

UNIT IV ENVIRONMENTAL ISSUES

CLIMATE CHANGE (2 Mark)

Definition (2 Mark)

The average weather of an area is called climate. "The change in the general weather condition, seasonal variation of a region over a long period" is called climate change.

Causes of climate change

- Presence of green house gases (CO_2 , CCl_4 , CFCs, CH_4)
- Depletion of ozone layer.
- Rotation of earth on its axis
- Uneven distribution of rainfall
- Seasonal changes

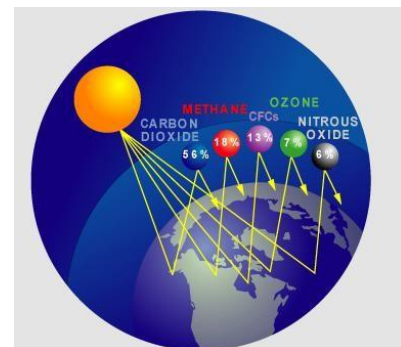
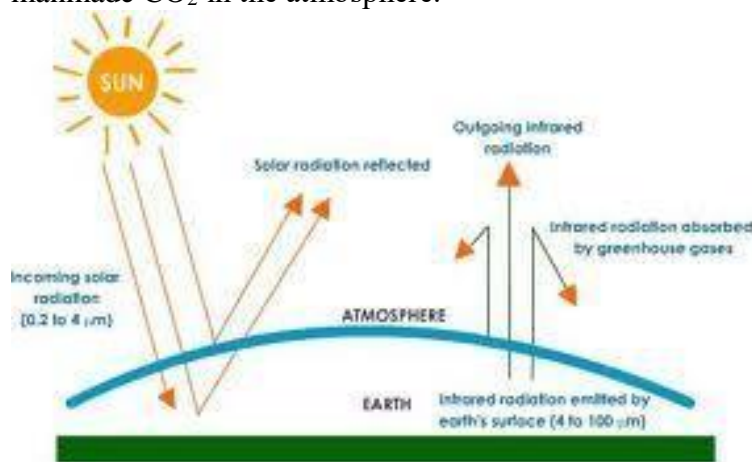
Effect of climate change

- Change the hydrological cycles results in floods and droughts
- Changes in global pattern of winds.
- Disturb the migration of birds, animals including humans
- Damage to plants, animals and humans.
- Global warming through green house effect, acid rain and ozone layer depletion.

GREEN HOUSE EFFECT/GLOBAL WARMING (8 Marks)

Definition (2 Mark)

It is defined as "the progressive warming of earth surface due to blanketing effect of manmade CO_2 in the atmosphere."



Major greenhouse gases and their sources

Greenhouse gases	Human sources
Carbon-di-oxide (CO ₂)	Fossil fuel burning, deforestation and plant burning
Methane (CH ₄)	Landfills, coal production, natural gas leaks from oil and gas production
Nitrous Oxide (N ₂ O)	Fossil fuel burning, fertilizers
Chloro Fluoro Carbon (CFCs)	Air conditioners. Refrigerators, plastic foams
Hydro Chloro Fluoro Carbon (HCFCs)	Air conditioners. Refrigerators, plastic foams
Hydro Fluoro Carbon (HFCs)	Air conditioners. Refrigerators, plastic foams
Carbon Tetra Chloride(CCl ₄)	Cleaning solvent

Effect on global warming

- Increase in sea level
- Effect on Agriculture and forestry
- Effect on water resources
- Effect on terrestrial ecosystems
- Effect on human health.
- Global temperature increases
- Flood and drought



Control measures of global warming:

- Plant more trees.
- Use energy more efficiently.
- Shift to renewable energy resources.
- Shift from coal to natural resources.
- Efficiently remove CO₂ from smoke stacks.
- Reducing CO₂ emission
- Adopt sustainable agriculture.
- Implement energy conservation measures.
- Cut down the current rate use of CFC's and fossil fuel.

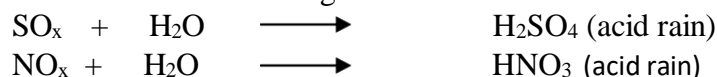
ACID RAIN (8 Marks)

Definition (2 Mark)

It is defined as “Oxides of nitrogen (NO₂), sulphur (SO₂) produced by combustion of coal, petroleum etc, and dissolved in atmospheric water vapor (H₂O) results in the formation of acids like nitric acid, sulphuric acid etc, and reach the earth surface as Acid rain.”

Mechanism of Acid rain formation: (8 Mark)

- Thermal power plants, industries and vehicles release NO₂ and SO₂ into atmosphere
- The presence of sulphur oxide and nitrogen oxide in the atmosphere under favorable conditions
- When sufficient moisture (water droplets) is present in the atmosphere
- The above oxides (NO₂ and SO₂) dissolve in the water droplets to become nitric acid and sulphuric acid
- Reach the earth as acid rain through rain water.



- These strong acids increasing the acidity in rain water.



Effects of acid rain: (4 Mark)

(i) Human beings

- Destroy life – nervous, respiratory and digestive system
- Causes premature death from heart and lung disorders.

(ii) On Buildings

- Corrosion - Taj Mahal, houses, statues, bridges, metals.
- Corrodes the metal, destruction of paints and stone.(marble and lime stone)

(iii) On terrestrial and Lake Ecosystem

- Reduces the rate of photosynthesis, Fish population and bio mass production.
- Reduces growth of plants and increased sensitivity to drought and diseases.
- Reduces crop yields.

(iv) Effect of acid rain on Aquatic organisms

- The lakes and streams, where pH level decreases and aluminium levels increases may affect fishes and plants.
- It kills aquatic organisms like plants and fishes.

- The activity of bacteria, fungi and other micro organisms is reduced in acidic water.
- Dead materials are slowly decomposed and the biomass production is reduced in water.

Control measures of Acid rain: (4 Mark)

- Clean combustion technologies
- Using pollution control equipments
- Replacement of coal by natural gas
- Liming of lakes and soils.
- Emission of SO₂ and NO₂ from industries and power plants should be reduced by using pollution control equipments like scrubbers.
- Industries and power plants do not burn fossil fuels.
- Coal containing less sulphur should be used in industries and power plants
- Alternative energy of coal, natural gases, powered vehicles, battery powered cars, fuel cells etc, are used.

OZONE LAYER DEPLETION (8 Marks)

Definition (2 Mark)

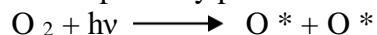
- Ozone gas is present in the atmosphere.
- It is highly concentrated at the stratosphere between 10 to 50 Km above the sea level and is called as ozone layer.

Importance:- (2 Mark)

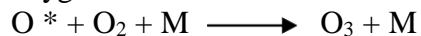
- O₃ protects us from damaging UV radiation of the sun.
- It filters UV radiation.
- Now a day's certain parts of O₃ layer is becoming thinner and O₃ holes are formed. Because of this more UV radiation reaches the earth's surface.
- UV radiation affects DNA molecules, causes damages to the outer cell of plants and animals.
- It causes skin cancer and eye disease in human beings.

Formation of O₃ (2 Mark)

- It is formed in the atmosphere by photochemical reaction



- The atomic oxygen reacts with molecular O₂ to form O₃

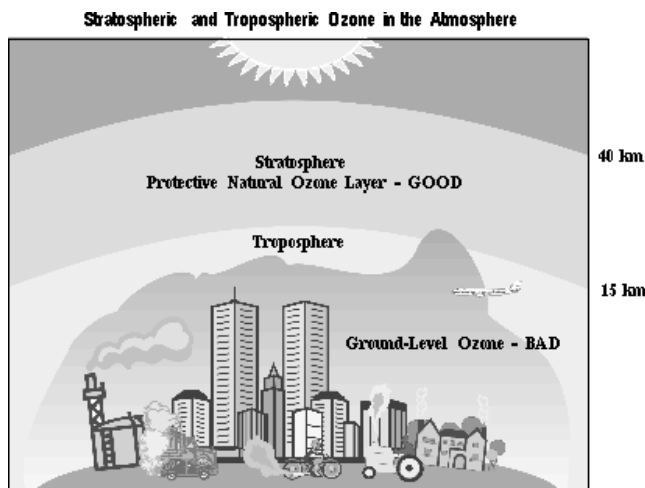


Where M = third body like nitrogen.

O* = Nascent oxygen / atomic oxygen

Mechanism of O₃ layer depletion (8 Mark)

- Refrigerators, air conditioners, aerosol sprays and cleaning solvents release CFCs into the atmosphere.
- CFCs release chlorine which breaks O₃ to O₂
$$\text{Cl} + \text{O}_3 \longrightarrow \text{ClO} + \text{O}_2 (\text{g})$$
$$\text{ClO} + \text{O}_3 \longrightarrow \text{Cl} + \text{O}_2$$
- Each chlorine atom is capable of breaking several O₃ molecules.
- It is a chain reaction.
- 1% loss of O₃ results in 2% increase in UV rays reaching the earth surface.



Ozone depletion chemicals (2 Mark)

- CFC, HCFC, BFC.
- Sometimes atmospheric sulfur dioxide
- It is converted in to H_2SO_4 which increases the rate of O_3 layer depletion.

Effects of ozone layer depletion (4 Mark)

(i) Effects on human beings

- UV rays cause skin cancer.
- Increases the rate of non melanin skin cancer in fair colored people.
- Prolonged expose to UV rays leads to actinia, Katatities (slow blindness) and cataracts.

(ii) Effects on aquatic system

- UV rays affects phytoplankton, fish, larval crabs.
- Phytoplankton consumes large amounts of CO_2
- Decrease in population of phytoplankton.

(iii) Effect on Materials

- Degradation of paints, plastics and other polymeric materials.

(iv) Effect on Climate

- More amount of CO_2 in atmosphere which contributes to global warming.

Control measures (2 Mark)

- Manufacturing and using of O_3 depleting chemicals should be stopped.
- Use of methyl bromide which is a crop fumigant should be controlled.
- Replacing CFC s by other materials which are less damage.

NUCLEAR ACCIDENTS AND NUCLEAR HOLOCAUST (4 + 4Mark)

Nuclear energy (2 Mark)

Energy released during a nuclear reaction is called nuclear energy. Nuclear reactors produce the nuclear energy either by nuclear fission or fusion.

Nuclear accidents (2 Mark)

The most serious hazards to human and environmental health from the nuclear accident is the release of large amounts of nuclear energy and radioactive products into the atmosphere.

Types of nuclear accidents (2 Mark)

- Nuclear test;
- Nuclear power plant
- Improper disposal of radioactive waste
- Accident during transport
- Core melt down

Effect of Nuclear radiations (2 Mark)

- Breaking of chemical bonds such as DNA in cells.
- Suffer from fatigue, vomiting and hair loss.
- Affect bone marrow, blood cells, natural resistance and blood to fail clot.
- Kills the organisms by damaging the tissues of heart and brain.

NUCLEAR HOLOCAUST (4 Marks)

Definition (2 Marks)

It is defined as “destruction of biodiversity (living beings are totally destroyed) by nuclear equipments and nuclear bombs”.

Effect of Nuclear Holocaust (4 Mark)

Nuclear winter (4 Mark)

- Nuclear bombardments will cause combustion of wood, plastics, petroleum, forest etc
- Large quantity of black shoot will be carried to the stratosphere.
- Black shoot will absorb UV radiations and will not allow the radiations to reach the earth.
- Therefore cooling will result. This is called as nuclear winter.
- Nuclear winter is opposite to global warming.

Effects of Nuclear winter (2 Mark)

- Lower the global temperature.
- Crop productivity will be reduced.
- It ignites all combustible material.
- Destroy all the living beings, material crushing, and destruction of homes.

Example of Nuclear Holocaust: (2 Mark)

- **Nuclear war** - Japan and Hiroshima are best e.g. of nuclear holocaust, which happened at II world war.
- **At Chernobyl** - A low power tests at Chernobyl in Ukraine, the reactor exploded.

Control Measures: (2 Mark)

- Suitable precautions are to be taken for handling these materials to avoid accident.
- Constant monitoring of the radiation level
- Regular checks and control measures.

CASE STUDIES

- Chernobyl Nuclear disaster, Bhopal gas Tragedy

QUESTION BANK

PART – A

1. What is Ozone depletion? *
2. What is Global warming? *
3. What is Green house gases / global warming? *
4. What are the causes of energy demand?
5. What is acid rain? / What is acid precipitation? *
6. How CFC's are accumulated in atmosphere? *
7. What are the causes and effect of ozone layer depletion?
8. What are the advantage of rain water harvesting *
9. Mention the causes & effects of acid rain. *
10. Define the term “nuclear winter” *
11. Write short note on consumerism and waste products *
12. Define “E waste” *
13. Differentiate nuclear accident & nuclear holocaust. *

PART – B

1. Explain the process of Greenhouse effect *
2. Explain the Mechanism of Acid rain formation *
3. Explain the mechanism of ozone layer depletion. *
4. Explain the various objectives of public awareness.*

Population Growth (2Mark)

The increase in population due to “low death rate and high birth rate” is called population growth.

Causes of rapid population growth (2Mark)

- The rapid population growth is due to decrease in death rate and increase in birth rate.
- Availability of antibiotics, immunization, increased food production, clean water and air decreases the famine-related deaths.
- In agricultural based countries, children are required to help parents in the field that is why population increases in the developing countries.

Characteristics of population growth (4Mark)

- **Exponential growth** (2Mark)
Population growth occurs exponentially like $10, 10^2, 10^3, 10^4$ etc.
- **Doubling time** (2Mark)
The time require for a population to double its size T_d (doubling time) = $70 / r$ (r- annual growth rate)
- **Infant mortality rate** (2Mark)
Percentage of infants died out of those born in 1 year
- **Total fertility rate (TFR)** (2Mark)

It is the average number of children delivered by women in her life time

➤ **Replacement level**

Two parents bearing two children will be replaced by their off spring.

➤ **Male/female ratio**

The ratio of girls and boys should be fairly balanced in society

➤ **Demographic transition.**

Death rates and birth rates fall due to improved living conditions.

Problems of population growth (2Mark)

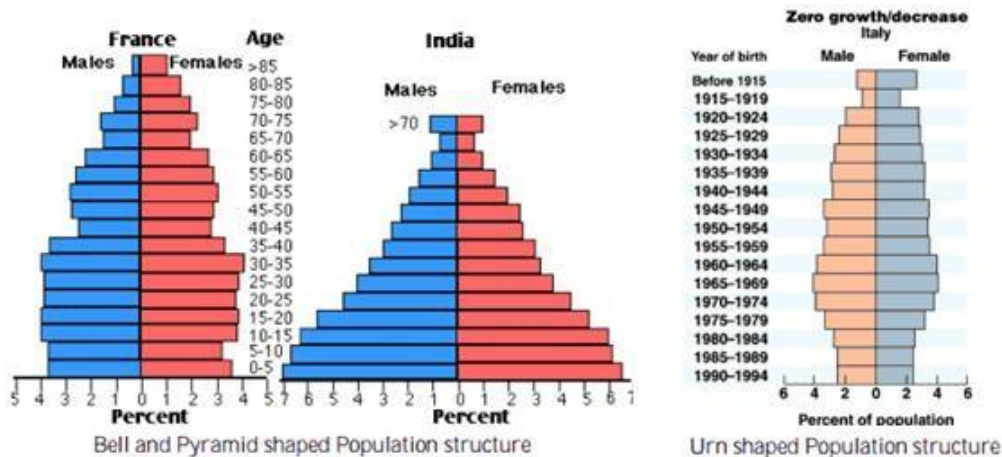
- Increasing demands for food and natural resources
- Inadequate housing and health services
- Loss of agriculture lands
- Unemployment
- Environmental pollution

Variation of Population Among Nations (4 Mark)

- The human population has grown faster in the 20th century than ever before.
 - Only 25% in the Most developed countries (USA, Canada, Australia).
 - 80% in the Less developed countries (South America, Africa, and Asia).
 - The annual rate of population growth experienced in developing countries is three times higher than when compared to developed countries.
 - The density of population is very low in Antarctica and very high in Asia and Europe
 - Density of Asia's population is approximately three times higher than the world
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- China was the most population country throughout the 20th century
 - India may win the race in the 21st century
 - Ethiopia with about 18 million people 50 years ago is likely to grow at least tenfold over a century
 - Bangladesh with very small area is already overcrowded at 128 million people.
 - The population of Japan will shrink to 100 million by 2050, from the present 126 million.
 - Europe will constitute only 7% in 50 years from 72% present population

Variation of population based on age structure (8 Mark)

1. Bell shaped – France, USA, and UK. (stable)
2. Pyramid shaped – India, Bangladesh, and Ethiopia. (increase)
3. Urn shaped – Germany, Italy, Sweden, Japan (decrease)



Bell shaped variation of Population structure – France, USA, and UK. (Stable)

- It shows that, the pre-productive age group population (0 - 14 years) and reproductive age group population (15-44 years) are more or less equal.
- Show the people entering in to the reproductive age group will not change the population and thus the population growth is stable.

Pyramid shaped variation of Population structure–India, Bangladesh and Ethiopia. (Increase)

- It shows that, the pre-productive age group population (0 - 14 years) is more, indicated at the base of the pyramid, and post-reproductive age group population (above 45 years) is less, indicated at top of pyramid.
- The large number young age people will soon enter in to reproductive age group population (15 - 44 years), which increases the population growth.

Urn shaped variation of Population structure – Germany, Italy, Sweden, Japan (decrease)

- It shows that, the pre-productive age group population (0 - 14 years) is smaller than the reproductive age group population (15 - 44 years).
- In the next 10 years, the number of people in the reproductive age group is less than the before, resulting in a decrease of population growth.

Population Explosion (2Mark)

It is defined as “the enormous increase in population due to low death rate and high birth rate”.

Causes

- Modern medical facilities, life expectancy, illiteracy.

Effects

- Poverty, Environmental degradation, over-exploitation of natural resources, threat, communal war.

Remedy

- Through birth control programs.

FAMILY WELFARE PROGRAMME (4 Mark)

Objectives



- Slowing down the population explosion
- Over exploitation of natural resources

Importance of Family Welfare Programme

- To decrease the population explosion
- To minimize Air, Water, and Soil pollution
- To reduce the human impact on biodiversity
- To lower the energy consumption

FAMILY PLANNING PROGRAMME (4 Mark)

Objectives

- Reduce infant mortality rate.
- Encourage late marriages.
- Improve women's health.
- Control of communal diseases.
- Constrain the spread of AIDS / HIV

Family Welfare Programme in India

- India started family planning programme in 1952, when the population was nearly 400 million.
- In 1978, raised the marriage age from 18 to 21 for men and 15 to 18 for women
- Permanent methods or sterilization by minor surgery
- Tubectomy in female
- Male sterilization or Vasectomy
- Both are very simple procedures, done under local anesthesia, are painless, and patients have no post-operative problems
- Vasectomy does not cause any loss in male's sexual ability
- Temporary birth control methods are:
 - (i). use of condoms
 - (ii) Intrauterine devices (copper T's)
 - (iii) OC Pills and Injectable drugs

ENVIRONMENT AND HUMAN HEALTH (8 Mark)

- A physically fit person not suffering from any disease is called a healthy person"
- According to the World Health Organization (WHO) in 1948, "Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity"

Factors influencing human health

- Nutritional factors
- Biological factors
- Chemical factors
- Psychological factors

Important hazards and their health effects

1. Physical hazards and their health effects

S.No	Physical hazards	Health effects
1	Radioactive radiations	1. Affects the cells in the body and the function of glands and organs 2. suffer from cancer
2	UV radiations	Skin cancer
3	Global warming	Temperature increases cause famine, mortality
4	Chlorofluoro carbons	Damage O ₃ layer, allows more UV-rays, cause skin cancer.
5	Noise	Painful and irreparable damage to human ear

2. Chemical hazards and their health effects

S.No	Chemical hazards	Health effects
1	Combustion of Fossil fuels	Asthma and lung diseases
2	Industrial effluents	Kill cells and cause cancer and death
3	Pesticides	Affect the food chain
4	Heavy metals	Contaminate water, cause ill effects

3. Biological Hazards and their health effects

S.No	Biological hazards	Health effects
1	Bacteria, Viruses and Parasites	Diarrhea, malaria, anaemia, cholera

Control and prevention:

- Always wash your hands before sitting for food
- Cut short and clean your nails
- Maintaining the skin, teeth, hair
- Drinking chemical treated and filtered water
- Before cooking wash the vegetables and fruits with clean water

HUMAN RIGHTS (8 Mark)

“Human rights are the fundamental rights, which are possessed by all human beings irrespective of their cast, nationality, sex and language”.

- **Human right to freedom**
 1. Every citizen has the freedom to express his views freely
 2. They have full rights to starts any profession
- **Human right to property** : Every human beings has the right to earn property
- **Human right to freedom of religion**: freedom to choose their religion according to his wishes.
- **Human right to culture and education**: equal rights both in culture, language and education.
- **Human right to constitutional remedies**: fundamental rights to he / she can go to the court for protections.
- **Human right to equality**: All citizens are equal before the law and employment.
- **Human right against exploitation**: every citizen has the right to fight against exploitation.



- **Human right to food and environment:** right to get sufficient healthy food, safe drinking water and healthy environment.
 - **Human right to good health:** right to have very good physical and mental health.
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VALUE EDUCATION (8 Mark)

Education is nothing but learning, through which knowledge about the particular thing can be acquired.

Types of education

1. **Formal education**
 - All learning process in formal education is self related.
2. **Value education**
 - It is an instrument used to analyze our behavior and provide proper direction to our youth.
 - It teaches them the direction between right and wrong, to be compassionate, helpful, loving, and generous and tolerant.
3. **Value-based environment education**
 - Environment education provided knowledge about principles of ecology and biodiversity

Objectives of value education

- To improve the integral growth of human beings.
- To create attitudes and improvement towards sustainable lifestyle.
- To increase awareness about our national history our cultural heritage, constitutional rights, national integration, community development and environment.
- To create and develop awareness about the values and their significance and role.
- To know about various living and non- living organisms and their interaction with environment.

Types of values

1. **Universal values / Social value**
 - It tells about the human conditions.
 - They are reflected in life, joy, love, compassion, tolerance, service, truth, etc.
2. **Cultural values**
 - It varies with respect to time and place
 - These are concerned with right and wrong, good and bad, true and false and behavior of human beings.
3. **Individual values**
 - Parents and teachers are the main key to shape our Individual values.
 - It is reflected in Individual goals, relationships, commitments, etc
4. **Global values**
 - The human civilization is a part of the planet and similarly nature and natural

phenomena over the earth are inter connected and inter link with special bonds of harmony

- If this harmony is disturbed anywhere there will be an ecological imbalance leading to catastrophic results.

5. Spiritual values

- It promote conservationism and transform our consumerist approach
- It is reflected in self-restraint, self-discipline, reduction of wants, etc.

HIV / AIDS (4 Mark)

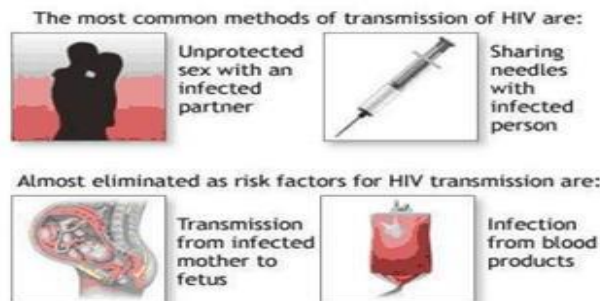
AIDS is the abbreviated form for Acquired Immune Deficiency Syndrome caused by a virus called HIV (Human Immune deficiency Virus).

Origin of HIV/AIDS (2Mark)

- Through African Monkey
- Through Vaccine Programme
- African monkey or Chimpanzees To human.
(a) Polio, small pox vaccine from monkey's kidney-Africa.
(b) Hepatitis-B viral vaccine-Los Angles and New York.

Factors influencing modes of Transmission of HIV (2 Mark)

- Unprotected sex with infected person.
- Using needles or syringes from HIV positive person.
- During pregnancy, breast feeding HIV transmits from mother to infant babies.
- Blood transfusion during accident and pregnancy.
- Biologically the male to female transmission is 2 to 4 time more efficient than female to male
- Women's cervical tissue is more vulnerable to HIV than men.



Tests for HIV

- ELISA - test
- Western plot - confirmation test

Factors not influencing transmission of HIV (2 Mark)

- Tears, food, air, cough, handshake and normal kissing
- Mosquito flies and insect bites
- Sharing of utensils, clothes, toilets and bathroom

Effects (2 Mark)

- Death
- Loss of labor

- Inability to work
- Lack of energy

Function of HIV in human body (2 Mark)

- White blood cells (WBC) are responsible for the formation of antibodies called T – helper cells.
- T – Helper cells are the key infection fighter in the immune system. Once HIV cells are enter into the body they destroy the T- cells and cause many infectious diseases.

Symptoms of Affected Persons (2 Mark)

1. Minor symptoms
 - Persistent cough for more than one month
 - General ski disease
 - Viral infection
 - Fungus infection in mouth and throat
 - Frequent fever, headache and fatigue.
2. Major symptoms
 - Diarrhea for more than one month
 - TB for more than one month
 - Fall of hairs
 - 10% of body weight loss within short period.

Control and Preventive measures (2 Mark)

- Education.
- Prevention of Blood borne HIV transmission.
- Primary health care.
- Counseling services.
- Drug treatment. (a) AZT (Azido thymidine or Zidovudine or Retrovin)
(b) DDI (Dideoxyinosine)

WOMEN AND CHILD WELFARE (4 Mark)

Objectives of Women welfare

- To provide proper education
- To impart vocational training
- To insist the need of healthy nutrition during pregnancy period
- To increase the awareness about family planning
- To avoid female infanticide
- To increase the employment opportunities
- To restore the dignity, equality, and respect for women
- Suffer gender discrimination and devaluation at home, at workplace, in matrimony, in inheritance, in public life and power
- Women – performs multiple roles
- Ministry of Women and child development – High number of cases of abduction, dowry deaths, rape, domestic violence, criminal offences and mental torture to women, needs immediate attention

Child Welfare (4 Mark)

- Children are considered to be the assets of a society
- But about a million babies, out of 21 million born every year in India are abandoned soon after their birth due to different socio-economic reasons.



- About 20 million children in our country are estimated to be working as child labours.
- **Poverty** is the main reason to drive these children into long hours of work in miserable, unhealthy conditions
- Do not get the minimum nutritive food, education, and recreational facilities, which are their rights.
- Awareness regarding the proper care of children – need of the hour

QUESTION BANK

PART – A

1. Write short notes on population dynamics.
2. What are the factors affecting population size?
3. What is meant by population stabilization.
4. Define the term population explosion. *
5. What is doubling time, total fertility rates? *
6. Define Zero Population growth. *
7. What are the objectives of family planning programs? *
8. What are the factors influencing human population?
9. Why the knowledge of HIV and AIDS is must? *
10. What are the two primary strains of HIV?
11. What do you meant by GIS and remote sensing? *
12. List any two tests for HIV. *
13. Name two drugs used in treatment of AIDS. *
14. What is meant by value education?
15. Differentiate HIV from AIDS. *

PART – B

1. Explain the population characteristics & variations among nations.
2. Explain how our health is affected by environmental pollution. *
3. Explain various impacts caused by population explosion over environment.
4. Discuss various issues & measures for Women & Child Welfare at International & National level. *
5. Briefly discuss HIV/AIDS, mode of its spread and its effect on environment.
6. Write an essay on role of information technology environment. *
7. Write notes on the following in relation to human population and environment
 - i) Women and child welfare. *
 - ii) Human rights*
 - iii) Value education. *

*-Give more preference