NATURAL RESOURCES

1. INTRODUCTION ::

Definition :

The stock of the nature such as air, water, soil, coal, minerals, animals and plants are useful to mankind in many ways. They are termed as natural resources.

Types of Natural Resources :

Natural resources are broadly classified into following two categories :

Inexhaustible Resources

Exhaustible Resources

2. INEXHAUSTIBLE RESOURCES ::

- These resources are present in unlimited quantity in the nature and they are not likely to be exhausted by human activities.
- Solar energy, wind power, tidal power, rainfall and even atomic energy are classified as inexhaustible resources.

3. EXHAUSTIBLE RESOURCES ::

- These resources have limited supply on the earth are therefore, liable to be exhausted if used in discrimately.

  Exhaustible resources are of **two types :**

  (A) Nonrenewable energy resources

  (B) Renewable energy resources.

(A) Non-Renewable or Conventional Energy resources -

- It is directly or Indirectly from the sun and present in limited quantity. Ex. Coal & Petroleum (Fossil fuels) which cannot be renewed and produce a lot of air pollution and water pollution.

(B) Renewable or Non-Conventional Energy Resources :

- These are solar radiation, wind power, hydel power, biomass and nuclear power. They are pollution free sources of energy which can be renewed in nature.

"The energy received from sun in the form of heat and light is known as solar energy."

- **Fossil fuel -**

- Fossil fuels are remains organisms embedded in the surface of the earth with high carbon, hydrogen contents which are used by man as fuels.
- These are those energy resources which are extracted from the earth eg. coal, oil, natural gas and petroleum have resulted from the decay of dead plants & animals in the absence of oxygen. Fossils means the remains of living things, so these fuels have been named as **fossil fuel**.

Types of Inexaustible Resources :

- **Air -**

- Total volume of air present in atmosphere consists of 78 per cent nitrogen, 21 per cent oxygen and

1 per cent other gases such as carbon dioxide ammonia, methane, hydrogen, ozone and noble gases such as neon, helium, krypton, xenon and radon.

- **Water -**
- The seas, oceans, rivers, streams, lakes, pools, polar ice caps, water vapour, etc. form the hydrosphere.
- Water is of two types : Salt water (sea) and fresh water.
- **Fresh water :** It is an unlimited natural resource. Its quality is often degraded but not quantity. Fresh water is obtained from the following **three naturel sources** :

  (a) Rain water,

  (b) Surface water (surface flow) or

  (c) Ground water.

Types of Exhaustible Resources :

- **Soil -**
- The superficial layer that covers large areas of the earth's crust is called soil. It consists of mineral particles, decaying and decayed organic materials, living organisms, air and water and acts as a medium for plant growth, supporting them and supplying them with nutrients. It is also a habitat for numerous animals and micro-organisms. Soil is actually exhaustible but maintainable natural resource.
- The word 'soil' is derived from a Latin word 'solum' meaning earthly material in which plants grow. Soil is a stratified mixture of inorganic and organic materials, both of which are decomoposition products. The soil forming rocks by fragmentation or weathering.

- **Biogas -**
- Biogas "A mixture of gases is produced by the anaerobic degradation of animal and agricultural wastes, it is called bio-gas." Biogas consists mainly of methane which is produced when organic matter decays under anaerobic conditions. Cow-dung, faecal matter and other biodegradable wastes are allowed to decay under anaerobic conditions in digesters equipped with device to collect methane thus formed. Biogas is produced by the degradation of biological matter by the bacterial action in the absence of free oxygen.
- The average **composition of biogas** is :
- CH_4 (Methane) 50 - 60 %
- CO_2 (Carbon di oxide) 30 - 40 %
- H_2 (Hydrogen) 5 - 10 %
- N_2 (Nitrogen) 2 - 6 %
- H_2S (Hydrogen sulphide) traces

4. WILD LIFE RESOURCES :

Flora term is used for plant species and fauna for animal species which occur in domesticated and living in a natural habitat and constitute important renewable natural resources.

4.1 Conservation of Wild Life :

Wild life plays an important role in biosphere, and thus be should be conserved. Some important measures for conserving wildlife are mentioned below:

- Natural habitat should be protected by bringing up more National Parks, Sanctuaries and Biosphere Reserves.

- Successful captivity breeding programme should be introduced to maintain plant and animal species.
- Public awareness programme like Van Mahotsava, should be taken with all sincerity.
- Government should pass legislations to protect wildlife.
- Poaching should be checked.
- Heavy penalties should be imposed on traders of furs, skins and feathers.
- Forests should be conserved by afforestation.
- Agro-forestry programme should be implemented.
- Ornamental and aesthetic trees should be planted more.
- Loss of habitat is major cause of dlotruction of wild life.

(A) National Parks :

These are strictly reserved area. At present there are 89 National Parks in India. It is about 1 % of India's total geographical area. In National Parks activities (Forestry, Cultivation or grazing) are not permitted.

The **Jim Corbett National Park** near **Nainital** was the first National Park established in India. Notable among then are Kaziranga. National Park for Asiatic Lion, Corbett National Park & Kanha National Park.

Some important National Park of India are given in table :

Some Important National Parks

S.No.	Name and Location	State	Area (sq km)	Important animals found
1.	Kaziranga National Park	Assam	430	Rhinoceros, Barking deer.
2.	Corbett National park	U.P.	525	**Tiger**, Panther, Nilgai, Sambhar, King Cobra,
3.	Gir National Park	Gujarat	1,412	**Asiatic lion**, Panther, Sambhar, Nilgai, Chital, 4-horned antelope, Crocodile, Partridge.
4.	Kanha National Park	Madhya Pradesh	940	**Tiger**, Panther, Chital, Chinkara, Four horned deer, Langur, Sloth bear, Crocodile, Pea-fowl.
5.	Bandipur National Park	Karnataka	874	**Elephant**, tiger, Leopard, Chital, Panther,
6.	Desert National Park, Jaisalmer	Rajasthan	3,000	**Great Indian Bustard**, Black buck, chinkara.

(B) Sanctuaries :

It is protection of fauna only. Operations such as collection of minor forest products & private ownerships rights, harvesting of timber are allowed provided they do not affect the animals adversely. At present there are 492 Wild life Sancturies in our countary. Out of 581 National Parks & Sancturies 17 havebeen selected for **'Project Tiger'. The Bharatpur Sanctuary is world famous for Avifaura.**

- Some important Wildlife Sancturies are given in table :

Some Important Sancturies of India

S.No.	Name and Location	State	Important Animals found
1.	Annamalai Sanctuary	Tamil Nadu	Elephant, Tiger, Panther, Sambhar, Spotted deer, Sloth bear,
2.	Keoladeo Ghana Bird Sanctuary, Bharatpur	Rajasthan	Siberian crane, Egrets herons, Spoons bill, Great indian bustard etc.
3.	Dachigam Sanctuary,	Jammu & Kashmir	Hangul or Kashmir Stag, Musk deer, Black bear, Brown bear.
4.	Mudumalai Wildlife Sanctuary,	Tamil Nadu	Elephant, Sambhar, Chital, Barking deer, Flying squirrel, Wild dog, Wild cat, Civet, Sloth bear, Monitor lizard
5.	Nagarjuna Sagar Sanctuary,	Andhra Pradesh	Tiger, Panther, Wild bear, Chital, Nilgai, Sambhar, Black buck, Fox jackal, Wolf, Crocodile
6.	Periyar Sanctuary	Kerala	Elephants, Gaur, Leopard, Sloth bear, Sambhar, Hornbill, egret. It is famous for elephants
7.	Chilka lake bird Sanctuary	Orissa	Water Dowls, ducks, Cranes, Golden plovers
8.	Manas Wildlife Sanctuary,	Assam	Tiger, Panther, Rhino, Gaur, Wild buffalo, Sambhar, Swamp deer, Wild dog

4.2 Biosphere Reserves :

The Biosphere Reserves are a special category of protected areas of land or coastal environment, wherein people are in integral component of the system.

Roles of Biosphere Reserves :

(A) Conservation :

- To ensure the conservation of landscapes, ecosystems, species and genetic resources. It also encourages traditional resources use.

(B) Development :

- To promote economic development which is culturally, socially and ecologically sustainable.

(C) Scientific Research, Monitoring and Education :

- The aim is to provide support for research, monitoring, education and information exchange related to local national and global issues of conservation and development.

❑ Biosphere Reserve in India :

14 Areas have been marked to be declared as Biosphere Reserves in India. Of these, the following 9 have been so far notified.

- Nilgiri Biosphere Reserve
- Nanda Devi in Uttar Pradesh
- Nokrek Biosphere Reserve
- Uttarakhand Biosphere Reserve
- Kanger valley Biosphere Reserve
- Manas Biosphere Reserve

- Great Nicobar Biosphere Reserve
- Sunderbans Biosphere Reserve
- Gulf of Mannar Biosphere Reserve

❑ **Red Data Book :**

Intenational Union of Conservation of Nature & Natural Resources (IUCN) has classified threatened species of plants & animals according to the degree of danger as -

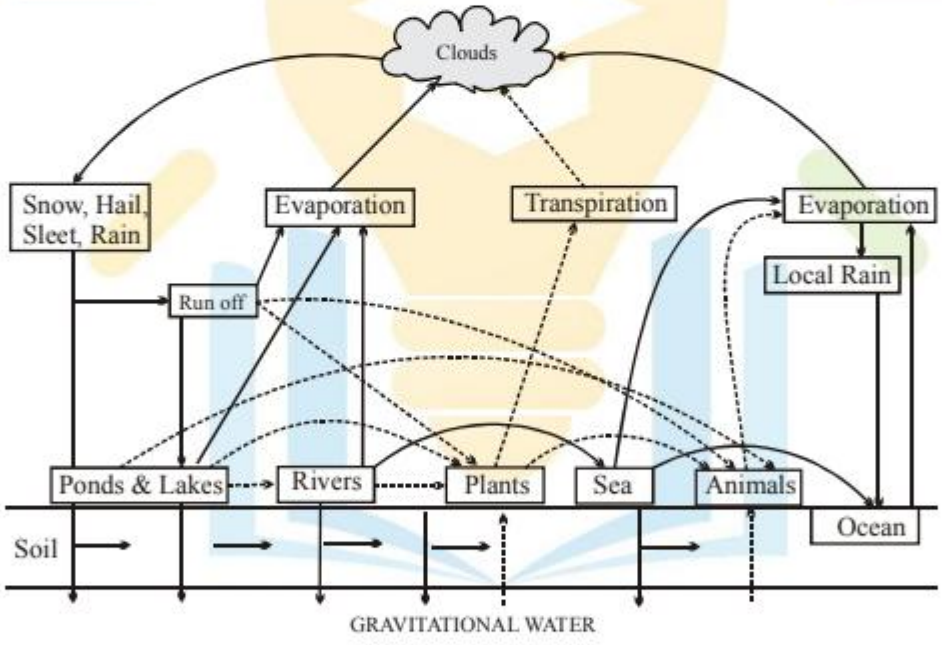
❑ **Endangered (E) :** These species are in danger of extinction of the causal factors continue to operate.

❑ **Vulnerable (V) :** These species are likely to enter into endangered category if the causal factor continue operate.

❑ **Rare species (R) :** Species with small world population that are not present endangered or vulnerable but are at risk.

4. BIOGEOCHEMICAL CYCLES ::

- Biogenetic elements (macro-, micro- & other elements) flow from the environment into and out of the plant in a cyclic manner.
- This flow of nutrients from abiotic to biotic components of the ecosystem and vice-versa constitute the biogeochemical cycles.



The Water Cycle

5.1 Hydrological or Water Cycle :

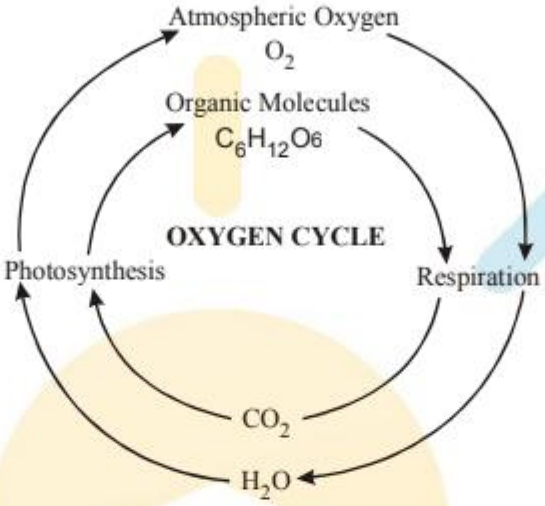
A Wonder Liquid -

- Water on earth is cycled by two processes, **evaporation** and **precipitation**.
- The atmospheric precipitation occurs in the form of snow, hail or sleet etc. The run off water is finally collected in ocean through rivers.
- Some water remains solid in the form of snow which gradually melts and reaches the sea.
- Soil water is used by plants and most of it again reaches the atmosphere through transpiration.

- Animals consume water directly from water bodies & also the gravitational water.
- By evaporation, the water returns to atmosphere and cycle is repeated.

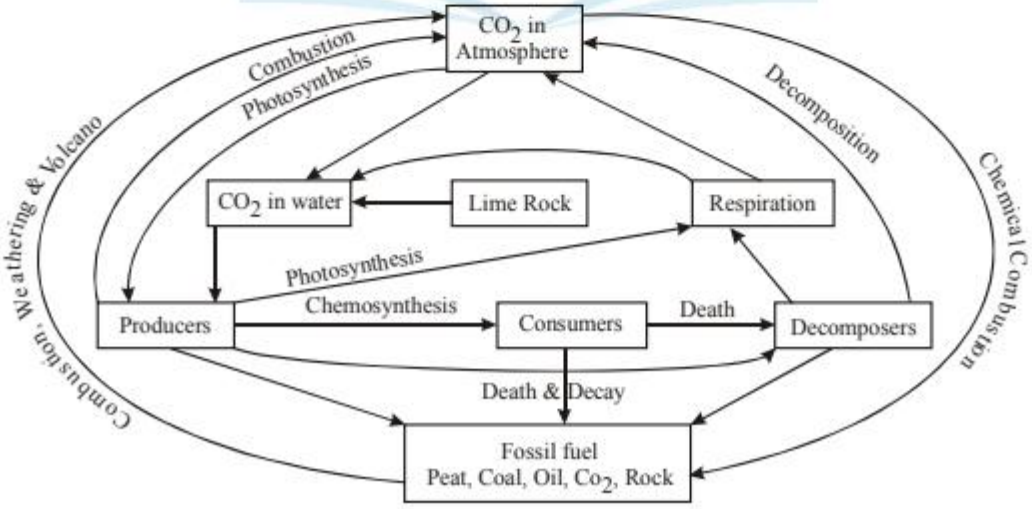
5.2 Oxygen Cycle :

- Oxygen required for respiration is plants and animals enters into body from the sorrounding environment. Oxygen back to environment in the form of CO_2 and water. Oxygen enters through plants as CO_2 and water during photosynthesis. It is released in the form of molecular oxygen.



5.3 Carbon Cycle :

- CO_2 is 0.03% in atmosphere, which is utilized by producers in photosynthesis for making food.
- From producers, it goes to consumers and then through decomposers into atmosphere.
- The producers, consumers & decomposers may be converted into fossil fuel (petrol, coal etc.) or form carbonate rock after death.
- By way of respiration the biotic component returns CO_2 to atmosphere.
- CO_2 may get dissolved in water. The lime rocks also contribute to CO_2 in water. The aquatic producer use this CO_2 for photosynthesis and return it by respiration.
- By combustion of fossil fuel & also by volcanic activity, CO_2 is returned to the atmosphere.



The Carbon Cycle

5.4 Nitrogen Cycle :

- The atmosphere is the source of N_2 where it is about 79%. Plant cannot use N_2 directly.
- In living organisms nitrogen is important constituent of protein and nucleic acid.
- The N_2 cycle has five important steps -

(A) Nitrogen Fixation :

- Conversion of N_2 gas into its compounds like nitrates & nitrites is called N_2 fixation. It is done either non-biologically by lightening or biologically by symbiotic or free- living bacteria.

(B) Assimilation of Nitrogen :

- N_2 cannot be used by plants directly. They absorb it in the form of nitrate. Nitrate later on reduced to ammonia which provide amino ($-NH_2$) group. It is important part of proteins.

(C) Ammonification :

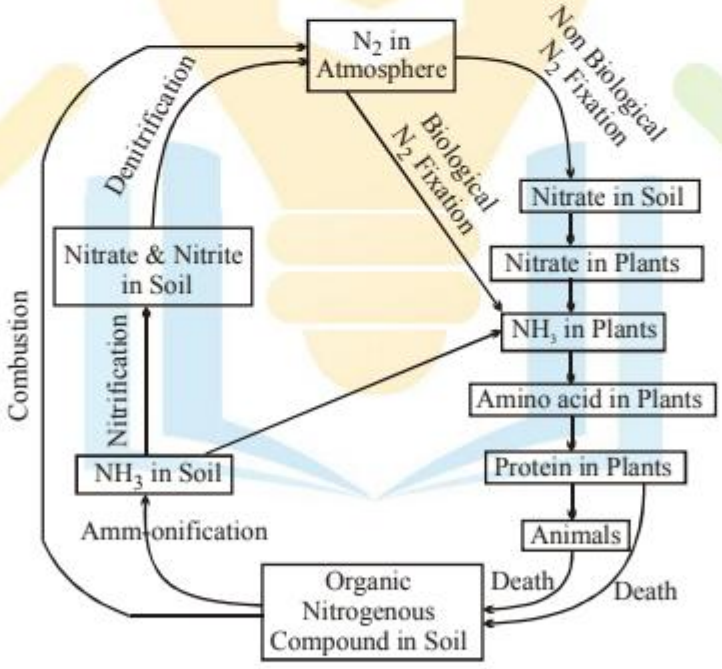
- Dead plant & animal protein and their waste like urea & uric acid converted to ammonia by some ammonifying bacteria in soil. e.g. *Bacillus mycoides, B. vulgaris & B. ramosus* etc.

(D) Nitrification :

- Ammonia is converted into nitrite by *Nitrosomonas* bacteria, and *Nitrobacter* convert nitrite into nitrate. This nitrate again can be absorbed by plant & thus cycled back.

(E) Denitrification :

- Some denitrifying bacteria like *Pseudomonas* reduce nitrate into nitrogen gas in soil. This gas is again back to environment.



The Nitrogen Cycle

EXERCISE - 1

A. VERY SHORT ANSWER TYPES QUESTIONS

Q.1 Write any two examples of fossil fuel ?

Q.2 Name any one denitryfying bacteria ?

Q.3 Name any two biosphere reserve found inIndia ?

Q.4 Define Sanctury ?

Q.5 What are endangered species ?

B. SHORT ANSWER TYPES QUESTIONS

(About 30–40 words)

Q.6 Write a short note on fossil fuel ?

Q.7 Distinguish between renewable & non-renewable resources ?

Q.8 What are Biosphere Reserve ?

Q.9 Distinguish between inexhaustible & exhaustible resources. ?

Q.10 Write a short note on oxygen cycle ?

Q.11 Explain the value of Biogas as Natural Resources ?

Q.12 Give an account on water cycle ?

C. LONG ANSWER TYPES QUESTIONS

(More than 60–70 words)

Q.13 Discuss carbon cycle ?

Q.14 Give an account of nitrogen cycle in the environment ?

Q.15 Describe various renewable sources of energy ?

Q.16 What is Red data book ? Describe its significance.

Q.17 Write a short note on Sancturies in India ?

Q.18 What is a Biosphere Reserve ?

D. FILL IN THE BLANKS

Q.19 Most biotic resources are .....

Q.20 Natural resources are broadly classified into inexhaustible & .....

Q.21 Biogas consists mainly of ..... .

Q.22 The superficial layer that covers large areas of the earth's crust is called ..... .

Q.23 Ammonia is converted into nitrite by ..... bacteria.

E. TRUE OR FALSE

Q.24 Nitrogen cannot be used by plants directly.

Q.25 By evaporation, the water returns to atmosphere.

Q.26 *Pseudomonas* convert nitrite into nitrate.

Q.27 Minerals can be metallic or non-metallic.

Q.28 Vulnerable species are with small world population.

Q.29 Sanctuary is protection of fauna only.

Q.30 The Bharatpur Sanctuary is world famous for Avifauna.

Q.31 Ammonifying bacteria are Bacillus mycoides & B. vulgaris.

Q.32 Renewable Resources are coal & petroleum.

F. SINGLE CHOICE QUESTIONS

Q.33 Most of the water on the earth surface is found in -

(A) Oceans and seas (B) Underground
(C) Rivers (D) Lakes

Q.34 Natural habitat can be protected by creating -

(A) National Parks (B) Sanctuaries
(C) Biosphere Reserves (D) All of these

Q.35 Exhaustible resources are -

(A) Water (B) Fossil fuels
(C) Minerals (D) All

Q.36 Biogas is a good fuel because it is -

(A) Cheap fuel (B) Non-polluting fuel

(C) Convenient fuel (D) All of these

Q.37 National Park associated with Rhinoceros is -

(A) Kaziranga (B) Ranthambore

(C) Corbett (D) Valley of flowers

Q.38 First National Park of India is -

(A) Kanha National Park

(B) Periyar National Park

(C) Corbett National Park

(D) Bandipur National Park

Q.39 Which of the following is a non renewable source

(A) Water (B) Forest

(C) Wild-life (D) Fossil fuels

Q.40 Chilka lake is situated in -

(A) Andhra Pradesh (B) Orissa

(C) Gujarat (D) Assam

G. MATCH THE COLUMNS

Q.41 Match the column –

Column - I	**Column - II**
1. Fe, Cu	a. Nitrosomonas
2. Denitrification	b. Non-metallic minerals
3. Nitrification	c. *Bacillus mycoides*
4. Alluvial soil	d. Rich in $Al(OH)_3$
5. Ammonification	e. *Pseudomonas*
6. Sand, Stone	f. Metallic minerals

H. FILL THE BOX WITH APPROPRIATE WORD

Q.42 Conversion of N_2 gas into its components like nitrates & nitrites –

Q.43 Gir forest is in –

EXERCISE - 2

A. SINGLE CHOICE QUESTIONS

Q.1 One of the most important natural resources of energy is -
(A) Electricity (B) Fossil fuels
(C) Biogas (D) Nuclear fission

Q.2 Fossil fuels and metallic minerals are -
(A) Renewable resources
(B) Inexhaustible resources
(C) Nonrenewable resources
(D) None of these

Q.3 The renewable source of energy is -
(A) Coal (B) Petroleum
(C) Biomass (D) Kerosene

Q.4 The Ranthambore National Park is located in -
(A) Maharashtra (B) Uttar Pradesh
(C) Gujrat (D) Rajasthan

Q.5 Forest and wildlife are which kind of natural resources -
(A) Renewable (B) Non-renewable
(C) Inexhaustible (D) None above

Q.6 The 'threatened species' refers to the species which are -
(A) Endangered (B) Vulnerable
(C) Rare (D) All of these

Q.7 The most exploited nonrenewable resource is–
(A) Water (B) Petroleum
(C) Electricity (D) All above

Q.8 The natural source of energy which is most important is -
(A) Atomic energy (B) Biogas
(C) Sunlight (D) Fossil fuels

Q.9 Identify the correct match between tiger reserve and its state -
(A) Corbett - Madhya Pradesh
(B) Eriyar - Orissa
(C) Manas - Assam
(D) Bandipur - Tamil Nadu

B. MULTIPLE CHOICE QUESTIONS

Q.10 The total earth covered by water is about -
(A) 73 % (B) 50 % (C) 92 % (D) 70 %

Q.11 Floods can be controlled by -
(A) Replacement of trees (B) Deforestation
(C) Reforestation (D) None of these

Q.12 The important energy resource which originate from photosynthetic activity of green plants is -
(A) Dendrothermal (B) Biogas
(C) Tidal energy (D) None of these

Q.13 Inexhaustible, non-conventional energy source is -
(A) Coal (B) Tidal
(C) Wind (D) None of these

C. PASSAGE BASED QUESTIONS

PASSAGE 1 (Q.14 TO Q. 19)

The leguminous plants contain nodules in their roots which contain symbiotic (mutualistic) bacterium has enzymes to convert atmospheric nitrogen into nitrogen salts (e.g. nitrates). These nitrogen salts persist in the soil and such a soil, which is enriched by the nitrogen, is ready to support the next cereal crop. The conversion of nitrogen gas of atmosphere into nitrogen compounds, which can be utilised by leguminous plants and other plants, is called nitrogen fixation. Nitrate is used by plant, animals and pass out as ammonia Ammonia is then turned to nitrites and then to nitrogen.

Q.16 Name leguminous plants ?

Q.17 Name a free-living bacterium capable of fixing atmospheric nitrogen ?

Q.18 What is the role of Nitrosomonas ?

Q.19 Name a bacteria which convert N_2 ?

Q.20 What is X ?

ANSWER
EXERCISE -1

A. VERY SHORT ANSWER TYPES QUESTIONS

1. Coal, Petroleum.
2. *Pseudomonas*.
3. Nilgiri, Nandadavi
4. In is protection of Fauna.
5. Danger of extinction.

D. FILL IN THE BLANKS

19. Renewable **20.** Exhaustible
21. Methane **22.** Soil
23. Nitrosomonas

E. TRUE OR FALSE

24. True **25.** True **26.** False
27. True **28.** False **29.** True
30. True **31.** True **32.** False

F. SINGLE CHOICE QUESTIONS

33. A **34.** D **35.** D
36. D **37.** A **38.** C
39. C **40.** B

G. MATCH THE COLUMNS

41. 1-g, 2-f, 3-a, 4-d, 5-c, 6-b

H. FILL THE BOX WITH APPROPRIATE WORD

42. Nitrogen fixation
43. Gujrat

EXERCISE - 2

A. SINGLE CHOICE QUESTIONS

B **2.** C **3.** C
4. D **5.** A **6.** D
7. B **8.** C **9.** C

B. MULTIPLE CHOICE QUESTIONS

10. A,C **11.** A,B **12.** B,C