

# EXPERTS CREATIVE CLASS NOTES

(Key for success JKBOSE/CBSE)

## Subject: SCIENCE For Class 8TH

### About the author/an open letter

Mr Wali Mohammad Bhat has been teaching science in different schools of Kashmir in the Deptt. Of Education for more than three decades. He started writing this booklet/class notes in the second week of March, 2020 when the whole nation has been locked down for COVID-19 – a pandemic disease. He believes that writing this booklet is just like a classroom teaching. Though this booklet can never replace a teacher but it shall make the student – feel the presence of a teacher.

Keeping the uncertainty among students and teachers of the nation resulted due to the pandemic disease, when all the schools were closed, he wrote this booklet in such a style & design that the students will never get bored, but will be able to understand science very easily. Keeping in view a well known saying, “a picture can say a thousand words”, a large number of coloured pictures and sketches of various processes, procedures, appliances have been given in this booklet to help the students to understand the various concepts of science clearly.

Mr. W.M. Bhat has been conferred by the best teacher awards at State and National level in recognition of his valuable services to the community as a teacher of outstanding merit besides a best Social Servant award with a Gold Medal in the field of social services with regard to the nation.

The author extends special and sincere thanks to Mr. Khurshid Ahmad Tantray for printing and compiling this booklet. Positive suggestions for further improvement of the booklet are always welcome.

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## Chapter No. 1

**MICROORGANISMS**

(Friend and Foe)

**Topics:- Basic Concepts/Conceptual questions as per text book:****Q.1. What are Microorganisms and what are their types?**

Ans: **Microorganisms**:- The organisms which are small and cannot be seen with naked eye but can only be seen under a microscope are called Microorganisms. They exist in all types of habitats. Microorganisms may be either single celled like bacteria, protozoa etc or multi-cellular like algae, fungi.

**Types/Groups of Microorganisms**:- The various groups of Microorganisms are

- (i) Bacteria      (ii) Fungi      (iii) Protozoa      (iv) Algae      (v) Virus



Spiral bacteria



Rod Shaped bacteria

**Bacteria**

Amoeba



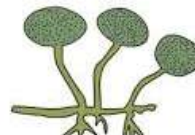
Paramecium

**Protozoa**

Chlamydomonas



Spirogyra

**Algae**

Bread mould



Penicillium



Aspergillus

**Fungi**

Influenza



Rabies Virus

**Virus****Q.2. What are beneficial aspects of bacteria?**

Ans: **Usefulness or Beneficial aspects of Bacteria**:- Microorganisms play an important role in our lives. Some of them are beneficial in many ways as under

- i. They are used in the production of antibiotics like penicillin etc.
- ii. They are used in the production of Dairy products like, Curd, Cheese etc.
- iii. They are used in the production of bakery products like bread and cakes.

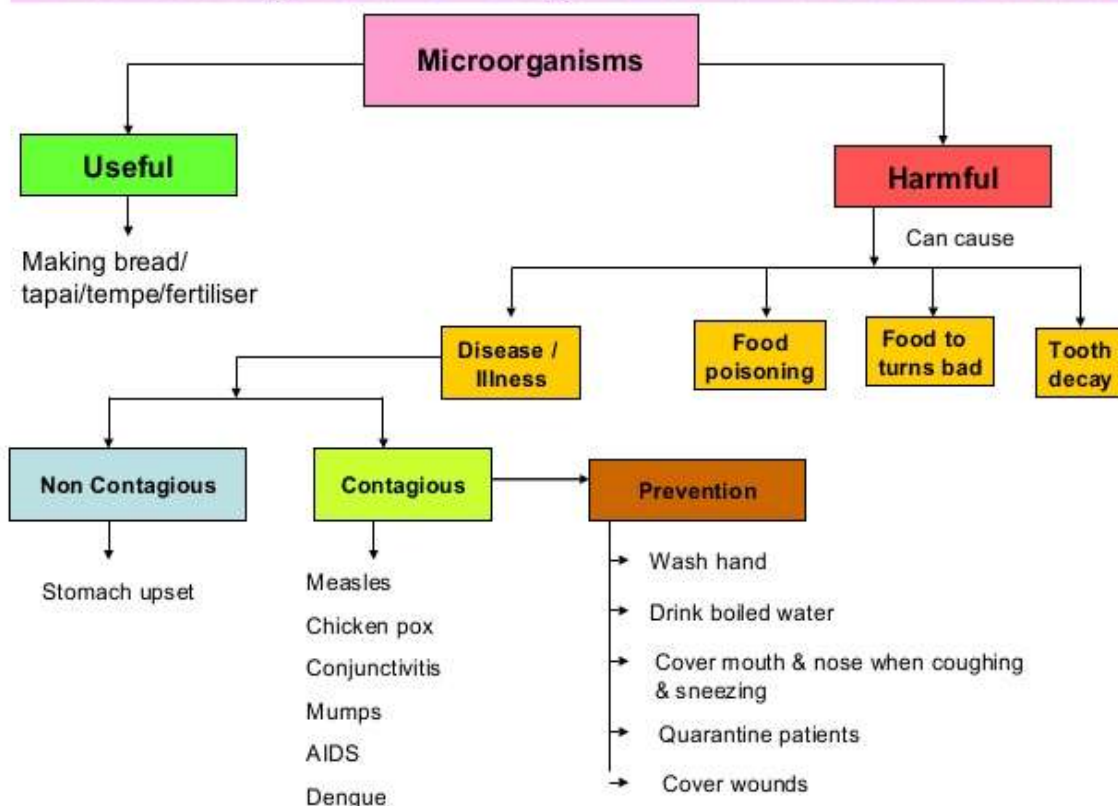
- iv. They are used in the production of Alcoholic beverages like wines, beers etc.
- v. They are used in the production of enzymes.
- vi. They are used in the decomposition of organic matter.
- vii. They are used in the tanning of leather.
- viii. They are used in the production of organic acids.
- ix. They are used in the production of food yeast.
- x. They are also used in cleaning up the environment e.g. organic wastes like vegetable peels, remains of animals etc.

**Q.3. What are harmful effects of Microorganisms?**

Ans: **Harmful effects**:- Microorganisms are harmful in many ways

- i. Some microorganisms called pathogens cause a large variety of diseases in plants, animals and human beings.
- ii. Some microorganisms spoil food, clothing, leather etc.
- iii. Microbes also cause water pollution i.e, death of aquatic life in water resources.

**1.2 Understanding that some microorganism are harmful and some are useful**



**Q.4. What are Antibiotics? Give examples.**

Ans: **Antibiotics**:- Antibiotics are drugs or chemicals derived from living matter or microorganisms used to kill or prevent the growth of other

microorganisms e.g. Ampicillin, Penicillin, Chloramphenicol, Amoxillin, Tetracyclin, Teramycin etc.

**Q.5. Name some diseases caused by Microorganisms in humans.**

Ans: The common diseases caused by microbes are

- A. **Viruses**:- Common cold, Influenza, Rabies, Smallpox, Measles, Fever, AIDS, Mumps etc.
- B. **Bacteria**:- Cholera, Tuberculosis, Typhoid, Pneumonia, Tetanus, Leprosy etc.
- C. **Protozoa**:- Malaria, Amoebic dysentery, Sleeping sickness, Black fever etc.
- D. **Fungi**:- Ringworm, Athlete's Foot, Skin Sore etc.

**Q.6. Name some common plant diseases caused by Microorganisms.**

Ans: Several microorganisms cause diseases in plants like Wheat, Rice, Potato, Sugarcane, Orange, Apple and others as under:

- |      |                             |   |          |
|------|-----------------------------|---|----------|
| i.   | Black Rot of Cabbage        | → | Bacteria |
| ii.  | Late Blight of Potato       | → | Fungi    |
| iii. | White Rust of Mustard       | → | Fungi    |
| iv.  | Rice blast of Rice          | → | Fungi    |
| v.   | Rust of Wheat               | → | Fungi    |
| vi.  | Yellow Vein Mosaic of Bindi | → | Virus    |

**Q.7. Define Food poisoning, Antibodies, Pathogens, Vaccine, Microscope.**

Ans: **Food Poisoning**:- Food poisoning also called Food borne illness is an illness caused by eating contaminated food as a result of secretions or toxic substance produced by some microorganisms in our food like bacteria, viruses and parasites.

The symptoms of Food poisoning are:

- |                                |               |                                 |
|--------------------------------|---------------|---------------------------------|
| (i) Nausea                     | (ii) Vomiting | (iii) Watery or Bloody diarrhea |
| (iv) Abdominal pain and cramps | (v) Fever     |                                 |

**Antibodies**:- Antibodies, also known as immunoglobulin's are the Y shaped proteins produced by the immune system to help or stop intruders from harming the body. They find the invader/intruder/antigens in the body, stick to them and destroy them.

**Pathogens**:- The disease causing microorganisms are called as Pathogens or harmful bacteria e.g. bacteria like Salmonella, Listeria, E.Coli, Viruses, Fungi, Parasites.

**Vaccine**:- Vaccine is a substance used to stimulate the production of antibodies and provide immunity against certain diseases. They are prepared from weakened or killed forms of microbes or its toxins. Vaccines protect against many life threatening diseases like Measles, Polio, Tetanus, Meningitis, Influenza, Typhoid, Diphtheria, Cervical Cancer, Hepatitis etc.

**Microscope**:- Microscope is an optical instrument which enables us to see very small objects like microorganisms.

**Q.8. What is Food preservation? Name different types of Food Preservation.**

Ans: **Food Preservation**:- Food preservation is the process or treating and handling food to stop or slow down food spoilage, loss of quality, edibility or nutritional value and thus allow for longer food storage.

**Methods of Food Preservation**:- (i) Dehydration/Drying (ii) Pickling i.e. Food preserved in vinegar. (iii) Smoking (iv) Canning (v) Bottling (vi) Refrigeration (vii) Sterilization (viii) Pasteurization (ix) Chemical preservation or chemical additives like Acetic acid, Lactic acid or benzoic acid.

**Q.9. What is Nitrogen Fixation?**

Ans: **Nitrogen Fixation**:- The process of conversion of atmospheric nitrogen into combined form i.e. Nitrates or Nitrites Ammonia through chemical and especially biological action of bacteria like Rhizobia.

The nitrogen gas of air can be fixed i.e. converted into nitrogen compounds by certain nitrogen fixing bacteria present in the soil e.g. Rhizobium bacteria present in the nodules of leguminous plants like pea and beans, by blue green algae and by lightning.

**Q.10. What is Nitrogen cycle? Or Explain briefly N<sub>2</sub> Cycle.**

Ans: **Nitrogen Cycle**:- The atmosphere has 78% nitrogen. The nitrogen fixing bacteria present in air, soil and root nodules of leguminous plants, blue green algae and lightning in the sky fix i.e. convert free nitrogen gas of air into compounds of nitrogen which go into soil.

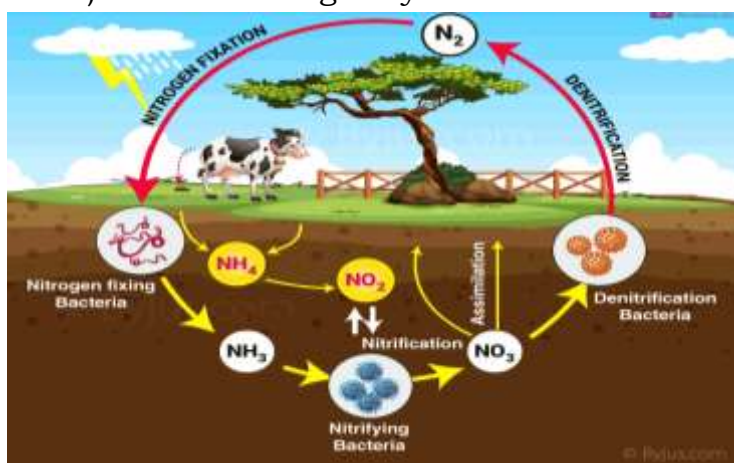
The plants in the soil convert the compounds of nitrogen into plant proteins and other organic compounds for their body development.

Animals feeding on plants convert plant proteins into animal proteins and other organic compounds to make up their body. On one hand after death and decay of plants, animals and other animal excretions get decomposed and converted in simple compounds of nitrogen by

certain bacteria and fungi present in the soil. All the simple compounds of nitrogen formed in this way go back into soil.

On the other hand some compounds of nitrogen formed from decay of dead plants, animals and their excreta are decomposed by denitrifying bacteria present in the soil to form nitrogen gas which goes back freely into the atmosphere again.

**Conclusion:-** Thus the circulation of nitrogen element through living things (Plants and animals) and non-living things/environment (air, soil and water) is called nitrogen cycle in nature.



**Q.11. What are carriers? Name two most common carriers and the diseases spread by them.**

Ans: **Carrier:-** The insect or the animal which transmits disease causing microorganisms to human without itself suffering from them is called a carrier.

The two most common carriers of disease causing microorganisms or microbes are:

- (i) Housefly (ii) Mosquito

**Diseases spread by Houseflies:-**

- (i) Cholera (ii) Tuberculosis (TB)  
(iii) Typhoid (iv) Diarrhea

**Diseases spread by Mosquitoes:-** (i) Malaria

**Q.12. What are major groups of microorganisms?**

Ans: Major groups of microorganisms:

- i. **Bacteria:-** Bacteria are very small single celled microorganisms which have cell walls but do not have an organized nucleus and other structures. e.g. Lactobacillus bacteria, Rhizobium bacteria. They are both autotrophic as well as heterotrophic in their mode of nutrition. They are omnipresent.

ii. **Viruses**:- Viruses are the smallest microorganisms which may be plant, animal or bacterium. They are much smaller than bacteria and do not show most of the characteristics of living things. They do not respire, feed, grow, excrete or move on their own but only reproduce if they enter a living body. e.g. C. Cold virus, HIV etc.

iii. **Protozoa**:- Protozoa are a group of single celled microorganisms which are classified as animals. They are found in ponds, lakes, dirty water drains, rivers, damp soil etc e.g. Amoeba, Paramecium, Entamoeba, Plasmodium etc.

iv. **Algae**:- Algae is a large group of simple plant like organisms. They contain chlorophyll and produce food by photosynthesis like plants but do not have roots, stems, leaves e.g. Chlamydomonas, Spirogyra, Blue green algae, Diatoms, Seaweeds. Some of the algae are unicellular but most of them are multi cellular.

v. **Fungi**:- Fungi are a group of plant like organisms which do not have chlorophyll. They are heterotrophic e.g. Yeast, Moulds, Penicillium, Mushroom etc.



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### **Important points to remember:**

1. Father of Bacteriology:- Louis Pasteur
2. Algae used as Food:- Red Algae Porphyra
3. Antibiotics have no effect on virus:- Because they do not have metabolism of their own.
4. Size of smallest bacterium:-  $0.2 - 0.3\mu\text{m}$
5. Size of largest bacterium:- 15mm in length and  $1.5\mu\text{m}$  in diameter.



6. Who discovered penicillin:- Alexander Fleming – 1929
7. Vaccine for small pox was invented by:- Edward Jenner in 1798.
8. Fermentation: The conversion of sugar into alcohol with the help of microorganism is called Fermentation.
9. Causative of Anthrax:- Bacillus anthracis
10. Discovery of Bacillus anthracis:- Robert Koch in 1876.
11. Discovery of Fermentation:- Louis Pasteur in 1857
12. Pasteurization:- Process of heating milk (upto 70°C), followed by quick cooling.
13. Name two chemical preservatives:-
  - (i) Sodium metabisulphite
  - (ii) Sodium benzoate used to preserve foods → Jams, Jellies, Juices and squashes
  - (iii) Citric Acid:- used to preserve confectionary sweets.

## Chapter No. 2

## COAL &amp; PETROLEUM

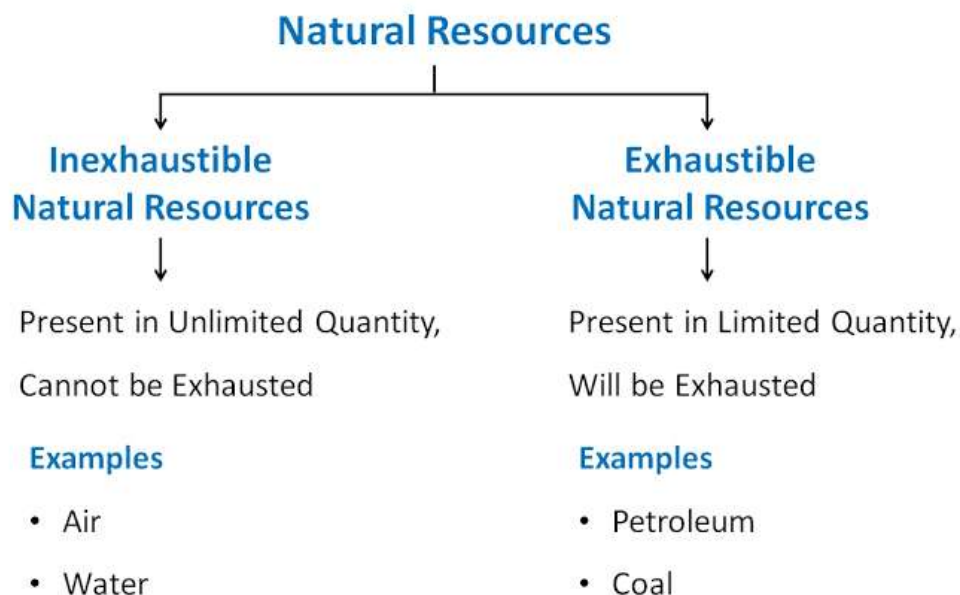
**Topics:- Basic Concepts/Conceptual questions as per text book:**

**Q.1. What is a resource? Explain main groups of resources.**

Ans: **Resource:-** Anything in the environment which can be used for the benefit of human beings directly or indirectly is called a resource. Resources may be manmade or natural. All the natural resources can be classified into two main groups as under:

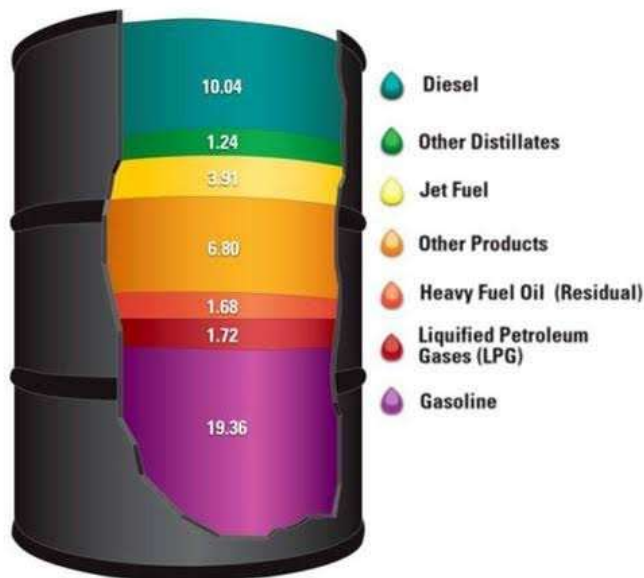
i. **Inexhaustible Natural Resources:-** The term inexhaustible means something “which cannot be used up completely”. Those natural resources which are present in unlimited quantity in nature and are not likely to be exhausted by human activities are called inexhaustible natural resources e.g. Sunlight, Air, Water, Soil etc.

ii. **Exhaustible Natural Resources:-** The term exhaustible means something “Which are present in a limited quantity in nature and can be exhausted/finished by human activities” are called exhaustible natural resources e.g. Coal, Petroleum, Natural gas, Minerals, Forests, Wildlife etc.



**Q.2. What are Fossil fuels or Fossils? How are they formed?**

Ans: **Fossil Fuels:-** The natural fuels formed from the remains of prehistoric plants or animals buried under the earth millions of years ago are called Fossil fuels or Fossils. e.g. Coal, Petroleum and Natural Gas.

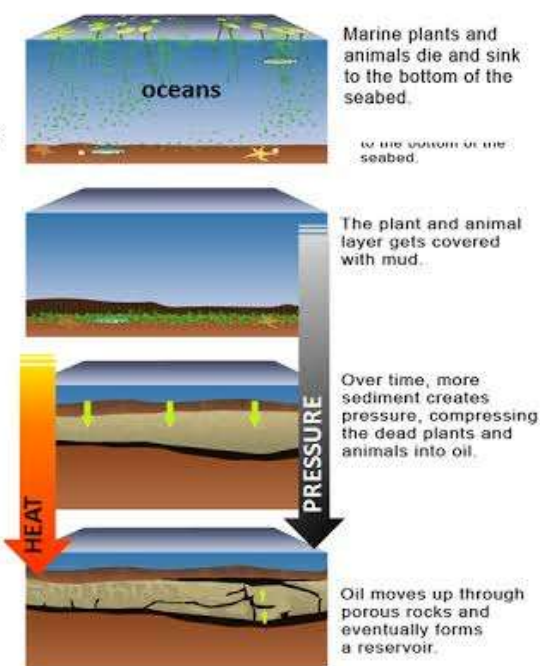
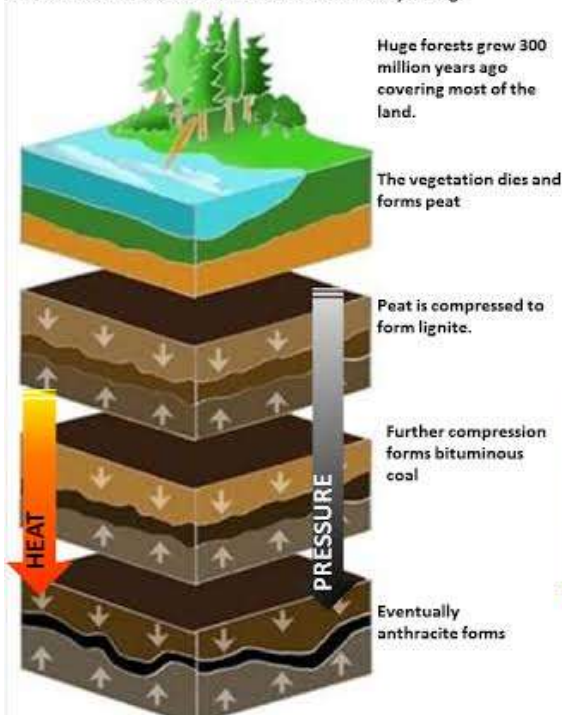


**Formation of Fossil Fuels:-** Fossil fuels like Coal, Petroleum and Natural gas were formed from the dead remains of living organisms like plants and animals buried under the earth millions of years ago. When these living organisms died were gradually buried deep in the earth and got covered with sediments like mud and sand. In the absence of air, the chemical effects of heat, pressure and bacteria converted these remains of plants and animals into fossil fuels.

**COAL      FOSSIL FUEL FORMATION      OIL & GAS**

It took at least millions of years for coal to form-from land plants -huge ancient fern forests that existed over 300 millions years ago

It took at least a million years for oil and gas to form from ocean plants, like phytoplankton and algae, hundreds of millions of years ago.



**Q.3. What is Coal? How was coal formed? What are its uses?**

Ans: **Coal:-** Coal is a hard, black, combustible mineral that mainly consists of Carbon. Coal is found in deep coal mines under the surface of the earth.

**General Resources of Coal in India:-** Coal is found in abundance in India more especially in Bihar, West Bengal, Orissa, M.P. and J&K.

**Formation of coal:-** Coal was formed by the decomposition of large land plants and trees buried under the earth about 300 million years ago. Due to natural processes like earthquakes, volcanoes and floods, the dense forests on the earth were buried under the surface of earth. Due to high pressure and high temperature inside the earth and in the absence of air, the wood of buried forest plants and trees were slowly converted into coal.

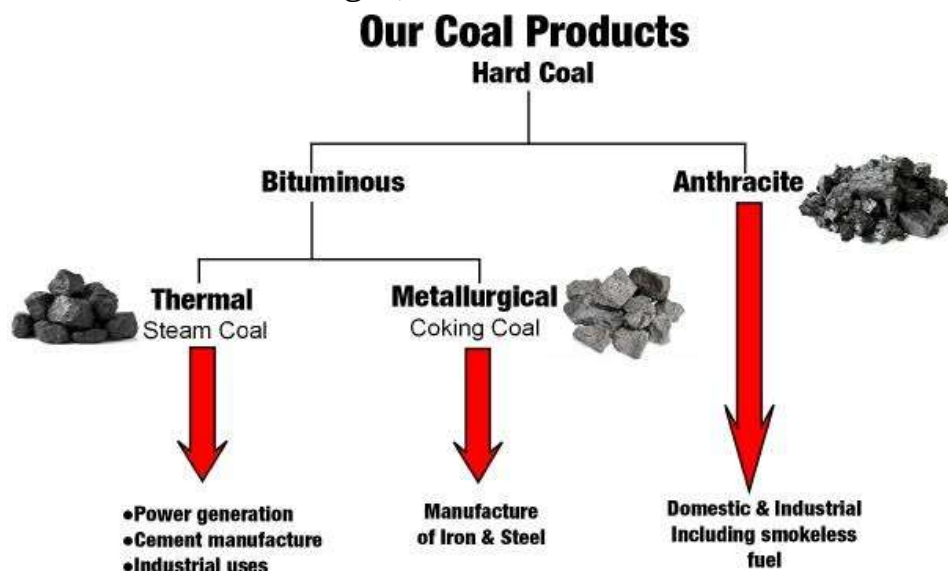
**Carbonisation:-** The slow process by which the dead plants buried deep under the earth have become coal is called carbonization.

**Uses of coal:-** Coal is mainly carbon. When heated in air, coal burns and produces mainly carbon dioxide with a large amount of heat energy.

The important uses of coal are

- i. It is used as fuel in homes and industry.
- ii. It is used as fuel at thermal power plants to produce electricity.
- iii. It is used to make coal gas also used as industrial fuel.
- iv. It is used to make coke.
- v. Coal was used as a fuel to make steam to run steam engine of trains.
- vi. It is also used as a source of organic chemicals.

**Products of coal:-** The various useful products obtained by processing the coal when heated strongly in closed retorts in the absence of air are Coal gas, coal tar and coke.



**Q.4. What is coal gas and what are its uses?**

Ans: **Coal Gas:-** The coal gas is a gaseous fuel which is obtained by the strong heating of coal in the absence of air during the processing of coal to get coke. It is mixture of methane and hydrogen with some carbon monoxide.

**Uses:-**

- i. Coal gas is used in industries situated near the coal processing plants.
- ii. Coal gas is used for lighting purposes (in street lighting)

**Q.5. What is Coal Tar? What are its uses?**

Ans: **Coal Tar:-** Coal tar is a thick, black liquid having an unpleasant smell which is obtained by heating coal in the absence of air. Coal tar is a mixture of 200 carbon/organic compounds. The most useful carbon compounds include benzene, toluene, naphthalene, anthracene, phenol and aniline. The various compounds present in coal tar are separated by fractional distillation.

**Uses:-**

- i. Compounds or products obtained from coal tar are used as starting materials for manufacturing a large number of substances.
- ii. The products obtained from coal tar are used to make synthetic dyes, perfumes, paints, varnishes, pesticides, photographic materials.
- iii. Coal tar is used for medaling the roads.

**Q.6. What is Coke? What are its uses?**

Ans: **Coke:-** Coke is a tough and porous black solid substance prepared by heating coal in the absence of air. It is a pure form of carbon and is obtained as a black residue while processing/heating of coal.

**Uses:-**

- i. Coke is used as a reducing agent in the extraction of metals like iron, zinc etc.
- ii. Coke is also used in the manufacture of steel.
- iii. It is also used as a fuel because it is smokeless.
- iv. It is used in the manufacture of graphite.
- v. It is used in the manufacture of calcium carbide from producing acetylene.

**Q.7. What is petroleum? How was petroleum formed?**

Ans: **Petroleum:-** Petroleum is a dark coloured, thick crude oil found deep below the ground in certain areas. It has an unpleasant order. The name petroleum means rock oil i.e. petra means rock and oleum means oil. Petroleum is a complex mixture of compounds called hydrocarbons.

Petroleum is a natural resource and is also called crude oil or mineral oil and is obtained from deep oil wells.

**Sources of crude oil/petroleum in India:-** Gujarat, Assam, Bombay High in Mumbai, Godavari and Kaveri basins.

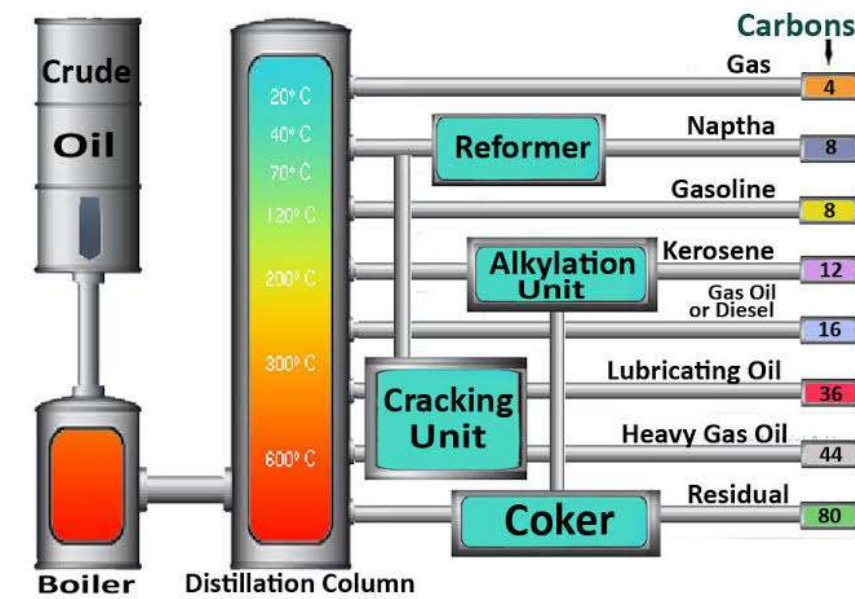
**Formation of petroleum:** Petroleum was formed by the decomposition of the remains of tiny plants and animals buried under the sea million years ago. It is believed that the tiny plants and animals died and got covered with mud and sand under the sea. Due to high pressure, heat action of bacteria and in the absence of air, the dead remains of these plants and animals were slowly converted into petroleum. The petroleum thus formed got trapped between two layers of impervious rocks i.e. non porous rocks forming an oil deposit.

**Q.8. What is refining of petroleum or simply refining?**

Ans: **Refining:** The process of separating crude petroleum oil into more useful fractions or products is called refining.

The separation of petroleum into different fractions is done by the process of fractional distillation. In the process the fractions of petroleum having different boiling points are collected separately.

**Products/Fractions of petroleum:-** The various useful fractions obtained by the refining of petroleum are Petroleum gas, Petrol, Kerosene, Diesel, Lubricating oil. Paraffin wax and Bitumen.



**Q.9. Uses of petroleum products:**

- Petroleum gas:-** Petroleum gas used in the form of LPG is used as fuel in homes, hotels, restaurants and industries.

- ii. **Petrol:-**
  - a. It is used as a fuel in light motor vehicles.
  - b. It is also used as a solvent for dry-cleaning.
- iii. **Kerosene oil:-**
  - a. It is used as a fuel in wick stoves and pressure stoves to cook food.
  - b. It is also used in lanterns for lighting purposes.
  - c. Special grade of Kerosene oil is used as aviation fuel in Jet aeroplanes.
- iv. **Diesel:-**
  - a. It is used as a fuel I heavy motor vehicles.
  - b. It is also used as fuel in electric generators to produce electricity.
  - c. It is also used to run water pumps for irrigation purposes.
- v. **Lubricating oil:-** It is used for lubrication in machines and car engines.
- vi. **Paraffin wax:-** It is used for making candles, Vaseline, ointments, wax paper and grease.
- vii. **Bitumen:-**
  - a. It is used for road surfacing.
  - b. It is also used for water proofing the roofs of buildings.
  - c. It is also used for black paints.

**Q.10. What is Natural gas? What are the advantages of using CNG as fuel?**

Ans: **Natural gas:-** Natural gas is a very important fossil fuel. It consists mainly of methane (95%) with small quantities of ethane and propane. Natural gas is formed under the earth by the decomposition of vegetable matter lying under water by bacteria in absence of air, just like coal and petroleum. When natural gas is compressed by applying pressure, it is called Compressed Natural Gas (CNG).

**Advantages of CNG as fuel:-**

- i. It does not cause air pollution.
- ii. It is a clean fuel because it does not produce any smoke on burning.
- iii. It does not leave any solid residue on burning.

**Sources of Natural gas in India:-** Tripura, Rajasthan Maharashtra, Krishna-Godavari delta.

**Uses of CNG:-**

- i. It is used as domestic fuel.
- ii. It is used as fuel in thermal power to generate electricity.
- iii. It is used as fuel in cars, buses.
- iv. CNG is used as a source of hydrogen gas needed to manufacture fertilizers.
- v. It is used as a starting material for manufacture of a number of chemicals called Photochemical.

**Q.11. What are the advantages of using LPG as fuel?**

Ans: **Advantages of LPG:-** LPG is considered to be a better fuel because of the following reasons.

- i. LPG has a high calorific fuel (about 50 KJ/g)
- ii. It burns with a smokeless flame i.e. it does cause pollution.
- iii. It does produce any poisonous gas on burning.
- iv. It is easy to handle and convenient to store.
- v. It undergoes complete combustion.
- vi. It is very neat and clean fuel.

**Q.12. Explain why fossil fuels are exhaustible natural resources?**

Ans: Fossil fuels are considered exhaustible natural resources because it took many hundred years to convert dead plants and animals into fossil fuels. Fossil fuel reserves are limited in quantity for the use of human activities.

**Q.13. Name important industrial minerals available in J&K.**

- Ans:
- |       |                      |   |
|-------|----------------------|---|
| i.    | <b>Borax:-</b>       | Pagga Valley in Ladakh                              |
| ii.   | <b>Cement Stone:</b> | Wuyan (Kmr), Reasi & Basholi in Jammu               |
| iii.  | <b>China Clay:</b>   | Chakhar Tikri, Jangalgali (Jmu)                     |
| iv.   | <b>Gypsum:</b>       | Ramban, Batote, Gool Gulab Garh, Baramula, Anantnag |
| v.    | <b>Graphite:</b>     | Karnah, Malogam (Kmr), Kishtwar (Jmu)               |
| vi.   | <b>Mica:</b>         | Doda, Ramban & Reasi                                |
| vii.  | <b>Sulphur:</b>      | Anantnag, Khrew, Pagga Valley, Rajouri              |
| viii. | <b>Marble:</b>       | Drangmula, Zirhama, Thatri                          |
| ix.   | <b>Asbestos:</b>     | Kargil  |
| x.    | <b>Slate:</b>        | Ramsu, Banihal, Ramban, Baramula                    |

**Q.14. What are petrochemicals? Name important petrochemicals.**

Ans: **Petrochemicals:-** Those chemicals which are obtained from petroleum and natural gas are called petrochemicals e.g. Methyl alcohol, Ethyl alcohol, Formaldehyde, Acetone, Acetic acid, Ethylene, Benzene.

**Uses:** Petrochemical are very important and used to manufacture useful materials like Detergents, Polyester, Nylon, Acrylic, Plastics viz



Polyvinyl chloride (PVC), Synthetic rubber like rubber drugs, Dyes, Perfumes, Fertilizers, Insecticides and Explosives.



**Important points to remember:**

1. Petroleum is also called – Black gold.
2. **PCRA:** Petroleum Conservation Research Association
3. **Tips for Minimising the wastage of Petrol & Diesel.**
  - i. Drive the vehicle at constant speed.
  - ii. Switch off the vehicles engine at jams & traffic lights.
  - iii. Ensure correct air pressure in the tyres of vehicle.
  - iv. Ensure regular maintenance of the vehicle including engine.
4. **Petrol Refinery:** The plant where petroleum is processed to separate its constituents.
5. **First time use of coal gas:** For street lighting in London in 1810, New York in 1820
6. **World's first oil well:** Pennsylvania USA in 1859.
7. **To Save Petrol & Diesel:** Coal and petroleum resources are limited. So we should use them judiciously.
8. **Biggest coal producing state:** Bihar
9. **Highest Caloric Value:** Hydrogen i.e. 150 KJ/gram
10. **Calorific Value of Fuel:** The amount of heat evolved in Kilo Joules when one gram of fuel is burnt completely is called calorific value. Calorific value of Hydrogen > CNG > LPG > Kerosene, Petrol, Diesel > Coal
11. **Destructive distillation:** Heating of coal to a high temperature i.e. above 1000°C in absence of air.