14	d	15	c
16	b	17	c	18	c	19	a	20	d
21	e	22	a	23	a	24	a	25	b
26	b	27	d	28	a	29	a	30	b
31	b	32	d	33	d	34	c		

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Critical Thinking Questions

1	c	2	b	3	a	4	a	5	b
6	b	7	b	8	d	9	a	10	d
11	c	12	b	13	c	14	c	15	a
16	c	17	a	18	b	19	c	20	b
21	b	22	d						

Assertion and Reason

1	b	2	d	3	d	4	a	5	d
6	d	7	a	8	c	9	c	10	b

A Answers and Solutions

Diseases caused by viruses

1. (b) Chikungunya virus spreads by *Ades* mosquito.
3. (c) Dengue is commonly called 'bone breaking fever' which is caused by a virus transmitted by *Culex fatigans* and species of *Aedes* mosquito.
5. (b) Polio is highly infectious viral disease of infants and children. Its causal agent is a RNA containing *Polio virus*.
17. (c) Small pox is an acute highly communicable disease. It is caused by virus named variola virus. Now it is nearly eradicated from India.
19. (a) Yellow fever, a viral disease is transmitted by mosquitoes of various species of *Stegomyia genera*.
24. (a) Hepatitis may be transmitted via blood transfusions, contaminated equipment, unsterile needles, or any body secretion like saliva, sweat, semen, breast milk, urine, faeces.
25. (b) Measles is one of the most prevalent and serious disease of children. It is caused by virus named rubeola virus. Due to infection of virus, body produces antitoxin against viral infection, which is called interferon.
27. (d) Bubonic plague which affects rats and men is caused by *Pasteurella pestis* and is transmitted by insect vector flea *Xenopsylla cheopis*.

Diseases caused by bacteria

1. (a) Leprosy is a communicable bacterial disease caused by *Mycobacterium leprae*.
3. (d) Widal's test is the test for the presence of agglutinins to O and H antigens of *Salmonella typhi* and *Salmonella paratyphi* in the serum of patients with suspected *Salmonella* infection.

4. (a) Tuberculosis is a bacterial disease caused by *Mycobacterium tuberculosis*.
19. (a) Diphtheria is a serious disease caused by bacterium *Corynebacterium diphtheriae*. It commonly attacks mucus membrane of nose, throat and tonsils. The symptoms include high fever, sore throat, difficulty in breathing due to chocking.
22. (c) Syphilis a sexually transmitted disease (STD) is caused by *Treponema pallidum*.

Diseases caused by protozoa

3. (c) *Entamoeba gingivalis* lives in the buccal cavity of man. It causes ulcers in gums; which are invaded by pus forming bacteria. *Entamoeba gingivalis* feeds on bacteria also.
7. (c) Gambian fever or Gambian sleeping sickness is caused by a protozoan *Trypanosoma gambiense* and is transmitted by *Glossina palpalis* (tse-tse fly).
8. (d) Sleeping sickness is spread by tse-tse fly.
10. (c) Amoebiasis or amoebic dysentery is caused by the ingestion of quadrinucleate cyst of *Entamoeba histolytica* along with contaminated food and drinks.
17. (a) Schuffner's dots or granules are small red eosinophillic granules which appear in the cytoplasm of host corpuscles during malarial infection.
18. (b) Black water fever is caused by *Plasmodium falciparum*. It is also called as aestivo-autumnal or malignant tertian malaria or pernicious malaria. The fever is often fatal to the patient as it affects the brain.
23. (b) Sporozoites are the infective stage of malaria parasite. They present in the saliva of infected female *Anopheles* mosquito.
27. (c) By washing the hands, we can avoid the ingestion of cysts. Cysts are responsible for infection.

Diseases caused by helminthes

7. (d) Rocky mountain spotted fever is an acute rickettsial disease characterised by high fever, chills, pain in muscles and joints. It is caused by an infected tick.
13. (a) *Culex fatigans* is a biological vector for *Wuchereria bancrofti*. Filariasis or elephantiasis is caused by a nematode *Wuchereria bancrofti* which is transmitted through the bite of *Culex fatigans* mosquito. In this disease, there is huge enlargement of the diseased (affected) organ.

Diabetes mellitus and Cardiovascular diseases

2. (c) PCR (Polymerase Chain Reaction) is a method for amplifying a specific region of DNA molecule and thus, can help in the diagnosis of genetic basis of disorder
3. (b) Streptokinase produced by the bacterium *Streptococcus* and modified by genetic engineering is used as a 'clot buster' for removing clots from the blood vessels of patients who have undergone myocardial infarction leading to heart attack.
16. (d) Coronary heart disease is due to insufficient blood supply to the heart muscle. Main function of the coronary arteries is to supply oxygen and nutrients to the heart muscle and remove CO_2 and other metabolic wastes. But due to narrowing and hardening of these arteries due to accumulation of fatty deposits, lead to clot formation and resulting in the blockage of blood supply to a part of heart. These includes angina pectoris, heart attack and rheumatic heart disease.

Arthritis and Cancer

1. (d) Leukemia is abnormal increase in number of leucocytes which are all immature.
3. (b) Oxygen free radical released can destroy cancerous cells.
5. (b) Osteoporosis is a reduction in bone tissue mass causing weakness of skeletal strength, thus, bones become fragile. It results from excessive resorption of calcium and phosphorus from the bone.
12. (b) Glaucoma is not cancer but an abnormality of eye in which there is an increase in fluid (intra-ocular) pressure which leads to permanent damage of optic nerve fibres and consequently irreversible loss of eye-sight.
16. (a) In human beings cancer is caused by extra-activation of certain genes called proto-oncogenes into cellular oncogenes. Proto-oncogenes typically encode proteins receptors, signal transduction proteins, and transcription factors. Mutations in these genes tend to relax control mechanisms and accelerate cell division, leading to cell proliferation that is characteristic of cancer. Tumor suppressor gene normally keeps mitosis in check & prevent cancer from occurring.
18. (b) Cancer is caused by physical, chemical and biological factors. These factors are called carcinogens. Some of the carcinogens and their target tissues are
 Cadmium oxide - Prostate gland
 Diethylstibestrol (DES)- Vagina
 Aflatoxin - Liver
 Vinyl chloride (VC) - Liver
21. (d) Contact Inhibition is a property of normal cell not of cancer cells.

22. (d) Epstein-Barr Virus [EBV], also called Human herpes virus -4, is associated with cancers, such as Hodgkin's lymphoma, Burkitt's lymphoma, Nasopharyngeal carcinoma and gastric cancer.

Critical Thinking Questions

3. (a) Sickle cell anaemia is caused by a single gene mutation in the sixth place of β -chain of haemoglobin where glutamic acid is replaced by valine.

Assertion and Reason

1. (b)
2. (d)
3. (d)
4. (a) Recently Dr. Leif Busk of Sweden reported that when high carbohydrate food like potato chips and french fries are heated then a carcinogenic chemical called acrylamide, is formed.
5. (d) Ionising radiation's like X-rays, gamma - rays and particulate radiations from radioactive substance are known to rupture DNA strands and induce mutations to cause cancers.
6. (d) Sarcoma are malignant growths of the connective tissue. Adenoma is cancer of gland adenoma is located in the gland.
7. (a) Oncoviruses are cancer-causing viruses and may be DNA or RNA virus e.g., Epstein-Barr-Virus, Herpes simplex type 2 virus etc. This shows that the development of cancerous tumour is associated with certain genes.
8. (c) Human infection is direct and oral. It occurs by eating raw or under-cooked meaty pork (Pig muscle with cysticercus larvae of taenia). Infection in vegetarians occurs through improperly washed vegetable. So proper cooking of pork and properly washed vegetable to avoid taenia infection.
9. (c) Bladder cancer is caused by certain dyes. It is most commonly reported in the worker who work in industries such as dyeing and printing where these are exposed to aniline.
10. (b) There is no chance of transmission of malaria to man on the bite of male *Anopheles* as their mouth parts are organised to feed on fruit juice and leaves and they cannot even bite humans.

Common Human Diseases

Self Evaluation Test

1. Addison's disease is characterised by [CBSE PMT 1991]
- Elongation of limb bones and jaw becomes broad
 - Hypertension and enlargement of thyroid
 - Loss of appetite, vomiting, muscular weakness, lowering of BMR, blood pressure and bronze coloured patches of skin
 - Obesity, osteoporosis and glycosuria
2. Which of the following glands is enlarged in malaria [Odisha JEE 2009]
- Pancreas
 - Liver
 - Spleen
 - All of these
3. Match the following
- | | |
|---------------------------------|----------------------|
| A. <i>Leishmania donovani</i> | p. Malaria |
| B. <i>Wuchereria bancrofti</i> | q. Amoebiasis |
| C. <i>Trypanosoma gambiense</i> | r. Kala azar |
| D. <i>Entamoeba histolytica</i> | s. Sleeping sickness |
| | t. Filariasis |
- [CBSE PMT 1991; CPMT 2000; AMU (Med.) 2000; KCET 2002, 07; MP PMT 2002; Bihar MDAT 2002; AFMC 2003; DPMT 2006; Odisha JEE 2010]
- $A - s, B - r, C - q, D - p$
 - $A - r, B - s, C - t, D - t$
 - $A - r, B - t, C - s, D - q$
 - $A - r, B - t, C - q, D - p$
4. Which of the following symptoms indicate red sickness [CBSE PMT 1997]
- Red and ulcerated skin
 - Nausea and anaemia
 - Nausea and loss of hair
 - Ulcerated skin, nausea and loss of hair
5. Column I lists some disorders associated with brain. Column II lists the causes for these disorders. Match the two columns and identify the correct from those given
- | Column I | Column II |
|------------------------|---|
| A. Epilepsy | p. Degeneration of neurons in the cerebral cortex |
| B. Alzheimer's disease | q. Irregular electrical discharge in the neurons |
| C. Parkinson's disease | r. decreased production of acetylcholine |
| D. Huntington's chorea | s. Regeneration of dopamine releasing neurons |
| | t. Formation of blood clots in the brain |
- [KCET 2006]
- $A = t, B = s, C = r, D = p$
 - $A = q, B = r, C = p, D = s$
 - $A = q, B = r, C = s, D = p$
 - $A = q, B = s, C = r, D = p$
6. An example of Pasteur effect is..... [KCET 2004]
- Penicillium*
 - Pinnularia*
 - Saccharomyces*
 - Nostoc*
7. Defect in amino acid metabolism may results in [CPMT 2004]
- Albinism
 - Prophyria
 - Wilson's disease
 - Phenylketonuria
8. Deficiency of adrenal cortex activity leads to [CBSE PMT 1993]
- Addison's disease
 - Conn's disease
 - Cushing's disease
 - Simmond's disease
9. Which one of the following pairs is mismatched [AIEEE Pharmacy 2004]
- Hyperthyroidism – exophthalmic goitre
 - Hypercortisolism – cretinism
 - Hypothyroidism – myxoedema
 - Hypercortisolism – cushing's syndrome

Answers

1	c	2	c	3	c	4	d	5	c
6	c	7	d	8	a	9	b		