Human Health and Disease

• **Disease** is characterised by various signs and symptoms.

Diseases	
Infectious	Non-infectious
Example: Common cold	Example: Cancer

Infectious diseases

- It spreads through infectious agents that include bacteria, viruses, protozoans and fungi.
- Bacterial diseases
- o **Typhoid fever:** Salmonella typhi; Widal test is used for confirmation of typhoid
- Pneumonia: Streptococcus pneumoniae and Haemophilus influenzae; it infects the alveoli of lungs
- Other examples include dysentery, plague, diphtheria
- Viral diseases
- Common cold: Spreads through Rhino viruses
- Protozoan diseases
- Malaria: Pathogen is *Plasmodium*; malarial parasite requires two hosts: humans and female anopheles mosquito; malarial parasite reproduces asexually in the human host while in the mosquito host it reproduces sexually
- Amoebiasis (amoebic dysentery): Entamoeba histolytica
- Helminthes diseases
- Ascariasis: Pathogen is Ascaris
- Elephantiasis or filariasis: Pathogen is Wuchereria bancrofti
- Fungi
- Ringworms: Caused by fungi which belong to genera *Microsporum*, *Trichophyton* and *Epidermophyton*

- Immunity
- Ability of the body to fight infectious agents
- On the basis of the immunity possessed by the body, immunity can be innate immunity and acquired immunity.
- o **Innate immunity** is a non-specific type of defence mechanism.
- It has four types of barriers –
- Physical barrier: Example, skin covering of the body, secretion of mucous in the respiratory tract
- Physiological barrier: Example, acid in the stomach, tears from the eyes
- Cellular barrier: Example, monocytes and lymphocytes in blood
- **Cytokine barrier:** Example, interferon
- **Acquired immunity** is a specific type of defence mechanism. It shows two types of responses: primary response and secondary response.
- It involves two types of lymphocytes -
- **Blymphocytes:** Show humoral immune response
- **T lymphocytes:** Show cell mediated immunity (CMI)
- On the basis of production of antibodies, immunity can be further categorised as –
- o **Active immunity:** Body produces its own antibodies against antigens
- Passive immunity: Readymade antibody is transferred from one individual to another Colostrum (contains antibodies IgA) is an example of passive immunity provided by the mother to her child.
- **Vaccination:** It is the protection of the body from communicable diseases by administration of agents (called vaccines) that mimic the microbes. Vaccines are available against tetanus, polio, etc.
- **Antibodies:** Special, proteinous chemicals produced by B-lymphocytes present in our blood, in response to the entry of any foreign pathogen on our body.

AIDS (Acquired immunodeficiency syndrome)

It can spread -

- through sexual contact with the infected person
- from the mother to her child, through the placenta
- infected blood transfusion
- by the use of infected syringe
- It is caused by HIV virus (a retro virus) and has RNA as genetic material. HIV stands for Human Immunodeficiency Virus.
- When HIV virus enters the host cell, the viral RNA gets converted into viral DNA, which gets incorporated into the host DNA and starts producing new virus particles.
- Diagnostic test for AIDS: ELISA (enzyme-linked-immunosorbent serologic assay)

Treatment – No permanent cure; antiretroviral therapies can prolong the life of patient

Prevention of AIDS

- Ensuring use of disposable syringes
- Screening blood from blood banks
- Advocating safe sex

Cancer

- Tumour caused by abnormal and uncontrolled cell division. It is of two types –
- o Benign tumour: Remains confined to a particular location and does not spread
- Malignant tumour: Cells divides and invades new locations by getting transported through blood to distant sites
- Metastasis: Property of malignant tumour to invade the distant body parts, thereby initiating formation of new tumours.
- **Carcinogen:** Cancer-causing agents; e.g., X-rays, UV rays
- **Cancer detection and diagnosis:** Techniques involved are radiography, computed tomography and magnetic resonance imaging.
- **Treatment of cancer:** Involves techniques like radiotherapy, chemotherapy and immunotherapy.

Drugs and alcohol abuse includes -

¬ Opioids: Example, Heroin (extracted from Papaver somniferum)

— Cannabinoids: Example, marijuana, hashish, charas, ganja (obtained from Cannabis sativa), cocaine (obtained from Erythroxylum coca)

Adolescence and Drug abuse

Adolescence is the period during which the child becomes matured. It is between 12 – 18 years of age.

• Causes of drug abuse -

- \neg Curiosity
- \neg Adventure
- ¬ Excitement
- ¬ Experimentation
- ¬ Stress or pressure to excel in examination

Effects of drug/alcohol abuse -

- ¬ Reckless behaviour
- ¬ Malicious mischief
- ¬ Violence
- \neg Drop in academic performance
- ¬ Depression, isolation, aggressiveness, etc.

• Prevention and control -

- ¬ Avoid pressure
- ¬ Counselling and education
- ¬ Take help from parents and peers
- ¬ Take professional and medical help