UNIT 10

ENVIRONMENTAL ECONOMICS

INTRODUCTION

ENVIRONMENTAL ECONOMICS

Environmental economics is the study of interactions between human economic activity and the natural environment.

AN ECOSYSTEM :

An ecosystem includes all living things (plants, animals and organisms) in a given area, interacting with each other, and also with their non-living environments (weather, earth, sun, soil, climate, atmosphere).

LINKAGE BETWEEN ECONOMY AND ENVIRONMENT.

- The relationship between the economy and the environment is generally explained in the form of a "Material Balance Model" developed by AlenKneese and R.V. Ayres.
- The model considers the total economic process as a physically balanced flow between inputs and outputs.

WHAT IS AN EXTERNALITY?

- An externality is an economic term referring to a cost or benefit incurred or received by a third party.
- However, the third party has no control over the creation of that cost or benefit.
- An externality can be both positive or negative and can stem from either the production or consumption of a good or service.
- The costs and benefits can be both private—to an individual or an organization—or social, meaning it can affect society as a whole.

UNDERSTANDING EXTERNALITIES

Externalities occur in an economy when the production or consumption of a specific good or service impacts a third party that is not directly related to the production or consumption of that good or service.

POLLUTION :MEANING

Pollution is the introduction of contaminants into the natural environment that causes adverse change, in the form of killing of life, toxicity of environment, damage to ecosystem and aesthetics of our surrounding.

Types of Pollution

- 1. Air pollution
- 2. Water pollution
- 3. Noise pollution
- 4. Land pollution

OTHER IMPORTANT CONCEPTS

CLIMATE CHANGE :

The climate change refers to seasonal changes over a long period with respect to the growing accumulation of greenhouse gases in the atmosphere.

ACID RAIN :

The result of sulphur dioxide (SO2) and nitrogen oxides (NOx) reacting in the atmosphere with water and returning to earth as rain, fog or snow.

SOLID WASTES :

Non-liquid, non-soluble materials, ranging from municipal garbage to industrial wastes that contain complex, and hazardous, substances. Solid wastes include sewage sludge, agricultural refuse, demolition wastes, and mining residues.

SUSTAINABLE DEVELOPMENT :

Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

ORGANIC FARMING :

System of farming which uses animal manure, organic waste and legumes reducing, the use of chemical fertilizers and pesticides.

BOOK EXERCISE QUESTIONS - MULTIPLE CHOICE QUESTIONS

PART - A

1. **The term environment has been derived from a French word----------.**
   a. Environ b. Environs
   c. Environia d. Envir

2. **The word biotic means environment**
   a. living b. non-living
   c. physical d. None of the above

3. **Ecosystem is smallest unit of**
   a. Ionosphere b. Lithosphere
   c. Biosphere d. Mesosphere

4. **Who developed Material Balance Models?**
   a. Thomas and Picardy
   b. AlenKneese and R.V. Ayres
   c. Joan Robinson and J.M. Keynes
   d. Joseph Stiglitz and Edward Chamberlin

5. **Environmental goods are ----------**
   a. Market goods
   b. Non-market goods
   c. Both
   d. None of the above

6. **In a pure public good, consumption is ----------**
   a. Rival b. Non-rival
   c. Both d. None of the above

7. **One of the most important market failures is caused by ----------**
   a. Positive externalities
   b. Negative externalities
   c. Both
   d. None of the above

8. **The common source of outdoor air pollution is caused by combustion processes from the following----------**
   a. Heating and cooking
   b. Traditional stoves
   c. Motor vehicles
   d. All the above

9. **The major contributor of Carbon monoxide is**
   a. Automobiles
   b. Industrial process
   c. Stationary fuel combustion
   d. None of the above

10. **Which one of the following causes of global warming?**
    a. Earth gravitation force
    b. Oxygen
    c. Centripetal force
    d. Increasing temperature

11. **Which of the following is responsible for protecting humans from harmful ultraviolet rays?**
    a. UV-A
    b. UV-C
    c. Ozone layer
    d. None of the above

12. **Global warming also refers to as**
    a. Ecological change
    b. Climate Change
    c. Atmosphere change
    d. None of the above

13. Which of the following is the anticipated effect of Global warming?

a. Rising sea levels

b. Changing precipitation

c. Expansion of deserts

d. All of the above

14. The process of nutrient enrichment is termed as

a. Eutrophication b. Limiting nutrients

c. Enrichment d. Schistosomiasis

15. Primary cause of Soil pollution is --------

a. Pest control measures

b. Land reclamation

c. Agricultural runoff

d. Chemical fertilizer

16. Which of the following is main cause for deforestation?

a. Timber harvesting industry

b. Natural afforestation

c. Soil stabilization

d. Climate stabilization

17. Electronic waste is commonly referred as ----------

a. Solid waste b. composite waste

c. e-waste d. hospital waste

18. Acid rain is one of the consequences of ----------Air pollution

a. Water Pollution b. Land pollution

c. Noise pollution

19. Sustainable Development Goals and targets are to be achieved by -------

a. 2020 b. 2025 c. 2030 d. 2050

20. Alkali soils are predominantly located in the ---------- plains?

a. Indus-Ganga

b. North-Indian

c. Gangetic plains

d. All the above

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

PART - B

Answer the following questions in one or two sentences

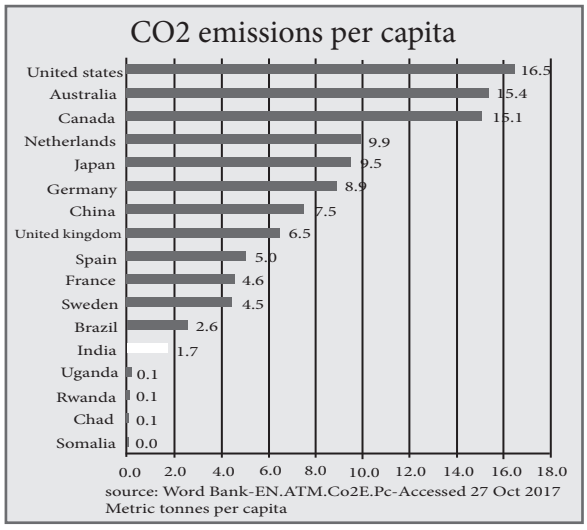
21. State the meaning of environment.

- Environment means "all the conditions, circumstances, and influences surrounding and affecting the development of an organism or group of organisms".
- It also means that the complex of physical, chemical and biotic factors that act upon an organism or an ecological community ultimately determine its form and survival.

22. What do you mean by ecosystem?

- An ecosystem includes all living things (plants, animals and organisms) in a given area, interacting with each other, and also with their non-living environments (weather, earth, sun, soil, climate, atmosphere).
- Ecosystems are the foundations of the Biosphere and they determine the health of the entire earth system.

23. Mention the countries where per capita carbondioxide emission is the highest in the world. (Write top five Countries)



24. What are environmental goods? Give examples.

- ❖ Environmental goods are typically non-market goods, including clear air, clean water, landscape, green transport infrastructure (footpaths, cycle ways, greenways, etc.), public parks, urban parks, rivers, mountains, forests, and beaches.
- ❖ Concerns with environmental goods focus on the effects that the exploitation of ecological systems have on the economy, the well-being of humans and other species, and on the environment.

25. What are the remedial measures to control noise pollution?

1. Use of noise barriers
2. Newer roadway for surface transport
3. Traffic control
4. Regulating times for heavy vehicles
5. Installations of noise barriers in the work place
6. Regulation of Loudspeakers

26. Define Global warming.

- ❖ Global warming is the current increase in temperature of the Earth's surface (both land and water) as well as its atmosphere.
- ❖ Ex: Average temperatures around the world have risen by 0.75°C (1.4°F) over the last 100 years.

27. Specify the meaning of seed ball.

- ❖ A seed ball (or seed bomb) is a seed that has been wrapped in soil materials, usually a mixture of clay and compost, and then dried.
- ❖ Essentially, the seed is 'pre-planted' and can be sown by depositing the seed ball anywhere suitable for the species, keeping the seed safely until the proper germination window arises.

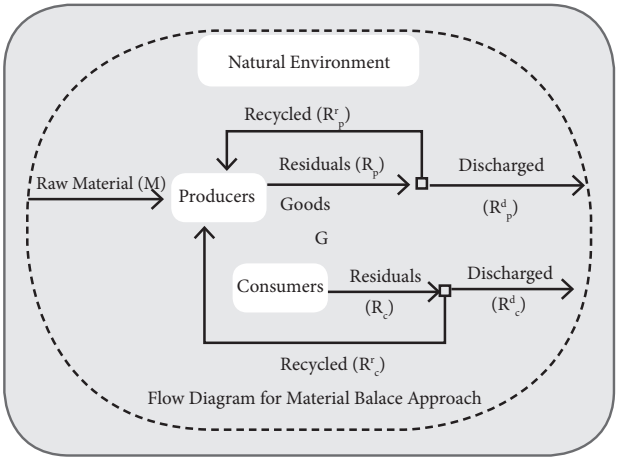
PART - C

Answer the following questions in one Paragraph.

28. Brief the linkage between economy and environment.

- ❖ The relationship between the economy and
- ❖ The environment is generally explained in the form of a "Material Balance Model" developed by AlenKneese and R.V. Ayres.
- ❖ The model considers the total economic process as a physically balanced flow between inputs and outputs.

The interdependence of economics and environment is given in the flow diagram.



Flow Diagram for Material Balace Approach

- ❖ The environment provides both a direct value as well as raw material intended for economic activity, thus making the environment and the economy interdependent.
- ❖ Environment provides land, water, air, energy resources, coal, oil, forests, minerals and metals and so many other natural resources which are essential for the economic development of the economy.
- ❖ It provides services which are directly used by the consumers i.e. air we breathe and water we drink as a liquid of life.
- ❖ It provides forests, water reservoirs, rivers etc. and wildlife sanctuaries which also play economic roles for the mankind.

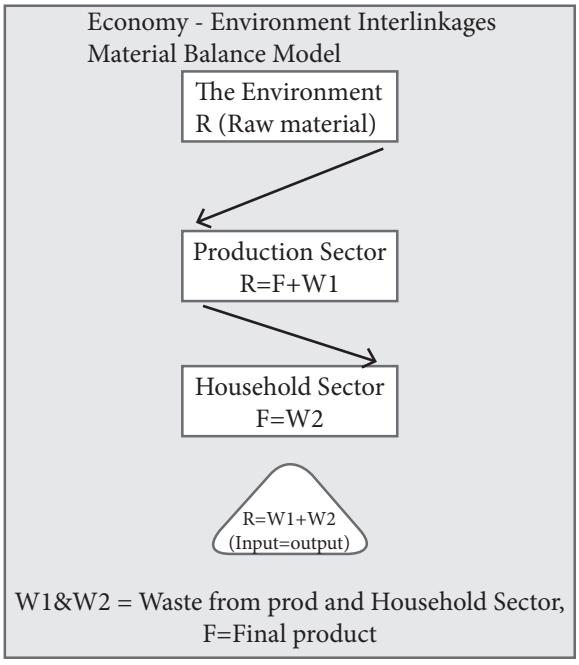
29. Specify the meaning of material balance principle.

Meaning

- ❖ The material balance principle considers the total economic process as a physically balanced flow between inputs and outputs.
- ❖ Inputs are bestowed with physical property of energy which is received from the environment.

Explanation

- ❖ The first law of thermodynamics, i.e. the law of conservation of matter and energy, emphasizes that in any production system "what goes in must come out".
- ❖ This is known as the Material Balance Approach or Material Balance Principle.
- ❖ The material flow diagram implies that mass inputs must equal mass outputs for every process.
- ❖ Moreover, all resources extracted from the environment eventually become unwanted wastes andpollutants.
- ❖ Production of output by firms from inputs resulting in discharge of solid, liquid and gaseous wastes.
- ❖ Similarly, waste results from consumption activities by households.
- ❖ In short, material and energy are drawn from environment, used for production and consumption activities and returned back to the environment as wastes.



In its simple form the Material Balance Approach can be put in form equation.

$$M = G–RC– RP + RrP + Rrc = Rdc + Rdc$$

Material and Energy Inflow from Natural World (M)	=	Economic Activities of Goods and service production (G)-Consumption and production residual discharges from consumption and production activities (R_c+R_p) + Recycles from production and consumption (R^r_p+R^r_c)	=	Final residual Discharge form Production and consumption into Natural world (R^d_c+R^d_c)

30. Explain different types of air pollution.

Indoor Air Pollution:

It refers to toxic contaminants that we encounter in our daily lives in our homes, schools and workplaces. For example, cooking and heating with solid fuels on open fires or traditional stoves results in high levels of indoor air pollution.

Outdoor Air Pollution:

It refers to ambient air. The common sources of outdoor air pollution are caused by combustion processes from motor vehicles, solid fuel burning and industry.

31. Distinguish between Balance of Trade and Balance of Payments.

Water pollution is caused due to several reasons. Here are the few major causes of water pollution:

1. Discharge of sewage and waste water:

Sewage, garbage and liquid waste of households, agricultural runoff and effluents from factories are discharged into lakes and rivers.

2. Dumping of solid wastes:

The dumping of solid wastes and litters in water bodies cause huge problems.

3. Discharge of industrial sastes:

Industrial waste contains pollutants like asbestos, lead, mercury, grease oil and petrochemicals, which are extremely harmful to both people and environment.

4. Oil Spill:

Sea water gets polluted due to oil spilled from ships and tankers while travelling.

5. Acid rain

When the acidic particles caused by air pollution in the atmosphere mix with water vapor, it results in acid rain.

6. Global warming:

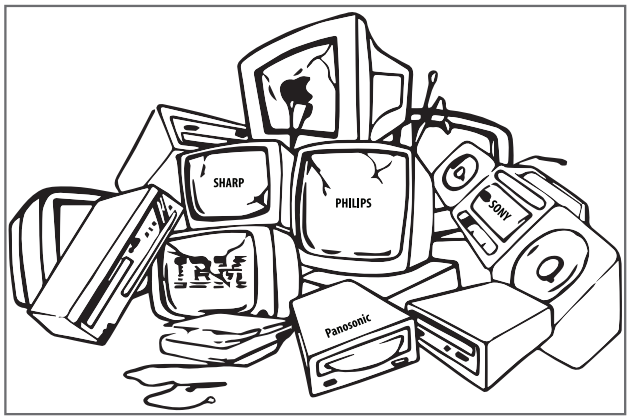
Due to global warming, there is an increase in water temperature as a result aquatic plants and animals are affected.

7. Eutrophication

Eutrophication is an increased level of nutrients in water bodies. This results in bloom of algae in water.

32. State the meaning of e-waste.

- Electronic waste which is commonly referred as “e-waste” is the new byproduct of the Info Tech society.
- It is a physical waste in the form of old discarded, end of life electronics.
- It includes a broad and growing range of electronic devices from large household appliances such as refrigerators, air conditioners, cellular phones, computers and other electronic goods".
- Similarly, e-waste can be defined as the result when consumer, business and household devices are disposed or sent for re-cyclingexample, television, computers, audio-equipments, VCR, DVD, telephone, etc.,



33. What is land pollution? Mention the causes of land pollution.

Definition

- The land pollution is defined as, "the degradation of land because of the disposal of waste on the land".
- Any substance (solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such a way that it alters the environment causes land pollution

Causes of Land Pollution

i. Deforestation and soil erosion:

Deforestation carried out to create dry lands is one of the major concerns.

ii. Agricultural activities:

With growing human and pet animal population, demand for food has increased considerably.

iii. Mining activities:

During extraction and mining activities, several land spaces are created beneath the surface.

iv. Landfills:

Each household produces tones of garbage each year due to changing economic lifestyle of the people.

v. Industrialization:

Due to increasing consumerism more industries were developed which led to deforestation.

vi. Construction activities:

Large waste articles like wood, metal, bricks, plastic are dumped at the outskirts of urban areas that lead to land pollution.

34. Write a note on a) Climate change and b) Acid rain

Climate Change

- The climate change refers to seasonal changes over a long period with respect to the growing accumulation of greenhouse gases in the atmosphere.
- Recent studies have shown that human activities since the beginning of the industrial revolution.

Acid Rain

- Acid rain is one of the consequences of air pollution.
- It occurs when emissions
- from factories, cars or heating boilers contact with the water in the atmosphere.
- These emissions contain nitrogen oxides, sulphur dioxide and sulphur trioxidewhich when mixed with water becomes sulfurous acid, nitric acid and sulfuric acid.
- This process also occurs by nature through volcanic eruptions.

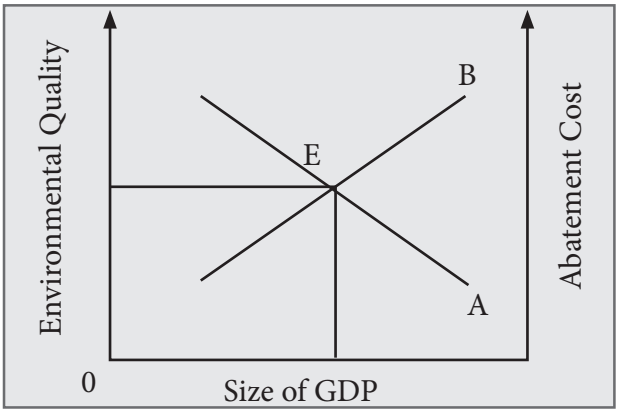
PART - D

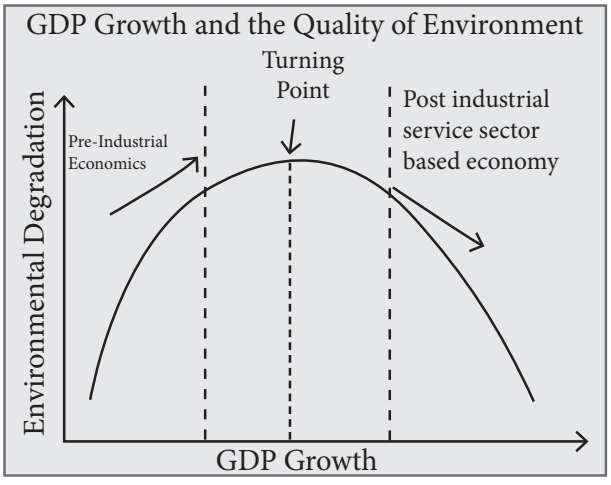
Answer the following questions in about a page.

35. Briefly explain the relationship between GDP growth and the quality of environment.

Environmental quality

- ❖ Environmental quality is a set of properties and characteristics of the environment either generalized or local, as they impinge on human beings and other organisms.
- ❖ It is a measure of the condition of an environment relative to the requirements of one or more species and to any human need.
- ❖ Environmental quality has been continuously declining due to capitalistic mode of functioning.





- ❖ Environment is a pure public good that can be consumed simultaneously by everyone and from which no one can be excluded.
- ❖ A pure public good is one for which consumption is non-revival and from which it is impossible to exclude a consumer.
- ❖ Pure public goods pose a free-rider problem. As a result, resources are depleted.
- ❖ The contribution of the natureto GDP as well as depletion of natural resources are not accounted in the present system of National Income Enumeration.
- ❖ Economic growth is often pointed out to be the cause of environmental issues based on the notion that increased production equals increased pollution.

36. Explain the concepts of externality and its classification.

Meaning of Externalities

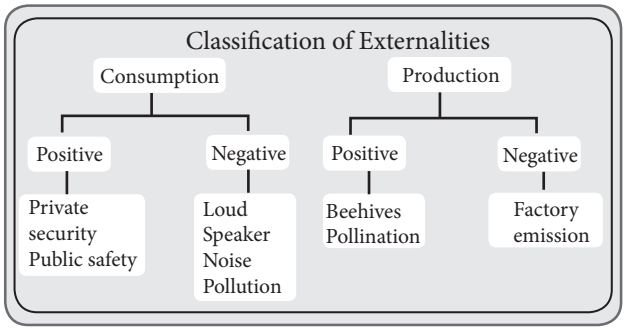
Externalities refer to external effects or spillover effects resulting from the act of production or consumption on the third parties.

Definitions

Externalities may be defined as "the cost or benefit imposed by the consumption and production activities of the individuals on the rest of the society not directly involved in these activity and towards which no payment is made".

Classification

Beneficial externalities are called "positive externalities" and adverse ones are called "negative externalities".



Positive Consumption Externality

When some residents of a locality hire a private security agency to patrol their area, the other residents of the area also benefit from better security without bearing cost.

Negative Consumption Externality

A person smoking cigarette gets maygives satisfaction to that person, but this act causes hardship (dissatisfaction) to the non-smokers who are driven to passive smoking.

Positive Production Externality

The ideal location for beehives is orchards (first growing fields). While bees make honey, they also help in the pollination of apple blossoms. The benefits accrue to both producers (honey as well as apple).

This is called 'reciprocal untraded interdependency. Suppose training is given for the workers in a company. If those trained workers leave the company to join some other company, the later company gets the benefit of skilled workers without incurring the cost of training.

Negative Production Externality

Negative production externalities include pollution generated by a factory that imposes costs on others.The emissions and effluents of a factory cause air and water pollution. Water becomes contaminated and unfit for drinking e.g. Tanneries. The innocent community bears the external cost for which it is not compensated.

37. Explain the importance of sustainable development and its goals.

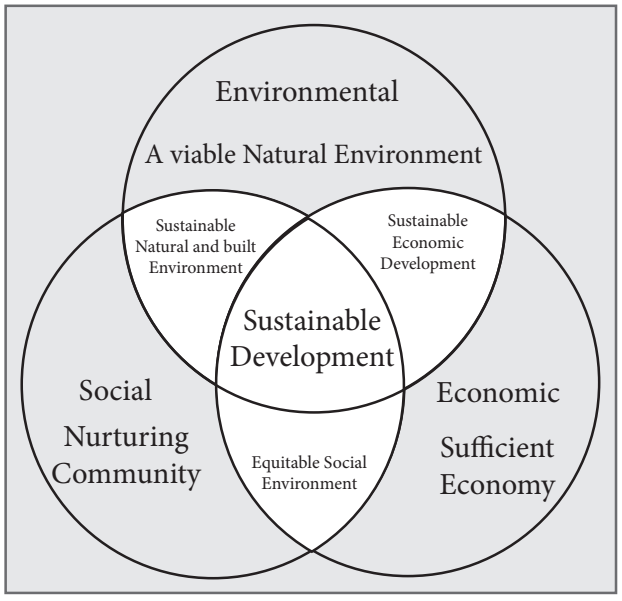
Meaning

Sustaintable development is concerned with the welfare of not only present generation but also future generation.

Definitions

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"

Importance of Sustainable Development



- Economic growth – building a strong, competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and identifying then coordinating development requirements.

- ❖ Environmental protection – contributing to protecting and enhancing our natural and developed environment, while helping to improve biodiversity, use natural resources wisely, minimizing waste and pollution, and adapting to and helping to decrease climate change, including a global shift to low-carbon economy
- ❖ Social inclusion – supporting strong, vibrant and healthy communities by providing the supply of housing required to meet the needs of present and future generations; and by creating a high-quality of development, with accessible local services that reflect the community's needs and support its health, social and cultural well-being.

The Global Goals For Sustainable Development

1. End Poverty in all its forms everywhere
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3. Ensure healthy lives and promote well-being for all at all ages
4. Ensure inclusive and quality education for all and promote lifelong learning
5. Achieve gender equality and empower women and girls
6. Ensure access to water and sanitation for all
7. Ensure access to affordable, reliable, sustainable and modern energy for all
8. Promote inclusive and sustainable economic growth, employment and decent work for all
9. Build resilient infrastructure, promote sustainable industrialization and foster innovation.
10. Reduce inequality within and among countries
11. Make cities inclusive, safe, resilient and sustainable
12. Ensure sustainable consumption and production pattern
13. Take urgent action to combat climate change and its impacts
14. Conserve and sustainably use the oceans, seas and marine resources
15. Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss
16. Promote just, peaceful and inclusive societies
17. Revitalize the global partnership for sustainable development

Additional One marks

1. Environmental Economics is the subset of economics that is concerned with the efficient allocation of ..... resources.

a. economical b. environmental

c. natural d.industrial

2. .....means "all the conditions, circumstances, and influences surrounding and affecting the development of an organism or group of organisms".

a. atmosphere

b. environmental economy

c. ecosystem

d. Environment

3. Environmental Economics is an area of economics that studies the financial impact of ……issues and policies.

a. environmental b. ecosystem

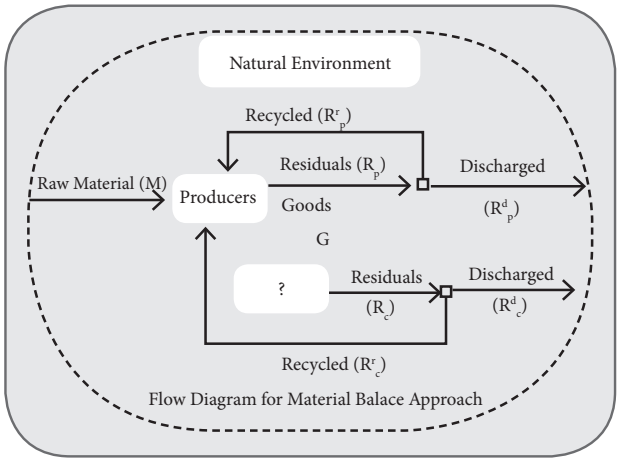
c. economy d. ergonomics

4. Ecosystems are the foundations of the …….. and they determine the health of the entire earth system.

a. Atmosphere b. Economy

c.Biodiversity d. Biosphere

5. Find the missing agent of economy.



a. Producer's Recycle b. Distributor

c. Consumers d. None of the above

6. The relationship between the …… and ……. is generally explained in the form of a "Material Balance Model" developed by AlenKneese and R.V. Ayres.

a. economy and the ecosystem

b. society and the environment

c.ecosystem and society

d. economy and the environment

7. ……. considers the total economic process as a physically balanced flow between inputs and outputs.

a. Material Balance Model

b. Material Equality Model

c. Material Environmental Model

d. Material atmospheric Model

8. The law of conservation of matter and energy, emphasizes that in any production system "what goes in must come out". Name the Law:

a. The second law of thermodynamics

b. The third law of thermodynamics

c. The first law of thermodynamics

d. none of the above

9. In economic activities of Goods and Service, what the RrP + RrC mean?

a. Recycles from Production and Consumption

b. Residual Discharges from Consumption and Production

c. Consumption and Production

d. Final Residual Discharge from Production and Consumption

10. In economic activities of Goods and Service, what the RC+RP mean?

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11. In economic activities of Goods and Service, what the RdP+ RdC mean?

a. Final Residual Discharge from Production and Consumption

b. Residual Discharges from Consumption and Production

c. Consumption and Production

d. Recycles from Production and Consumption

12. …….. is a set of properties and characteristics of the environment either generalized or local, as they impinge on human beings and other organisms.

a. Economic Status

b. Economics Growth

c. Environmental Degradation

d. Environmental quality

13. Environment is a pure …….. that can be consumed simultaneously by everyone and from which no one can be excluded.

a. Pure private good b. Free Good

c. public good d. mixed good

14. A pure public good is one for which consumption is non-revival and from which it is impossible to……..?

a. includes a consumer

b. includes a producer

c. excludes a consumer

d. excludes a producer

15. Pure public goods pose a ……..?

a. free-rider problem

b. environment tax

c. environment fee

d. none of the above

16. Externalities are third party effects arising from production and consumption of goods and services for which……..

a. equal compensation is paid

b.some compensation is paid

c. no appropriate compensation is paid

d. none of the above

17. ……..occur outside of the market i.e. they affect people not directly involved in the production and consumption of a good or service.

a. Fee good b. spill-over effects

c. Public good d. private good

18. Find the relevant term of the following statement. "When some residents of a locality hire a private security agency to patrol their area, the other residents of the area also benefit from better security without bearing cost"

a.NegativeProduction Externality

b.Negative Consumption Externality

c.Positive production Externality

d. Positive Consumption Externality

19. Find the relevant term of the **following statement. "A person smoking cigarette gets maygives satisfaction to that person, but this act causes hardship (dissatisfaction) to the non-smokers who are driven to passive smoking."**

a. Positive production Externality

b. Positive Consumption Externality

c. Negative Consumption Externality

d. None of the above

20. Find the relevant organization which said the following statement "Every day about 93% of the world's children under the age of 15 (1.8 billion children) breath polluted air that puts their health and development at serious risk"

a. WTO

b. WHO

c. International Environmental Organisation

d. Indian Ministry of Environment and Forest

21. Increasing temperature in the atmosphere leads to ..... and thereby .....and melting of polar icebergs, displacement and loss of habitat.

a. global warming and to increase sea level rise

b. Acid Rain and to increase sea level rise

c. global warming and to decrease sea level rise

d. None of the above

22. Identify the odd one.

a. Establishment of industries away from the towns and cities

b. Decrease the length of the Chimneys in industries

c. Growing more plants and trees

d. Use of non-conventional fuels like Biogas, CNG and LPG

23. Eutrophication is an increased ..... in water bodies.

a. level of minerals

b. level of vitamins

c. level of nutrients

d. level of balance

24. Eutrophication.....the oxygen in water which negatively affects fish and other aquatic animal population.

a. inflates b. depletes

c. increases d. keeps

25. Which of the following is not an example of Water-borne disease?

a. Hepatitis-A b. Typhoid

c. Dysentery d. HPV

26. Expand the following term NIHL.

a. Noise Induced Hearing Loss

b. Natural Induced Hearing Loss

c. Nitrogen Induced Hearing Loss

d. Neutron Induced Hearing Loss

27. Find the odd one in the context of man made noises.

a. ships

b. aircraft

c. seismic exploration

d. submarines

28. Find the odd one in the context Solid waste

a. plastic containers

b. emission

c. bottles

d. used cars

29. Which is not a remedial measures to control Land Pollution

a. Making people aware about the concept of a Reduce, Recycle and Reuse

b. Buying biodegradable products

c. Keeping cultivation

d. Minimizing the usage of pesticides

30. Average temperatures around the world have risen by ……. over the last 100 years.

a. 0.25°C b. 0.70°C c. 0.75°C d. 1.0°C

31. Find the odd one in the context green house effect.

a. Oxygen

b. Carbon dioxide

c. methane

d. Chlorofluoro Carbon

32. The CO2 is the most important of the green house gases contributing to …….of global warming.

a. 1% b. 50%

c. 500% d. 100%

33. Match the items in the List – I with items in List – II. Select the correct answer from the code given below :

	List – I		List – II
I.	Home	- 1.	PC, Boilers, Mixer
II.	Government	- 2.	ECG device, Microscope, Incubator
III.	Private Sectors	- 3.	PC, Television, Radio, Cell phones
IV.	Hospitals	- 4.	FAX machine, Xerox machine, Scanner

Codes :

	I	II	III	IV
a.	3	2	1	4
b.	2	4	1	3
c.	2	3	4	1
d.	3	4	1	2

34. ……. waste which is commonly referred as "e-waste" is the new byproduct of the Info Tech society.

a. Electrical

b. Economical

c. Electronic

d. Environmental

35. The alkali soils are predominantly located in the ……. ?

a. Indo-Gangetic plains

b.Himalayaas

c. Southern Peninsula

d.Western Ghats

36. …….. is formed due to the result of sulphur dioxide (SO2) and nitrogen oxides (NOx) reacting in the atmosphere with water and returning to earth as rain, fog or snow.

a. Global Warming

b. Acid Rain

c. Cloud Raining

d.Noise Pollutions

37. A public good is a good whose benefits are

a. diminished as it is consumed and whose benefits cannot be withheld from anyone

b. not diminished as it is consumed and whose benefits cannot be withheld from anyone c. not diminished as it is consumed and whose benefits can be withheld from anyone

d. concentrated among a select few

38. Match the terms on the left with the definitions in the column on the right.

I.	Externalities	- 1.	benefits from these goods aren't diminished by consumption and cannot be withheld from anyone
II.	third parties	- 2.	unintended costs or benefits imposed on third parties
III.	public goods	- 3.	someone who consumes a good or service without paying for it
IV.	free rider	- 4.	upon whom the externalities are imposed

Codes :

	I	II	III	IV
a.	3	2	1	4
b.	2	4	1	3
c.	2	3	4	1
d.	3	4	1	2

39. All of the following are ways to cope with negative externalities except

a. public choice

b. obligatory controls

c. pollution taxes

d. creating new property forms

40. Consumption of a pure public good

a. depletes the supply of the good for others

b. increases the supply of the good

c. denies the opportunity to consume the good to others

d. neither depletes the good nor excludes others from consuming it

41. Which of the following groups of gases contribute to the 'Green House Effect'?

a. Ammonia and Ozone

b. Carbon mono-oxide and Sulphur di-oxide

c. Carbon tetrafluoride and Nitrous oxide

d. Carbon dioxide and Methane

42. Environmental degradation means

a. Overall lowering of environmental qualities.

b. Adverse change brought in by human activities.

c. Ecological imbalance

d. All the above

43. Which of the following conditions indicate the impact of global warming?

1. Melting of glaciers
2. Lowering down of sea level
3. Changes in weather conditions
4. Rise in global temperature

Select the correct answer from the codes given below:

Codes:

a. 1 and 2 b. 1,2 and 3

c. 1, 3 and 4 d. 1,4

44. Consider the following statements:

Assertion (A): Forests are a renewable resource.

Reason (R): They enhance the quality ofenvironment.

Select the correct answer from the codes given below:

Codes:

a. Both A and R are true and R is the correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

45. Which one of the following does not promote stability of the ecosystem?

a. Balancing between production and consumption of each element in the ecosystem.

b. Balance between input and output of energy.

c. Normal functioning of different biochemical cycles.

d. Increase of human population

46. Consider the following statements:

Assertion (A): Organic farming reduces theemission of greenhouse gases.

Reason (R): Organic forming utilise alternatepractices.

Select the correct answer from the codes given below:

Codes:

a. Both A and R are true and R is the correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

47. Which of the following statements are correct ?

1. A new study has found that changes in solar activity contributed no more than 10 per cent to global warming in the 20th century published in the journal Environmental Research Letters.

2. It has been proposed that cosmic rays may have a role in cooling the earth by encouraging clouds to form, which subsequently reflect the sun's rays back into space.

3. Researchers found high correlation between cosmic rays and global temperatures occurring every 22 years.

Codes

a. 1 only b. 1 and 2 only

c. 2 and 3 only d. All of the above

48.Which of the following is regarded as the main cause of groundwater contamination?

(a) agricultural products

(b) landfills

(c)septic tanks

(d) All of the above main sources of ground water contamination.

49. Noise is……..?

a. Loud sound

b. Sound of high frequency

c. Unwanted sound

d. Constant sound

50. An Eco-System comprises of

a) Living organisms

b) Non-living organisms

c) Both living and non-living organisms

d) Only plants

51. Which of the following statement is TRUE?

a) Eco-Systems may vary in size

b) Eco-Systems are always very large

c) Eco-Systems are always very small.

d) None of these is true.

52. If one part of Eco-System is damaged, what happens?

a) It doesn't have any impact on the Eco-system

b) It completely destroys the eco-system

c) It has an impact on everything else in the eco-system

d) All of these

53. Air pollution causes

a. Global warming

b. Respiratory problems

c. Soil erosion

d. None of these

54. Pollution of water is responsible for

a. Oil refineries

b. Paper factories

c. Sugar mills

d. All

55. An externality can be a cost or benefit arising from the production of a good that falls upon

a. consumers but not producers.

b. producers but not consumers.

c. the consumer and the producer both.

d. someone other than the consumer or producer.

56. A noisy party that keeps neighbors awake is an example of a

a. negative production externality.

b. positive production externality.

c. negative consumption externality.

d. positive consumption externality.

57. Which one of the following is the best description of the term "ecosystem"?

a. A community of organisms interacting with one another

b. That part of the Earth which is inhabited by living organisms

c. A community of organisms together with the environment in which they live.

d. The flora and fauna of a geographical area.

58. Assertion (A) : Environmental quality is a set of properties and characteristics of the environment either generalized or local, as they impinge on human beings and other organisms.

Reason (R) : It is a measure of the condition of an environment relative to the requirements of one or more species and to any human need.

a. Both A and R are true and R is the correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

59. Assertion (A) : Wastes contain harmful chemicals and toxins which make the water poisonous for aquatic animals and plants.

Reason (R) : Sewage, garbage and liquid waste of households, agricultural runoff and effluents from factories are discharged into lakes and rivers.

a. Both A and R are true and R is the correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

60. Assertion (A) : Global warming adversely affects agriculture, horticulture and eco system.

Reason (R) : An increase in the global average surface air temperature of such magnitude will bring about alarming changes in rainfall patterns and other climatic conditions, resulting in serious ecological disequilibrium.

a. Both A and R are true and R is the correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

61. Assertion (A) : Organic production is a holistic system designed to optimize the productivity and fitness of diverse communities within the agro-ecosystem, including soil organisms, plants, livestock and people.

Reason (R) :The principal goal of organic production is to develop enterprises that are sustainable and harmonious with environment.

a. Both A and R are true and R is the correct explanation of A.

b. Both A and R are true but R is not the correct explanation of A.

c. A is true but R is false.

d. A is false but R is true.

62. Match the correct codes

1	Production Sector R	i	G–RC– RP + RrP + Rrc = Rdc + Rdc
2	Household Sector	ii	F+W1
3	R	iii	F+W2
4	Material Balance Approach M	iv	W1+W2 (Input=Output)

Codes

a. (1) – (i) (2) – (ii) (3) – (iv) (4) – (iii)

b. (1) – (ii) (2) – (iii) (3) – (iv) (4) – (i)

c. (1) – (iv) (2) – (iii) (3) – (i) (4) – (ii)

d. (1) – (i) (2) – (ii) (3) – (iii) (4) – (iv)

63. Match the correct codes

1	Eco System	i	The presence of harmful or objectionable material to damage water quality.
2	Pollution	ii	The increase in temperature of the Earth's surface, due to green house gases.
3	Water Pollution	iii	Residual discharges of contaminants in to the natural environment to the air or water.
4	Global warming	iv	The interacting system of a biological community and its nonliving environmental surroundings.

Codes

a. (1) – (i) (2) – (ii) (3) – (iv) (4) – (iii)

b. (1) – (ii) (2) – (iii) (3) – (iv) (4) – (i)

c. (1) – (iv) (2) – (iii) (3) – (i) (4) – (ii)

d. (1) – (i) (2) – (ii) (3) – (iii) (4) – (iv)

Answers

1	2	3	4	5	6	7	8	9	10
b	d	a	d	c	d	a	c	a	b
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
a	d	c	c	a	c	b	d	c	b
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
a	b	c	b	d	a	d	b	c	c
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
a	b	d	c	a	b	b	b	a	d
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
d	d	c	b	d	a	b	d	c	c
51	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
a	c	b	d	d	c	c	a	a	a
61	**62**	**63**							
a	b	c							

Additional Two Marks

1. What is meant by Environmental Economics?

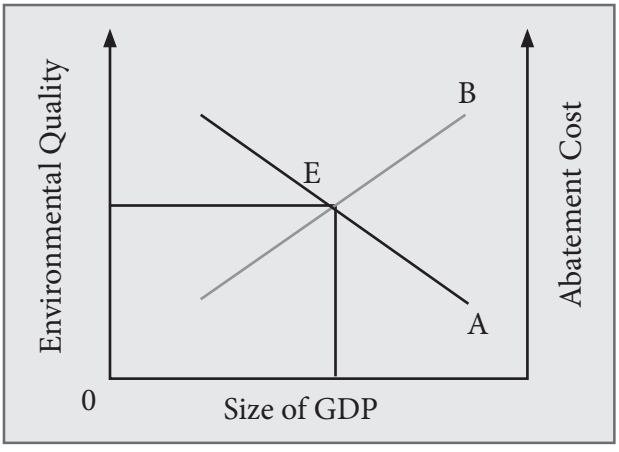
- Environmental economics (EE) is the study of interactions between human economic activity and the natural environment.
- EE is the subset of economics that is concerned with the efficient allocation of environmental resources.

2. What is the key objective of Environmental Economics?

- The key objective of EE is to identify those particular tools or policy alternatives that will move the market towards the most efficient allocation of natural resources.
- EE takes into consideration issues such as the conservation and valuation of natural resources, pollution control, waste management and recycling.

3. Draw the diagram depicts the interdependence of economics and environment.

The interdependence of economics and environment is given in the figure



4. Define the Environmental quality.

- Environmental quality is a set of properties and characteristics of the environment either generalized or local, as they impinge on human beings and other organisms.
- It is a measure of the condition of an environment relative to the requirements of one or more species and to any human need.

5. What is a "Pure public good"?

- A pure public good is one for which consumption is non-revival and from which it is impossible to exclude a consumer.
- Pure public goods pose a free-rider problem. As a result, resources are depleted.

6. What are spill over effects?

- Externalities occur outside of the market i.e. they affect people not directly involved in the production and consumption of a good or service.
- They are also known as spill-over effects.

7.Write any major water pollutants.

1.Pesticides and Biocides.

2.Thermal pollution.

8 . What are the important causes of climate change ?

- Presence of green houses gases in the atmosphere increases the global temperature .
- Depletion of Ozone layer

9. Deforestation

Deforestation is the permanent destruction of forests in order to make the land available for other uses

10. Definite- Externality.

Externality may be defined as "the cost or benefit imposed by the consumption and production activities of the individuals on the rest of the society not directly involved in these activity and towards which no payment is made".

11. What are the dimensions of sustainable development?

The SDGs links three dimensions of sustainable development: economic development, social inclusion and environmental sustainability.

12. What are the main aims of SDGs?

The SDGs aim to provide a global frame work for cooperation that address the three dimensions of sustainable development within the ethical framework based on:

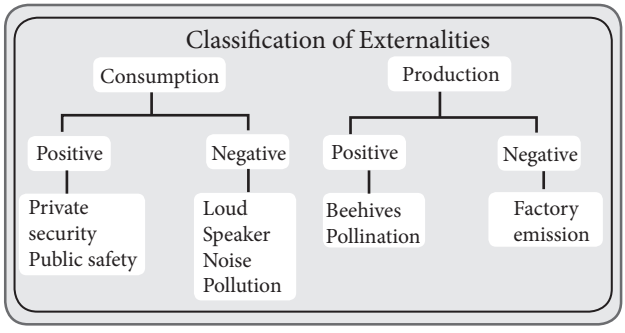
(i) right to development for every country,

(ii) human rights and social inclusion,

(iii) convergence of living standards across countries and

(iv) shared responsibilities and opportunities.

13. Draw the chart depicting classification of externalities.



14. Write an example for "Positive Consumption Externality"

When some residents of a locality hire a private security agency to patrol their area, the other residents of the area also benefit from better security without bearing cost.

15. Write an example for "Negative Consumption Externality"

A person smoking cigarette gets maygives satisfaction to that person, but this act causes hardship (dissatisfaction) to the non-smokers who are driven to passive smoking.

16. Write an example for "Positive Production Externality"

- ❖ The ideal location for beehives is orchards (first growing fields). While bees make honey, they also help in the pollination of apple blossoms.
- ❖ The benefits accrue to both producers (honey as well as apple). This is called 'reciprocal untraded interdependency.

17. What is pollution?

Pollution is the introduction of contaminants into the natural environment that causes adverse change, in the form of killing of life, toxicity of environment, damage to ecosystem and aesthetics of our surrounding.

18. Write a short note on "Indoor Air Pollution".

- ❖ Indoor Air Pollution refers to toxic contaminants that we encounter in our daily lives in our homes, schools and workplaces.
- ❖ For example, cooking and heating with solid fuels on open fires or traditional stoves results in high levels of indoor air pollution.

19. Write a short note on "Outdoor Air Pollution":

- Outdoor Air Pollution refers to ambient air.
- The common sources of outdoor air pollution are caused by combustion processes from motor vehicles, solid fuel burning and industry.

20. List the Remedial measures to control Air Pollution.

1. Establishment of industries away from the towns and cities
2. Increasing the length of the Chimneys in industries
3. Growing more plants and trees
4. Use of non-conventional fuels like Biogas, CNG and LPG.
5. Use of Mass Transit System (Public Transport)

21. What are the Remedial measures to control Water Pollution?

1. Comprehensive water management plan.
2. Construction of proper storm drains and settling ponds.
3. Maintenance of drain line.
4. Effluent and sewage treatment plant.
5. Regular monitoring of water and waste water.
6. Stringent actions towards illegal dumping of waste into the water bodies.

22. List the examples of Private Sectors E-Wastes.

- PC
- Mixer
- Incubator
- Boilers
- Signal Generators

23. List the Remedial measures to control Noise Pollution.

1. Use of noise barriers
2. Newer roadway for surface transport
3. Traffic control
4. Regulating times for heavy vehicles
5. Installations of noise barriers in the work place
6. Regulation of Loudspeakers

24. What is "Climate Change"?

- The climate change refers to seasonal changes over a long period with respect to the growing accumulation of greenhouse gases in the atmosphere.
- Recent studies have shown that human activities since the beginning of the industrial revolution.

25. Define the term "Acid Rain"

- Acid rain is one of the consequences of air pollution.
- It occurs when emissionsfrom factories, cars or heating boilers contact with the water in the atmosphere.
- These emissions contain nitrogen oxides, sulphur dioxide and sulphurtrioxide which when mixed with water becomes sulfurous acid, nitric acid and sulfuric acid.
- This process also occurs by nature through volcanic eruptions.

26. List the examples of Home E-Wastes.

- PC
- Television
- Radio
- Cell phones
- Washing machine
- Microwave oven
- CD player
- Fan
- Electric Iron

27. List the examples of Hospital E-Wastes.

- ❖ PC
- ❖ Monitors
- ❖ ECG device
- ❖ Microscope
- ❖ Incubator

Government:

- ❖ PC
- ❖ FAX machine
- ❖ Xerox machine
- ❖ Scanner
- ❖ Fan
- ❖ Tube lights
- ❖ Air conditions

28. What is solid waste?

- ❖ Solid Waste is basically discharge of useless and unwarranted materials as a result of human activity.
- ❖ Most commonly, they are composed of solids, semisolids or liquids.
- ❖ Solid wastes consist of the discards of households, hospital refuse, dead animals, debris from construction site, ashes, agricultural wastes and industrial wastes etc.

29. Define – "Organic Farming"

- ❖ Organic farming is a system of agricultural production which relies on animal manure, organic waste, crop rotation, legumes and biological pest control.
- ❖ It avoids use of synthetic fertilizer, pesticides and livestock additives. Organic inputs have certain benefits, such as enriching soil for microbes.

30. Write a brief note on "Trees"

- ❖ Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil and supporting wildlife.
- ❖ During the process of photosynthesis, trees take in carbon dioxide and produce the oxygen we breathe. So trees are considered to be the lungs of the earth.

31. What are the major Causes of Air Pollution?

1. Vehicle exhaust smoke
2. Fossil fuel based power plants
3. Exhaust from Industrial Plants and Factories
4. Construction and Agricultural activities
5. Natural Causes
6. Household activities

32. Write a note on the term "Eutrophication"

- ❖ Eutrophication is an increased level of nutrients in water bodies. This results in bloom of algae in water.
- ❖ It also depletes the oxygen in water which negatively affects fish and other aquatic animal population.

33. What is the "Trade-off between goods and services and environmental quality"?

- ❖ An economic activity (production of goods and services) is expected to generate utility (economic well-being) when it is eventually consumed by households.
- ❖ At the same time, given that pollution is an undesirable byproduct of production activities, households' economic well-being would be negatively impacted due to a deterioration in environmental quality

Additional Three Marks

1. Explain the Types of Water Pollution.

i. Surface water pollution:

Surface water includes natural water found on the earth's surface, like rivers, lakes, lagoons and oceans. Hazardous substances coming into contact with this surface water, dissolving or mixing physically with the water can be called surface water pollution.

ii. Groundwater pollution:

Groundwater contamination occurs when man- made products such as gasoline, oil and chemicals get into the ground water. In addition, untreated waste from septic tanks, toxic chemicals from underground storage tanks and leaky landfills contaminate groundwater.

iii. Microbiological pollution:

In many communities around the world, people drink untreated water (straight from a pond,river or stream). Sometimes there is natural pollution caused by micro-organism like viruses and bacteria. This natural pollution causes both aquatic and human illness.

iv. Oxygen depletion pollution:

When oxygen levels in the water are depleted, relatively harmless aerobic micro-organisms die and anaerobic micro-organisms begin to thrive. Some anaerobic micro-organisms are harmful to people, animals and the environment as they produce harmful toxins such as ammonia and sulfides.

2. What are the types of Noise Pollution?

i. Atmospheric Noise:

Atmospheric noise or static is caused by lighting discharges in thunderstorms and other natural electrical disturbances occurring in the atmosphere.

ii. Industrial Noise:

Industrial noise refers to noise that is created in the factories. Sound becomes noise it becomes unwanted. Heavy industries like ship building, iron and steel have long been associated with Noise Induced Hearing Loss (NIHL).

iii. Man made Noise:

The main sources of man-made noise pollution are ships, aircraft, seismic exploration, marine construction, drilling and motor boats.

3. Explain the Causes of Noise Pollution

i. Poor urban planning:

Improper urban planning will cause more nuisances among the city travelers.

ii. Sounds from motor vehicles:

Sounds from motor vehicles can cause temporary hearing loss.

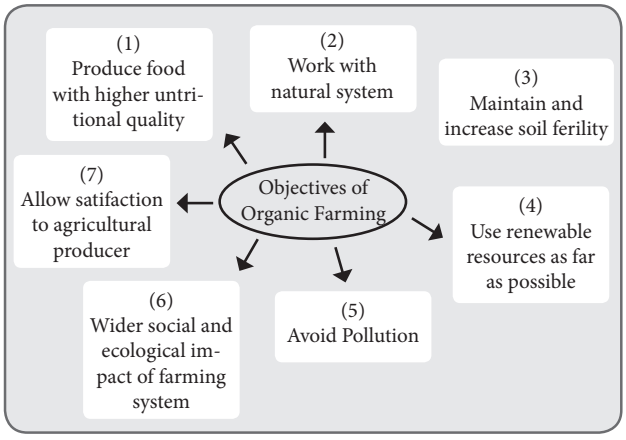
iii. Crackers:

Enormous Crackers are used during some occasions. Such activities create a very louder noise to the level of harming the public. Sometimes, they may even cause deafness to children and aged.

iv. Factory machinery:

The industrial noise caused by continuous operation of mills, machines and pneumatic drills, is unbearable nuisance to the workers.

4. What are the objectives of organic farming?



5. Discuss the Effects of Noise Pollution.

a. Hearing Loss:

Chronic exposure to noise may cause noise-induced hearing loss. Older people are exposed to significant occupational noise and thereby reduced hearing sensitivity.

b. Damage Physiological and Psychological health:

Unwanted noise can damage physiological and psychological health. For example, annoyance and aggression, hypertension, and high stress levels.

c. Cardiovascular effects:

High noise levels can contribute to cardiovascular problems and exposure to blood pressure.

d. Detrimental effect on animals and aquatic life:

Noise can have a detrimental effect on animals, increasing the risk of death.

e. Effects on wildlife and aquatic animals:

It creates hormone imbalance, chronic stress, panic and escape behavior and injury.

6. Explain the Types of Land Pollution.

i. Solid waste:

It includes all kinds of rubbish like paper, plastic containers, bottles, cans, food, used cars, broken electronic goods, municipal waste and hospital waste.

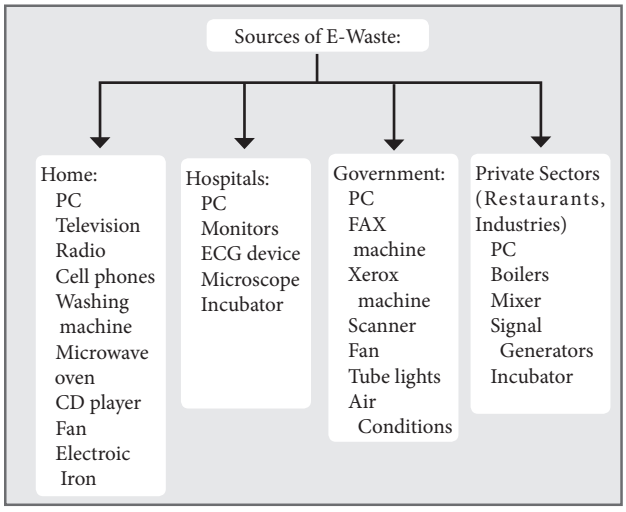
ii. Pesticides and Fertilizers:

Many farming activities engage in the application of fertilizers, pesticides and insecticides for higher crop yield which pollute land.

iii. Deforestation:

Humans depend on trees for many things including life. Trees absorb carbon dioxide from the air and release Oxygen, which is needed for life. Forest helps replenish soils and help retain nutrients being washed away. Deforestation is led to land pollution.

7. What are the various sources of E-Wastes?



8. Explain different types of Noise.

i. Atmospheric Noise:

Atmospheric noise or static is caused by lighting discharges in thunderstorms and other natural electrical disturbances occurring in the atmosphere.

ii. Industrial Noise:

Industrial noise refers to noise that is created in the factories. Sound becomes noise it becomes unwanted. Heavy industries like ship building, iron and steel have long been associated with Noise Induced Hearing Loss (NIHL).

iii. Man made Noise:

The main sources of man-made noise pollution are ships, aircraft, seismic exploration, marine construction, drilling and motor boats.

Additional Five Mark

1. State and discuss the Causes of Land Pollution

i. Deforestation and soil erosion:

Deforestation carried out to create dry lands is one of the major concerns. Land that is once converted into a dry or barren land, can never be made fertile again, whatever the magnitude of measures to convert it.

ii. Agricultural activities:

With growing human and pet animal population, demand for food has increased considerably. Farmers often use highly toxic fertilizers and pesticides to get rid off insects, fungi and bacteria from their crops. However the overuse of these chemicals, results in contamination and poisoning of land.

iii. Mining activities:

During extraction and mining activities, several land spaces are created beneath the surface.

iv. Landfills:

Each household produces tones of garbage each year due to changing economic lifestyle of the people. Garbage like plastic, paper, cloth, wood and hospital waste get accumulated. Items that cannot be recycled become a part of the landfills that cause land pollution.

v. Industrialization:

Due to increasing consumerism more industries were developed which led to deforestation. Research and development paved the way for modern fertilizers and chemicals that were highly toxic and led to soil contamination.

vi. Construction activities:

Due to urbanization, large amount of construction activities are taking place. This has resulted in large waste articles like wood, metal, bricks, plastic. These are dumped at the outskirts of urban areas that lead to land pollution.

vii. Nuclear waste:

The leftover radioactive materials, harmful and toxic chemicals affect human health. They are dumped beneath the earth to avoid any casualty.

2. Discuss the Effects of Land Pollution.

1. Soil pollution:

Soil pollution is another form of land pollution, where the upper layer of the soil is damaged. This is caused by the overuse of chemical fertilizers, and pesticides. This leads to loss of fertile land. Pesticides kill not only pests and also human beings.

2. Health Impact:

The land when contaminated with toxic chemicals and pesticides lead to problem of skin cancer and human respiratory system. The toxic chemicals can reach our body through foods and vegetables.

3. Cause for Air pollution:

Landfills and waste dumping lead to air pollution. The abnormal toxic substances spread in the atmosphere cause transmit respiratory diseases among the masses.

4. Effect on wildlife:

The animal kingdom has suffered mostly in the past decades. They face a serious threat with regards to loss of habitat and natural environment. The constant human activity on land is leaving.

3. List the Remedial measures to control Land Pollution

1. Making people aware about the concept of a Reduce, Recycle and Reuse
2. Buying biodegradable products
3. Minimizing the usage of pesticides
4. Shifting cultivation
5. Disposing unwanted garbage properly either by burning or by burying under the soil.
6. Minimizing the usage of plastics.

4. Enumerate the general principles of organic farming.

1. Protect the environment, minimize soil degradation and erosion, decrease pollution, optimize biological productivity and promote a sound state of health.
2. Maintain long-term soil fertility by optimizing conditions for biological activity within the soil
3. Maintain biological diversity within the system
4. Recycle materials and resources to the greatest extent possible within the enterprise
5. Provide attentive care that promotes the health and meets the behavioural needs of livestock
6. Prepare organic products, emphasizing careful processing, and handling methods in order to maintain the organic integrity and vital qualities of the products at all stages of production.
7. Rely on renewable resources in locally organized agricultural systems.

5. Discuss the major Causes of Air Pollution?

1. Vehicle exhaustion smoke:

Vehicles smoke happens to release high amounts of Carbon monoxide. Millions of vehicles are operated every day in cities, each one leaving behind its own carbon footprint on the environment.

2. Fossil fuel based power plants:

Fossil fuels also present a wider scale problem when they are burned for energy in power plants. Chemicals like sulfur dioxide are released during the burning process, which travel straight into the atmosphere. These types of pollutants react with water molecules to yield something known as acid rain.

3. Exhaust from Industrial Plants and Factories:

Heavy machineries located inside big factories and industrial plants also emit pollutants into the air.

4. Construction and Agricultural activities:

Potential impacts arising from the

construction debris would include dust particles and gaseous emissions from the construction sites. Likewise, using of ammonia for agriculture is a frequent byproduct that happens to be one of the most dangerous gases affecting air.

5. Natural Causes:

Earth is one of the biggest polluters itself, through volcanoes, forest fires, and dust storms. They are nature-borne events that dump massive amounts of air pollution into the atmosphere.

6. Household activities:

Household activities like cooking, heating and lighting, use of various forms of mosquito repellents, pesticides and chemicals for cleaning at home and use of artificial fragrances are some of the sources that contribute to air pollution.

6. Elaborate the Effects of Air Pollution

1. Respiratory and heart problems:

It creates several respiratory and heart ailments along with cancer. Children are highly vulnerable and exposed to air pollutants and commonly suffer from pneumonia and asthma.

2. Global warming:

Increasing temperature in the atmosphere leads to global warming and thereby to increase sea level rise and melting of polar icebergs, displacement and loss of habitat.

3. Acid rain:

Harmful gases like nitrogen oxides and sulfur oxides are released into the atmosphere during the burning of fossil fuels. Acid rain causes great damage to human beings, animals and crops.

4. Eutrophication:

Eutrophication is a condition where high amount of nitrogen present in some pollutants which adversely affects fish, plants and animal species.

5. Effect on Wildlife:

Toxic chemical present in the air can force wildlife species to move to new place and change their habitat.

6. Depletion of Ozone layer:

Ozone exists in earth's atmosphere and is responsible for protecting humans from harmful ultraviolet (UV) rays. Earth's ozone layer is depleting due to presence of chlorofluorocarbons and hydro chlorofluorocarbons in the atmosphere.

7. Human Health:

Outdoor air pollution is a major cause of death and disease globally. The health effects range from increased hospital admissions and emergency room visits, to increased risk of premature death. An estimated 4.2 billion premature deaths globally are linked to ambient air pollution.