GRT INSTITUTE OF ENGINEERING AND TECHNOLOGY, TIRUTTANI - 631209

(Approved by AICTE, New Delhi Affiliated to Anna University, Chennai.)

Department of Electronics and Communication Engineering

II Year – IV Semester

GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING

MINIMUM LEARNING MATERIAL

GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C 3 0 0 3

OBJECTIVES:

- To study the nature and facts about environment.
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds; Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial /Agricultural.

UNIT III NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over- utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme - environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

OUTCOMES:

- Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
- Public awareness of environmental is at infant stage
- Ignorance and incomplete knowledge has lead to misconceptions
- Development and improvement in std. of living has lead to serious environmental disasters

TEXTBOOKS:

1. Benny Joseph, =Environmental Science and Engineering‘, Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M.Masters, =Introduction to Environmental Engineering and Science‘, 2 edition, Pearson Education, 2004.

REFERENCES:

1. Dharmendra S. Sengar, =Environmental law‘, Prentice hall of India PVT LTD,New Delhi, 2007.
2. Erach Bharucha, ―Textbook of Environmental Studies‖, Universities Press (I) PVT, LTD, Hydrabad, 2015.
3. Rajagopalan, R, =Environmental Studies-From Crisis to Cure‘, Oxford University Press, 2005.
4. G. Tyler Miller and Scott E. Spoolman, ―Environmental Science‖, Cengage Learning India PVT, LTD, Delhi, 2014.

UNIT I – ENVIRONMENT, ECOSYSTEM AND BIODIVERSITY

Part A

1. Write the definition of environmental science and engineering.

Environmental science is the study of nature and the facts about environment. Basically environment can be defined as "all the social, economic, physical & chemical factors that surrounds man" (or) "all abiotic and biotic components around man - all living and nonliving things surrounds man".

2. Define environment.

'Environment' is derived from the French word ***Environner*** which means to encircle or surround. All the biological and non-biological things surrounding an organism are thus included in environment. Thus environment is sum total of water, air and land, inter-relationships among themselves and also with the human beings, other living organisms and property.

3. Write down the components of environment.

The components of environment can be broadly divided into two

1. Abiotic components - composed of all the nonliving components like temperature, water, minerals and gases etc

2. Biotic Components - composed of all the living components-plants, animals and micro-organisms.

The Abiotic components include: 1.Lithosphere 2. Hydrosphere 3. Atmosphere

The Biotic components include: 1, Producers 2. Consumers 3. Decomposers

4. Write notes on troposphere

This is the lowest layer of atmosphere. It extends up to 10-12km at mid latitudes, 5-6 km around poles and up to 18 km at equator. It contains water vapors, clouds and important gases like oxygen and nitrogen. The temperature in this region decreases at the rate of 5-7 degree centigrade per km.

5. Write notes on Stratosphere

This layer extends up to 50 km above the earth's surface. This is a stable layer and it consists of dry air. The main chemical species of this region is ozone. It protects human beings from ultra violet radiation, which are emitted from the sun.

6. Write notes on Thermosphere

This layer exists up to 500km above the earth's surface. The heating of the thermosphere is due to the absorption of solar energy by atomic oxygen. Within this layer is the relatively dense band of the charged particles called ionosphere. Worldwide communication is done using this layer.

7. Write the principles of environmental education.

1. Examine the major env. Issues
2. Discover the root cause
3. Develop problem solving skills
4. Promote co-operation in solving problems
5. Emphasis active participation in prevention and solution to problems.

8. Write the scope of environmental science.

1. Studying the interrelationship between the components of env.
2. Carrying out impact analysis and env. Audit

3. Preventing pollution from existing and new industries
4. Stopping the use of biological and nuclear weapons
5. Managing unpredictable disasters etc.

9. What are the reasons for environmental ignorance?

1. Science, technology and economics failed to integrate the knowledge onenvironmentalaspects in curriculum
2. The decision makers do not process environmental angle of decision making
3. Consideration of economic growth, poverty eradication has led to environmentaldegradation
4. Only few developmental activities are made considering the environmental aspects.

10. Why there is need for public awareness?

The United Nations Conference on Environment and Development held at Reo de Janeiro in 1992 (popularly known as 'Earth Summit') and world summit on sustainable development at Johannesburg in 2002, have highlighted the key issues of global environmental concern. They have attracted the attention of people.

11. Write role of NGOs in public awareness.

1. Advise the government in interacting with ground level people
2. Organize public meetings to create environmental awareness

Eg: Recent report of 'center for science and environment' on permissible limits of pesticides in cola drinks.

12. Define ecosystem.

An ecosystem is defined as a natural functional ecological unit comprising of living organisms and their non-living environment that interact to form a stable self-supporting system.

Eg: Pond, lake, desert, grassland, forest, etc.

13. Why are plants called as producers?

The green plants have chlorophyll with the help of which they trap solar energy and change it into chemical energy of carbohydrates using simple inorganic compounds namely water and carbondioxide.As the green plants manufacture their own food they are known as Autotrophs.

14. Write the classification of biological environment.

1. Floral/Plant Environnent
2. Faunal /Animal Environnent
3. Microbial environment

15. What is the structural features of ecosystem?

Composition and organization of biological communities and abiotic components constitute the structure of an ecosystem

i) Biotic structure: - The plants, animals and microorganisms present in the ecosystems form the biotic component.

ii) Abiotic structure: - The physical and chemical components of an ecosystem constitute its abiotic structure. It includes climatic factors, soil factors, geographical factors, energy, nutrients and toxic substances.

16. What is meant by biotic structure?

The plants, animals and microorganisms present in the ecosystems form the biotic component. It is classified in to, a) Producers, b) Consumers and c) Decomposers

17. What is meant by abiotic structure?

The physical and chemical components of an ecosystem constitute its abiotic structure. It includes climatic factors, soil factors, geographical factors, energy, nutrients and toxic substances. They are classified in to a) Physical factors and b) Chemical factors.

18. What are called Producers?

Producers are mainly the green plants, which can synthesize their food themselves by making use of CO2 present in the air and water in the presence of sunlight by involving chlorophyll, through the process of photosynthesis. They are also known as photo autotrophs.

19. What are called consumers?

All organisms which get their organic food by feeding upon other organisms are called consumers. The consumers are of the following types,

a) Herbivores
b) Carnivores
c) Omnivores
d) Detritivores

20. What are called Decomposers?

They derive their nutrition by breaking down the complex organic molecules to simpler organic compounds and ultimately in to inorganic nutrients. Various bacteria and fungi are decomposers.

21. Define ecology.

Ecology is defined as the study of relationship between organisms and their environment.

22. Define energy flow in an ecosystem.

The flow of energy from one trophic level to next trophic level with in an ecosystem is called energy flow in an eco-system.

23. Explain food chain

In food chain each organism eats the smaller organism and is eaten by the larger ones. All these organisms which are interlinked with each other through food together constitute a food chain.

24. What is meant by Grazing food chain?

It starts with green plants (primary producers) and culminates in carnivores.

Eg: Grass-grasshopper-Frog-Snake-Hawk.

25. What is meant by Detritus food chain?

It starts with dead organic matter which the detritivores and decomposers consume. Partially decomposed organic matter and even the decomposers are consumed by detritivores and their predators.

Eg: - Leaf litter-algae-crabs-small carnivore's fish-large carnivorous fish

(Mangrove ecosystem)

Dead organic matter-fungi-bacteria

26. Explain food web.

Various food chains are often interlinked at different trophic levels to form a complex interaction between different species from the point of view of food. This network is called the food web.

27. Define nutrient cycle/ Bio-geochemical cycle/ material cycle.

The cyclic exchange of nutrient material between the living organisms and their non-living environment is called nutrient cycle. As indicated by the name, the nutrients circulate through life (bio) and through earth (geo) repeatedly (cycle)

28. Name some of natural impacts on environment.

Some of the natural impacts are

1. Earthquake 2. Tsunamis 3. Flood 4. Volcanic eruption.

29. Name some of the anthropogenic impacts on environment.

1. London Smog 2. Mediterranean a dead sea 3. Nuclear explosions 4. Minamata disease 5. Bhopal disaster 6. Chernobyl disaster 7. Gulf war hazards

30. Define sustainable development

Sustainable development can be summarized as 'meeting the needs of the present without compromising the ability of future generations to meet their own needs.

31. Explain the concept of sustainable development

The concept of sustainable development has the following underlying promises.

1. A symbiotic relationship between the consumer human race and the producer natural system.

2. Compatibility between ecology and economics.

32. Write short notes on photosynthesis.

The process by which chlorophyll bearing plants use energy from the sun to convert carbon dioxide and water into sugars is called photosynthesis.

33. Define mole.

Mole is defined as the amount of substance present in a material. The term mole can be applied to any particle. In general it is the ratio between mass and molecular weight of a particle.

34. Define biodiversity.

Biodiversity is the abbreviated word for "biological diversity" (bio-life or living organisms, diversity-variety). Thus biodiversity is the total variety of life on our planet, the total number of races, varieties and species. The sum of total of various types of microbes, plants and animals (producers, consumers and decomposers) in a system.

The concept of biodiversity may be analyzed in 3 different levels. They are

1 ecosystem diversity 2 species diversity 3 genetic diversity

35. Define species diversity.

Species diversity describes the number of kinds of organisms within individual communities or ecosystems.

36. Define genetic diversity.

Genetic diversity is a measure of the variety of versions of same gene within individual species.

37. Define Biodiversity Hotspots:

Most of the world's biodiversity are near the equator especially tropical rain forest and coral reefs. Of all the world's species, only 10-15% live in North America and Europe.

The Malaysian Peninsula, for instance, has at least 8000 species of flowing plants, while Britain, with an area twice as large, has only 1400 species. South America has 200 000 species of plants.

38. Define significance of biodiversity:

a) Biosphere is a life supporting system to the human race. Each species in the biosphere has its own significance.
b) It is the combination of different organisms that enables the biosphere to sustain human race.
c) Biodiversity is vital for a healthy biosphere.
d) Biodiversity is must for the stability and proper functioning of the biosphere.

39. Define endangered species.

The species which are under immediate danger of extinction.

40. Write notes on in-situ conservation.

_ Conservation of species in its natural habitat, in place where the species normally occurs
_ the strategy involves establishing small or large protected areas, called protected areas
_ today in world, there are 9800 protected areas and 1500 national parks

41. Write notes on ex-situ conservation.

It involves maintenance and breeding of endangered plant and animal species underpartially or wholly controlled conditions in zoos, gardens and laboratories.

42. Write the importance features of Indian law for conservation of biodiversity.

The wild life (protection) Act 1972:

Enacted

1. To protect wild animals and birds which are in the verge of extinction
2. To protect biological diversity in particular and environmental protection in general.
3. For the protection of wild animals and birds and for all other matters connected there of or ancillary and incidental there to.

43. What are the threats to biodiversity?

(i) Habitat loss (ii) Hunting (iii) Fragmentation (iv) Over harvesting**.**

UNIT II – ENVIRONMENTAL POLLUTION

1. Define pollution.

"The unfavorable alteration of our surroundings" is called pollution.

2 Define Air pollution.

Air pollution may be defined as the presence of impurities in excessive quantity andduration to cause adverse effects on plants, animals, human beings and materials.

3. What are the different sources of air pollution?

The two main sources of air pollution are

A. Natural Sources
B.Man made or anthropogenic sources

Natural sources include dust storms, volcanoes, lightening sea salt, smoke, forest fires, etc., the man made sources are agricultural activities, industrial growth,domestic wastes, automobile exhausts, etc.

4. What do you know about particulate?

In general the term 'particulate' refers to all atmospheric substances that are notgases. They can be suspended droplets or solid particles or mixtures of the two.Particulates can be composed of materials ranging in size from 100mm down 0.1 mm andless. The chemical composition of particulate pollutants is very much dependent upon theorigin of the particulate.

5. Define suspended particulate matter?

Suspended Particulate Matter (SPM) is a complex mixture of small and large particles with size less than 100u varying origin and chemical composition.

6. Differentiate between Mist and Fog.

Mist

Mist is made up of liquid droplets generally smaller than 10um which are formed by condensation in the atmosphere or are released from industrial operations.

Fog

Fog is similar to mist but the droplet size bigger (> 10u) and water is the liquid. Fog is sufficiently dense to incomprehensible vision.

7. What are gaseous pollutants?

These are toxic and poisonous gases such as carbon monoxide, chlorine, ammonia, hydrogen sulphate, sulphur dioxide, nitrogen oxides and carbon dioxide.

8. What are the major sources of air pollution from automobiles?

The major sources of air pollution from automobiles are

1. Exhaust pipe ->70%
2. Crank case emission ->20%
3. Evaporations from fuel tank and Carburetor ->10%

9. What are effects of air pollution on animals?

1. Animals take up fluorides of air through plants.
2. Their milk production falls and their teeth and bones are affected. They are also prone to lead poisoning andparalysis.

10. List some of the effects of air pollution on physical properties of

1. Atmosphere. 2. Decrease in the visibility 3. Reduction of Solar radiation
4. Effects on weather conditions 5.Effects on atmospheric constituents

11. How air pollution can be controlled at source?

_ Proper use of the existing equipment
_ Change in process
_ Modification or Replacement of equipment's
_ Installation of controlling equipment's

12. What are the particulate control equipment?

_ Gravitational settling chambers
_ Cyclone separators
_ Fabric filters (or) Bag filters
_ Electrostatic precipitators
_ Wet scrubbers (or) Wet collectors

13. Define water pollution.

Water pollution is defined as any physical, chemical or biological change inquality of water that has a harmful effect on living organisms or makes the waterunsuitable for needs.

14. How can you differentiate point? Source from non-point source ofpollution.

Point sources discharge pollutant at a specific place through pipe lines, sewerlines, or ditches into water bodies. Non point sources discharge pollutants from largeand scattered area. These sources have no specific location.

15. What are the effects of inorganic substances in water?

_ makes the water unfit for drinking and other purposes.
_ Corrosion of metals exposed to such waters.
_ causes skin cancers, damages to spinal, CNS, liver and kidneys.
_ Reduces crop yield.

16. Define soil pollution.

Soil pollution is defined as the introduction of substances, biological organisms,or energy into the soil, resulting in a change of the soil quality, which is likely toaffect the normal use of the soil or endangering public health and the livingenvironment.

17. What is the cause of noise pollution?

_ Road traffic noise
_ Air traffic noise
_ Rail traffic noise
_ Domestic noise
_ Industrial noise

18. Define a) Decibel b) COD

a) Decibel:-Decibel (dB) is defined as the one tenth of the longest unit Bel.
b) COD:-COD (Chemical Oxygen Demand) is the amount oxygen required for
Chemical oxidation of organic matter using some oxidizing agent like K2Cr2O7 and KmnO4.

19. What are solid wastes? How solid wastes are disposed ultimately?

The wastes generated and discarded from human and animal activities that arenormally solid are called as solid wastes. Solid wastes are disposed bylandfill, incineration, composting methods.

20. Differentiate between primary and secondary air pollutants withexamples:

Primary pollutants

These are emitted directly in the atmosphere inharmful form.
Examples: CO, NO, SO2

Secondary pollutants

These are pollutants in which some of the primaryairpollutants may react with oneanother to form new pollutants
Examples:
NO, NO2------ıHNO3/NO3

21. What are point sources of water pollution?

Point sources are discharged pollutants at specific location through pipes ditches, sewers into bodies of surface water.

22. Define noise pollution.

The unwanted, unpleasant or disagreeable sound that causes discomfort for all living beings.

23. Define thermal pollution.

Thermal pollution is defined as the addition of excess of undesirable heat to water that makes it harmful to man, animal or aquatic life.

24. Name some important natural sources for nuclear hazards.

1. The important natural source is space, which emit cosmic rays.
2. Soil, rocks, air, water, food, radioactive radan – 222.

25. Define hazardous wastes

Wastes like chemicals, radioactive or biological substances which contribute to an increase in mortality are called hazardous wastes.

26. What are the types of solid wastes?

1. Municipal wastes. 2. Industrial wastes. 3. Hazardous wastes.

27. Write any major water pollutants.

1. Pesticides and biocides.
2. Thermal pollution.

28. Define photochemical smog.

The brownish smoke like appearance that frequently on clear, sunny days with significant amounts of automobile traffic.

29. Mention some important control measures of nuclear hazards.

1. Minimum number of nuclear installations should be commissioned.
2. Nuclear devices should be exploded underground.

30. Define disaster.

It is an event in which a society undergoes severe danger and causes loss of its members and physical properties.

31. Define floods.

Whenever the magnitude of water flow exceeds the carrying capacity of the channel within its banks the excess of water over flows on the surroundings causes floods.

32. Explain cyclone management

1. Satellite images are used by meteorological departments for forecasting the weather conditions which reveal the strength and intensity of the storm.
2. Radar system is used to detect the cyclone and its being used for cyclone warning
3. For observing the exact location of cyclone every half an hour satellite pictures are analyzed.

33. How does earthquake occurs

The earth's crust has several tectonic plates of solid rock. These plates move slowly along their boundaries. When friction prevents these plates from slipping stress develops and results in sudden fractures along the fault lines within the plates. This causes earthquakes and the violent vibrations in the earth.

34. Define the term Tsunami

A tsunami is a large wave that are generated in a water body when the sea floor is deformed by seismic activity. This activity displaces the overlying water in the ocean.

35. Write the causes of soil pollution

1. Industrial wastes 2.Urban wastes.

UNIT III – NATURAL RESOURCES

1. State the environmental effects of extracting and using mineral resources.

(i) De vegetation and defacing of landscape.

(ii) Ground water contamination.

(iii) Surface water pollution

(iv) Air pollution.

(v) Subsidence of land.

2. Define sustainable forestry?

Sustainable forestry is the optimum use of forest resources, which meet the needs of the present without compressing the ability of future generations to meet their own needs.

3. Define overgrazing (or) explain overgrazing.

Overgrazing is a process of, "eating away the forest vegetation without giving it a chance to regenerate".

4. What are the renewable and non-renewable energy resources? Give examples.

Renewable energy resources are natural resources which can be regenerated continuously and are inexhaustible. They can be used again and again in an endless manner.

Examples:

Renewable energy sources: wood, solar energy, wing energy.

Non-renewable energy resources: coal, petroleum.

5. State the problems caused by the construction of Dam.

(a) Displacement of tribal people.

(b) Loss of non-forest land.

(c) Loss of forests, flora and fauna.

6. What are the conventional sources of energy for the mankind?

Non – renewable energy resources are natural resources, which cannot be regenerated once they are exhausted. They cannot be used again.

7. What is desertification? Give two reasons for it.

It is a progressive destruction of degradation of arid or semi-arid lands to desert.

Reasons: 1. Desertification 2. Overgrazing 3. Mining 4. Quarrying

8. What is water logging?

Water logging is the land where water stand for most of the year.

9. What do you mean by environmental impact? (Or) Define environmental impact statement.

Environmental impact is nothing but the effect on the natural environment caused by various human actions. (Or) It is defined as an analysis of the expected effects of a development on the surrounding environment. It describes the environmental effects and solutions.

It includes two types

(i) Indirect effects ***Example:*** Pollution.

(ii) Direct effects ***Example:*** Cutting down trees.

10. Explain soil leaching.

The process in which materials in or on the soil gradually dissolve and are carried by water seeping through the soil.

Effect of soil leaching:

1. It removes valuable nutrients from the soil.
2. It may carry buried wastes into ground water and contaminates it.

11. Write any two functions of forests.

1. Forests perform very important functions both to humans and to nature.
2. They are habitats to millions of plants, animals and wildlife.
3. They recycle rainwater and remove pollutants from air.
4. They control water quality and quantity.

12. What are the causes of deforestation?

(i) Developmental projects. (ii) Mining operations. (iii) Raw-materials for industries.
(iv) Fuel requirements.(v) Shifting cultivation. (vi) Forest fires.

13. What are the advantages in conjunctive use of water?

(i) Control of water logging. (ii) Use of saline water, especially for cooling purpose.
(iii) Control of salt intrusion in coastal aquifers. (iv) Controlled withdrawal of water from ground water aquifer.

14. What is meant by soil erosion?

Soil erosion is the process of removal of superficial layer of the soil from oneplace to another. Soil erosion also removes the soil components and surface liter.

15. Write any two adverse effects caused by overgrazing.

(i) Land degradation.
(ii) Soil erosion.
(iii) Loss of useful species.

17. Define the term deforestation.

Deforestation is the process of removal (or) elimination of forest resources due to many natural or man-made activities. In general deforestation means destruction of forests.

18. Differentiate renewable and non-renewable sources of energy.

Renewable energy

1. It is regenerated continuously.
2. In exhaustible.
3. It can be used again and again
4. It is pollution free.
5. Available in limited amount in nature
6. It is developed in a long period.
7. Example: Wood, Solar energy, Windenergy.

Non-renewable energy

1. Cannot be regenerated.
2. Exhausted.
3. Cannot be used again.
4. It pollutes the atmosphere.
5. Available in unlimited amount innature.
6. It is developed in a short period.
7. Example: Coal, petroleum, nuclear fuel.

19. Mention the various causes of desertification.

1. Deforestation 2. Over grazing 3. Water management 4. Mining and quarrying 5. Climate change 6. Pollution.

20. What is eutrophication?

A large proportion of N and P fertilizers used in crop fields is washed off by the runoff water and reaches the water bodies causing over nourishment of the lakes. The process of accumulation of nutrients in the water bodies is called eutrophication.

UNIT IV - SOCIAL ISSUES AND THE ENVIRONMENT

1. Define "Sustainable Development "?

Meeting the needs of the present without compromising the ability of future generation to meet their own needs.

2. Write the objectives of consumerisation?

1. Improves rights and power of the buyers2. Making the manufacturer liable3. Reuse and recycle the product4. Reclaiming useful parts5. Reusable packing materials6. Health and happiness.

3. Explain the need for water conservation?

1. Due to deforestation the annual rainfall is decreased.
2. Over exploitation of ground water leads to drought.

4. List some of the characteristics of a sustainable society.

i. All the material processes will be designed to be of cyclic nature.

ii. There will not be any waste material or pollution of air, water, land and environment.

iii. The output from one system will be used as input to other systems.

iv. Only renewable energy will be used in the society, either directly or in the forms of hydro-power, wind power solar power and biomass.

v. The human population will be either stable stable in size or gradually declining.

4. Explain the factor affecting water shed?

1. Over grazing, Mining, Deforestation, Construction activities
2. Droughty climates.

5. Define urbanization.

Urbanization is defined as 'the process movement of human population from ruralareas to urban areas in search in search of better economic interests with better education,communication, health, civic facilities and other day to day needs.

6. What are problems or discomforts faced by rural people?

. Lack of modernization of agricultural sector:
. Lack of job opportunities;
. Poor life style;
. Poor health facilities;
. Poor education facilities;
. Poor transportation facilities;
. Poor availability of energy.

7***. What are the uses of energy in an urban areas?***

Energy is used in an urban area for the following.

(a) For industrial activities

(b) For transportation

(c) For water apply

(d) For building & commercial use

(e) For cleaning of pollutants

(f) For essential services.

8. Define Environmental Ethics?

Environmental Ethics refers to principle, issues and guidelines relating to human interaction with their environments.

9. What do you know about watershed?

A watershed is defined as the geographic area from which water in a particular stream, lake or estuary originates. It includes entire area of land that drains into the water body. It is separate from other system by high points in the area such as hills or slopes.

10. What are the effects of global warming?

Sea level increases, Negative effect on crop production and forest growth.

11. What are the impacts of human activities on watershed?

(a) Alteration of water courseb) Addition of pollution sources(c) Urbanization

(d) Securing of channels.

12. What is watershed management?

Watershed management is a process aimed at protecting and restoring the habitat and Water resources of a watershed, incorporating the needs of multiple stakeholders.

13. What are the causes of ozone layer depletion?

1 .Chlorofluorocarbon 2. Hydro Chlorofluorocarbon 3. Bromoflurocarbon.

14. What are the two important principles of watershed management?

The two important principles of watershed management are:

1) To preserve the environment, and

2) To use the most cost-effective means to achieve this goal.

15. What are the causes of ozone layer depletion?

1. UV rays destroys the melanin pigment in human skin.
2. Increases the average temperature of the earth.

16 .What is Acid Rain?

The presence of SO 2 & NO2 gases in the atmosphere decreases the pH of the water during the rain fall. This precipitation is called Acid Rain.

17. Name some of the factors causing relocation of people.

(a) Development activities

(b) Natural and man-made disasters

(c) Conservation initiatives.

18 .How CFCs are accumulated in atmosphere?

Aerosol propellants,refrigerants, cleaning solvents

19. Define resettlement and rehabilitation.

Resettlement is defined as the process of simple relocation or displacement of human population without considering their individual, community or societal needs. Rehabilitation is defined as the process of replacing the lost economic assets, rebuilding the community system that have been weakened by displacement, attending to the psychological trauma of forced separation from livelihood.

20. Explain the term Global Warming?

The increase input of CO2 and other greenhouse gases into the atmosphere from human activities will enhance the average global temperature of the atmosphere. This enhanced greenhouse effect is called global warming.

21 .What are the advantage of Rain water harvesting?

1. Mitigating the effects of droughts
2. Rise in ground water level
3. Minimizing soil erosion and flood hazards

22. How do you define term 'Environmental Ethics'?

Environment Ethics is the branch of ethics which is analyzing about human use or Earth's limited resources.

23. What is meant by greenhouses gases?

They are gases present in the atmosphere which absorb heat but will not radiate, cause increase in atmospheric temperature.

24. What are the factors that influence climate change on the earth?

1. Climate change on the earth is influenced by the following factors.
2. Variations in the Earth's orbital characteristics.
3. Atmospheric carbon dioxide variations.
4. Volcanic eruptions
5. Variations in solar output.

25. Mention the causes of Acid rain?

The gases SO 2 & NO2 in the atmosphere react with water to form acid.

SO2 + H2O H2SO4

NO2 + H2O HNO3

26. List out any four effects of climate change.

Mean sea level is increased on an average of around 1.8mm per year. Many ecosystems of the world have to adapt to the rapid change in global temperature.The rate of species extinction will be increased.

Human agriculture, forestry, water resources and health will be affected.

27. What are the effects of acid rain?

They corrodes houses, monuments, Statues & fences.

Deposition of acid partiles corrodes the metals.

28. Define Global warming.

Global warming is defined as the increase in temperature of the earth, which causes more changes in climate.

29. How can global warming be controlled?

i. Reduction in consumption of fossil fuel such as coal and petroleum.
ii. Use of biogas plants.
iii. Use of nuclear power plants.
iv. Increasing forest cover.
v. Use of unleaded petrol in automobiles.
vi. Installation of pollution controlling devices in automobiles and industries.

30. What are the two principal acids present in acid rain?

Sulphuric acid (H_2SO_4) and Nitric acid (HNO_3).

UNIT V –HUMAN POPULATIONAND ENVIRONMENT

1 .Define Birth Rate?

It is the number of live birth per 1000 people in a population in a given year.

2. Define Death Rate?

It is the number of deaths per 1000 people in a population in a given year.

3. Define Immigration?

It denotes the arrivals of individuals from neighboring population.

4. Define Emigration?

It denotes the dispersal of individuals from the original population to new areas.

5. Define population density?

Number of individuals of the population per unit area.

6. Define Population?

Group of individuals belonging to same species which live in a given are at a given time.

7. What is Population explosion?

Enormous increase in population due to low death and high birth rate.

8. What are causes of Population explosion?

Modern medicinal facilities, Increase of Life expectancy.

9. Define Infant mortality rate?

It is the percentage of infant died out of those born in one year.

10. Define total fertility rate?

It is the average number of children delivered by a woman in her life time.

11. What are the problems of population growth?

Environmental pollution, Unemployment problem and increasing demand for food.

12. What are the various methods of Family planning?

Traditional methods, Modern methods and Temporary methods.

13. What are Human rights?

They are the fundamental rights which are possess by all human beings irrespective of the caste, sex and language.

14. What are the different methods of imparting value education?

Telling, Modeling, Playing, Problem solving, Studying.

15 .What are the different types of Values?

Universal values, Cultural values, Individual values & spiritual values.

16. What is meant by HIV & AIDS?

HIV means Human Immunodeficiency Viruses.

AIDS means Acquired Immunodeficiency Syndrome caused by HIV viruses.

17. What are the factors which do not influence transmission of HIV?

Tears, Food, Cough, Handshake, Cloths & Utensils.

18 .What are the various modes of transmission of HIV?

Unsafe Sexual intercourse, Contaminated syringes and needles, Contaminated blood transfusion & from infected mother to baby.

19. Mention the ill effects of Aids?

Loss of Body weight, Fever & Diarrhea & More death rate.

20. What are the major precautions to avoid AIDS?

Safe sex, Using of Condoms, Public Education - AIDS awareness programmers, Monitoring of infected mothers, Monitoring of blood before transfusion.

21. ***How the population problem in India is analyzed?***

India's population problem may be viewed from three aspects

(1) The absolute size of population

(2) The rate of growth of the population

(3) The age structure of the population.

22. What is population explosion?

Population explosion means the rapid population growth which is unexpected and unimaginable.

23. Name some health related fitness components.

1. Muscular strength and endurance
2. Flexibility
3. Body composition

4 Cardio-vascular endurance

24. Define Demography.

It refers to the science of dealing with the study of size, composition and territorialdistribution of population; it includes study of natality, fertility, mortality, migration, andsocial mobility.

25. What is vital statistics?

Vital statistics are referred to systematically collected and compiled data relating tovital events of life such as birth, death, marriage, divorce, adoption, etc. Vital statistics are anindication of the given situation and help us in answering many health-related queries.

26. Name the fundamental rights of an Indian citizen.

1. Right to equality
2. Right to freedom of Speech and Activity
3. Right against Exploitation
4. Right to Freedom of Religion
5. Cultural and Educational Rights
6. Right to Constitutional Remedies.

27. What are zero growth curves?

It indicates the slow and steady growth in population.

28. What is opportunistic infection?

Infection with HIV can weaken the immune system to the point that it has difficultyfighting off certain infections. These types of infections are known as "opportunisticinfections" because they take the opportunity to weaken the immune system which causesillness of the body.

29. Name some tests available to find HIV infection.

In addition to the EIA or ELISA and Western blot, other tests now available include:

_ Radio ImmunePrecipitation Assay (RIPA)
_ Dot –blot immune binding assay
_ Immune fluorescence assay
_ Nucleic acid testing
_ Polymerase Chain Reaction (PCR)

30. List the special features of Comprehensive programme on women andchild welfare.

1. Personality2. Reduction of Deprivation3. Co-ordinational Effectively 4. Maternity and Motherhood

31. What are the reasons responsible for population explosion?

1. Invention of modern medical facilities reduces the death rate andincreases the birth rate
2. Increase of life expectancy
3. Illiteracy

32. Name some applications of IT in health.

_ Most of the ICU's (Intensive Care Units) are now using computers to monitorthe progress and condition of the patient, undergoing treatments.

_ Expert opinions from doctors away from the place can be sought with help ofIT tools like video conferencing etc.

_ can be used in the analysis and research on various potential medicines /drugsto be used in medical treatments.

33. List the applications of IT in environment.

a. Remote Sensing
b. Geographic Information System (GIS)
c. Global Positioning System (GPS)
d. Meteorology

34. Write about the value of education to the society.

1. Improve the integral growth of human being 2. Create attitude andimprovement towards sustainable lifestyle 3. To understand about naturalenvironment.

35. What are the major objectives of family welfare programme in India?

1. Reduce infant mortality rate to below 30/100 infants
2. Achieves 100% registration of birth, death and marriage
3. Encourage late marriage and later child birth
4. Constrain the spread of AIDS/HIV.

16 Marks

UNIT I-ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

01. Give an account of energy flow in ecosystems [Dec"2009/8M]

02. Describe the biotic component of an ecosystem. [Dec"2009/8M]

03. Discuss the importance of biodiversity. [Dec"2009/8M]

04. Write informative notes on In-situ conservation. [Dec"2009/8M, Nov"2011/8M]

05. Explain the structure and function of Ecosystem with a neat sketch.[May"2010/16M,Nov"10/8M]

06. Explain the values of biodiversity. [May"2010/16M, Nov"10/8M]

07. Write down the ecological succession and ecological pyramids. [Nov"10/8M]

08. Write about in-situ and ex-situ conservation of biodiversity. [Nov"10/8M]

09. Explain the structure and functions of the following [i] Forest Ecosystem [ii] Grasslands ecosystem [iii] Desert ecosystem [iv] Aquatic ecosystem [May"2011/16M]

10. Discuss the biodiversity at global, national and local levels. [May"2011/16M]

11. Discuss the universal model of energy flow in an ecosystem and explain how the flow of energy follows the I and II law of thermodynamics. [Nov"2011/8M]

12. What are ecological pyramids? Explain why in grassland ecosystems the pyramids of numbers are upright while in parasitic food chain it is inverted? [Nov"2011/8M]

13. What are the major causes of man-wildlife conflicts? Discuss the remedial steps that can curb the conflict. [Nov"2011/8M]

14. Explain the following. Food Chain, Food Web

15. Explain features and functions of Grass land ecosystem.

6. Explain features and functions of Aquatic ecosystem.

17. Explain the various threats of biodiversity and the measures recommended for conservation of biodiversity.

18. Explain the hot spots of biodiversity in India.

19. Explain how the biodiversity can be conserved.

UNIT II- ENVIRONMENTAL POLLUTION

1. What is noise? Describe briefly the effects of noise on human health. [Nov"2009/8M]

2. Suggest measures to control air pollution. [Nov"2009/8M]

3. Write short notes on Land filling method for solid waste. [Nov"2009/8M]

4. Write short notes on Disaster management. [Nov"2009/8M]

5. Discuss the method of solid waste management by sanitary land filling and thermal means. [May"2010/16M]

6. Explain various disaster management measures during cyclone, floods, earthquake and landslides. [May"2010/16M]

7. What do you know about Tsunami? Explain the formation of tsunami. [Nov"2010/8M]

8. Explain the different stages of municipal sewage treatment. [Nov"2010/8M]

9. Explain clearly the stages of solid waste management. [Nov"2010/8M]

10. Explain the sources and effects of thermal pollution. [Nov"2010/8M]

11. Explain the control and prevention measures of municipal solid waste in your area.[May"2011/16M]
12. Write about one of the industrial waste water treatment techniques, with a neat schematic diagram. [May"2011/16M]
13. Discuss the various sources of marine pollution. How can you prevent pollution of our oceans? [Nov"2011/8M]
14. How solid wastes are are classified? Write the sources of urban and industrial solid wastes. [Nov"2011/8M]
15. Briefly describe the sources, effect and prevention of soil pollution. [Nov"2011/8M]
16. Explain the mitigation measures for landslides. [Nov"2011/8M]
17. Explain the causes, effects and control measures of nuclear hazards.

UNIT III - NATURAL RESOURCES

1. Discuss in detail the causes and consequences of overexploitation of forest resources. [Dec"2009/8M, Nov"2010/8M]
2. Give a brief account of renewable energy resources and their significance.[Dec"2009/8M]
3. Explain the various renewable energy sources in the earth. [May 2010/16M]
4. Discuss the following. Land Resources, Land Degradation, Soil erosion and Desertification. [May 2010/16M, Nov"2010/8M]
5. Explain the various conventional energy sources. [Nov"2010/8M]
6. Explain the following in detail- Mineral resources and Food resources. [Nov"2010/8M]
7. What are the natural resources availability in India and discuss any two of them. [May 2011/16M]
8. Discuss the world food problems in detail and how does it affect other resources? [May 2011/16M]
9. Explain the basic types of soil erosion and agents responsible for soil erosion. What are the conservation practices employed to prevent soil erosion? [Nov 2011/16M]
10. What is land degradation? Explain factors responsible and controlling measures of land degradation.
11. Explain desertification and its consequences. How it can be managed?
12. Explain equitable use of resources for sustainable lifestyles.

UNIT IV - SOCIAL ISSUES AND THE ENVIRONMENT

01. Give a brief account of global warming. [Nov"2009/8M]
02. Bring out the various details of wasteland reclamation practices. [Nov"2009/8M]
03. Write a short note on Waste shed management.[Nov"2009/4M]
04. Discuss briefly on environment act 1986.[Nov"2009/4M]
05. Write briefly on Bhopal disaster and Chernobyl disaster. .[Nov"2009/8M]
06. What is Global warming? Explain the measures to prevent it.
Also explain the effects of global warming.[May"2010/16M]
07. Explain the effects of nuclear accidents with two case studies.[May"2010/16M]
08. Explain the powers and functions of state pollution control board. [Nov"2010/8M]
09. Explain the wild life protection act. [Nov"2010/8M]
10. Explain the ozone and ozone layer depletion. [Nov"2010/8M]

11. Discuss the energy requirement in detail for sustaining urban life. [Nov"2010/8M]
12. Write short notes on Role of NGO, Acid rain, ozone layer depletion and water conservation.[May"2011/16M]
13. Describe the functions of state board and central board according pollution control.[May"2011/8M]
14. Explain in brief about the Indian Pollution regulations. [May"2011/8M]
15. What do you mean by sustainable development? Explain the measures to attain sustainability. [Nov"2011/8M]
16. Discuss the salient features of (1). Wild life (protection) Act (2). Forest (conservation) Act.[Nov"2011/8M]
17. Discuss the objectives and various measures of wasteland reclamation and development. [Nov"2011/16M]
18. Explain enforcement machinery involved in environmental legislation.

UNIT V- HUMAN POPULATION AND THE ENVIRONMENT

01. Describe briefly (i). The factors that affect human population growth rate (6). (ii).human Rights (5). (iii). Value education. (5) [Nov"2009]
02. Discuss the factors influencing family size. [Nov"2009/8M]
03. Write a note on the various methods of family planning. [Nov"2009/4M]
04. What is AIDS? How to prevent it? [Nov"2009/4M]
05. Explain in detail various health schemes initiated by Indian government. [May"2010/8M]
06. Explain the role of Information Technology on Environment Protection and Human Health Protection. [May"2010/16 M, Nov"2010/10M, May"2011/16M, Nov"2011/16M]
07. Mention the causes of HIV transmission. [Nov"2010/6M]
08. Discuss the necessity of formation of women self-help group. [Nov"2010/6M]
09. Explain the need for value education. [Nov"2010/6M]
10. Write about child welfare. [Nov"2010/4M]
11. The world's population is 10000 years ago has been estimated at about 5 million. What exponential rate of growth would have resulted in the population in 1850? Which is estimated to have been 1 billion? Had that rate continued, what would be the population in the year 2010? [May"2011/16M]
12. How can age-structure pyramids serve as useful tool for predicting population growth trends of a nation? Explain with examples. [Nov"2011/12M]
13. What are the impacts of population explosion over the environment? [Nov"2011/4M]
14. Explain about women and child welfare.