Worksheet 14.3

Marks - 25

Case study based questions

10th Science

Sources Of Energy

Passage - 1 **5 Marks**

Coal is a complex mixture of compounds of carbon, hydrogen and oxygen, and some free carbon. Small amounts of nitrogen and sulphur compounds are also present in coal. It is found in deep coal mines under the surface of earth. Coal is important because it can be used as a source of energy as such, or it can be converted into other forms of energy like coal gas, electricity and oil (synthetic petrol). The exploitation of coal as a source of energy made the industrial revolution possible.

Q 1. Coal is a complex mixture of compounds of .....

(1) Carbon
(2) Hydrogen
(3) Oxygen
(4) All of the above

Worksheet 14.3

Marks - 25

Q 2. Small amounts of ..... compounds are also present in coal.

(1) Nitrogen
(2) Sulphur
(3) Both of the above
(4) None of the above

Q 3. Coal can be converted into other forms of energy like coal gas and oil.
State true or false.

(1) TRUE
(2) FALSE

Q 4. Oil formed by coal is known as .....

(1) Coal oil
(2) Synthetic petrol
(3) Petrol oil
(4) Cooking oil

Q 5. The exploitation of coal as a source of energy made the ..... revolution possible.

(1) industrial
(2) marketing
(3) green
(4) None of these

Passage - 2

5 Marks

Worksheet 14.3

Marks - 25

When coal is burnt, the carbon present in coal reacts with the oxygen of air to form carbon dioxide. When coal is subjected to destructive distillation (by heating strongly in the absence of air), then all the volatile material is removed from coal and coke is formed. Coke is 98% carbon. Coke is a better fuel than coal because it produces more heat (than an equal mass of coal), and it does not produce smoke while burning. Thus, burning of coke does not cause air pollution. Coke is, however, more valuable when used as a reducing agent in the extraction of metals from their ores.

Q 1. When coal is burnt, the ..... present in coal reacts with the ..... of air to form carbon dioxide.

(1) Carbon, oxygen
(2) Oxygen, carbon
(3) Hydrogen, carbon
(4) None of these

Q 2. Coke is ..... percentage of carbon.

(1) 86
(2) 98
(3) 89
(4) 68

Worksheet 14.3

Marks - 25

Q 3. Coke is valuable when used as a ..... in the extraction of metals from their .....

(1) Reducing agents , Compounds
(2) Oxidising agents , Compounds
(3) Reducing agents , Ores
(4) Reducing agents, Compounds

Q 4. When coal is subjected to destructive distillation, it is heated strongly in ..... of air.

(1) Presence
(2) Absence

Q 5. Coke is formed from coal by removing all ..... impurities.

(1) Solid
(2) Non-volatile
(3) Volatile
(4) None of these

Passage - 3 **5 Marks**

Worksheet 14.3

Marks - 25

Petroleum is a dark coloured, viscous, and foul smelling crude oil. The name petroleum means rock oil (petra = rock; oleum = oil). It is called petroleum because it is found under the crust of earth trapped in rocks. The crude oil petroleum is a complex mixture of several solid, liquid and gaseous hydrocarbons mixed with water, salt and earth particles. Petroleum occurs deep down under the earth between two layers of impervious rocks (non-porous rocks).

Q 1. Petroleum is also known as .....

(1) Crude Oil
(2) Natural Oil
(3) Black Oil
(4) None of these

Q 2. Crude oil is called petroleum because

(1) It is dark oil
(2) It is black oil
(3) It is found under the crust of earth trapped in rocks
(4) It is found in forests under trees.

Q 3. The crude oil petroleum is a complex mixture of several solid, liquid and gaseous ..... mixed with water, salt and .....

(1) Carbonates and sand particles
(2) Hydrocarbons and earth particles
(3) Natural gas and rock particles
(4) None of these

Q 4. Petroleum occcurs deep down under the earth between two layers of .....

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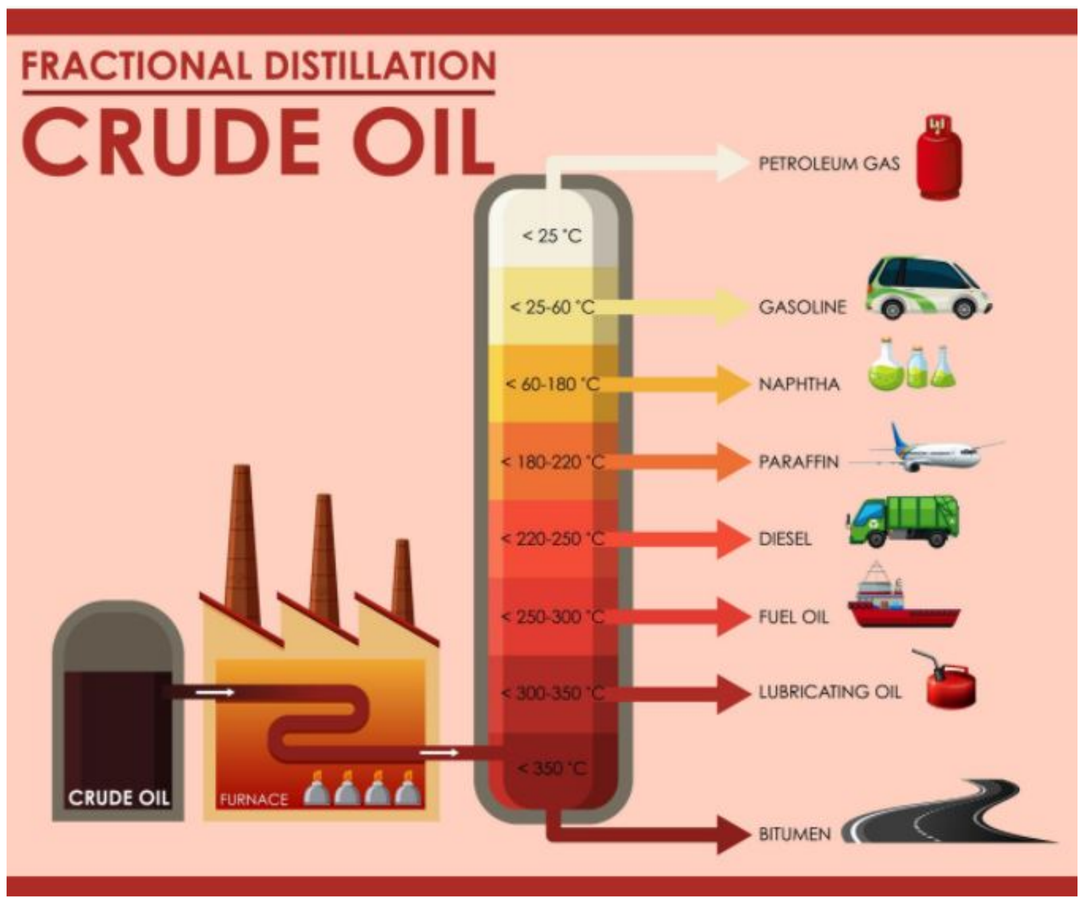
(1) Porous rocks
(2) Impervious rocks
(3) Sedimentary rocks
(4) None of these

Q 5. Petroleum is a .....

(1) Dark coloured
(2) Viscous
(3) Foul smelling
(4) All of these

Passage - 4

5 Marks



When a well is drilled through the rocks, natural gas comes out first with a great pressure and for a time, the crude oil comes out by itself due to gas pressure. Petroleum is the crude oil which is a complex mixture of alkane hydrocarbons with water, salt and earth particles. Petroleum cannot be used as a fuel as such. So, before petroleum can be used as a fuel for specific purposes, it has to be purified or refined by the process of fractional distillation.

Worksheet 14.3

Marks - 25

Q 1. When a well is drilled through the rocks, ... comes out first with a great pressure and for a time, the ..... comes out by itself due to gas pressure.

(1) Natural gas , crude oil
(2) LPG , Petrol
(3) Coal gas , diesel
(4) None of these

Q 2. During the extraction of petroleum, crude oil comes out by itself due to .....

(1) Oil pressure
(2) Gas pressure
(3) Water pressure
(4) None of these

Q 3. Petroleum is the crude oil which is a complex mixture of ..... with water, ... and earth particles.

(1) Carbonated compounds , sand
(2) Alkyne hydrocarbons , sand
(3) Alkane hydrocarbons , salt
(4) None of these

Q 4. Petroleum is purified by the process of .....

(1) Centrifugation
(2) Chromatography
(3) Evaporation
(4) Fractional distillation

Worksheet 14.3

Marks - 25

Q 5. Which of the following is true about petroleum?

(1) It is a mixture of carbons and salt.
(2) It is also known as crude oil.
(3) Both A and B
(4) Neither A nor B

Passage - 5 **5 Marks**

Kerosene is used in wick stoves or pressure stoves to cook food. Kerosene is also used as an illuminant (for lighting purposes) in hurricane lamps. A special grade of kerosene oil is used as 'aviation fuel' in jet aeroplanes. Fuel oil is used in industries to heat boilers and in furnaces. Fuel oil is also used in thermal power plants for generating electricity. Fuel oil is a better fuel than coal because fuel oil burns completely and does not leave any residue.

Q 1. ..... is used as an illuminant in hurricane lamps.

(1) LPG
(2) Diesel
(3) Kerosene
(4) Petrol

Q 2. A special grade of kerosene oil is used as ..... in jet aeroplanes.

(1) Liquid fuel
(2) Aviation fuel
(3) Motor fuel
(4) None of these

Worksheet 14.3

Marks - 25

Q 3. ..... is used in industries to heat boilers and in furnaces

(1) Fuel oil
(2) LPG
(3) Kerosene
(4) Petroleum gas

Q 4. Fuel oil is a better fuel than coal because

(1) fuel oil burns completely
(2) fuel oil does not leave any residue
(3) Both of these
(4) None of these

Q 5. Fuel oil is used in ..... for generating electricity.

(1) Nuclear power plant
(2) Thermal Power plant
(3) Both of these
(4) None of these

Worksheet 14.4

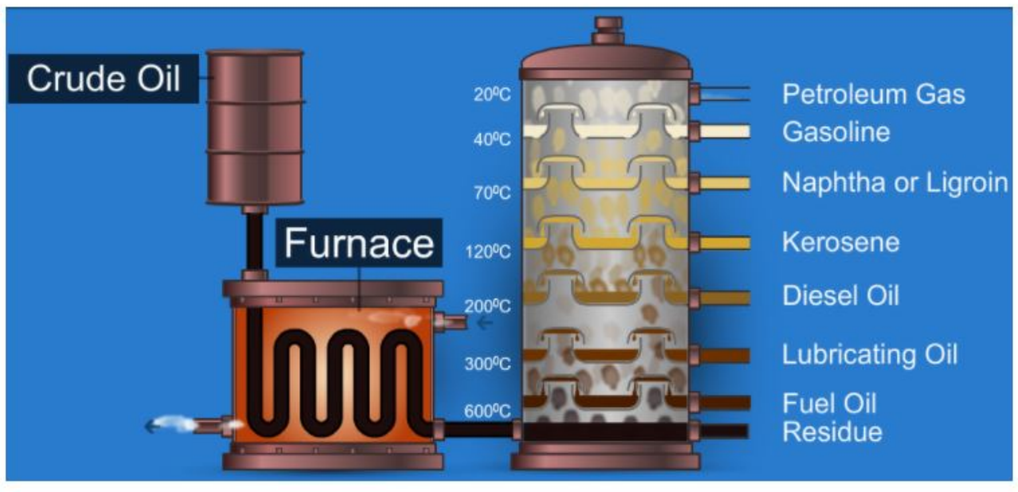
Marks - 25

Case study based questions

10th Science

Sources Of Energy

Passage - 1 **5 Marks**



The main constituent of petroleum gas is butane though it also contains smaller amounts of propane and ethane. Thus, we can say that petroleum gas is a mixture of three hydrocarbons : butane, propane and ethane. Butane, propane and ethane, all burn readily, producing a lot of heat. Butane, propane and ethane are gases under ordinary pressure (atmospheric pressure) but they can be easily liquefied under pressure. The petroleum gas which has been liquefied under pressure is called Liquefied Petroleum Gas (LPG).

Q 1. The main constituent of petroleum gas is .....

(1) Ethane
(2) Methane
(3) Propane
(4) Butane

Q 2. Petroleum gas is a mixture of three hydrocarbons. Choose the correct ones.

(1) Methane, Ethane, Propane
(2) Butane, Propane, Ethane
(3) Pentane, Hexane, Propane

---

(4) None of these

Q 3. What makes petroleum gas a very good fuel?

(1) Butane; propane and ethane, all burn readily
(2) Butane separately burns readily
(3) Buatne does not burn at all.
(4) None of these

Q 4. Petroleum gas which has been liquefied under pressure is called .....

(1) LPG
(2) CNG
(3) Petrol
(4) None of these

Q 5. Which of the following is hydrocarbon?

(1) Butane
(2) Propane
(3) Ethane
(4) All of these

Passage - 2 **5 Marks**

Worksheet 14.4

Marks - 25

Butane, propane and ethane are gases under ordinary pressure (atmospheric pressure) but they can be easily liquefied under pressure. The petroleum gas which has been liquefied under pressure is called Liquefied Petroleum Gas (LPG). Thus, liquefied petroleum gas (or LPG) consists mainly of butane (along with smaller amounts of propane and ethane) which has been liquefied by applying pressure. In other words, the domestic gas cylinders like Indane contain mainly butane. A domestic gas cylinder contains about 14 kilograms of LPG. A strong smelling substance called ethyl mercaptan is added to LPG cylinders to help in the detection of gas leakage.

Q 1. Butane, propane and ethane are ..... under ordinary pressure.

(1) Soild
(2) Liquids
(3) Gases
(4) Can not be determined

Q 2. The petroleum gas which has been liquefied under presure is called .....

(1) CNG
(2) LPG
(3) Natural gas
(4) All of the above

Worksheet 14.4

Marks - 25

Q 3. The domestic cylinders mostly contain .....

(1) Methane
(2) Ethane
(3) Propane
(4) Butane

Q 4. A domestic gas cylinder contains about ..... kg of LPG

(1) 10
(2) 12
(3) 14
(4) 16

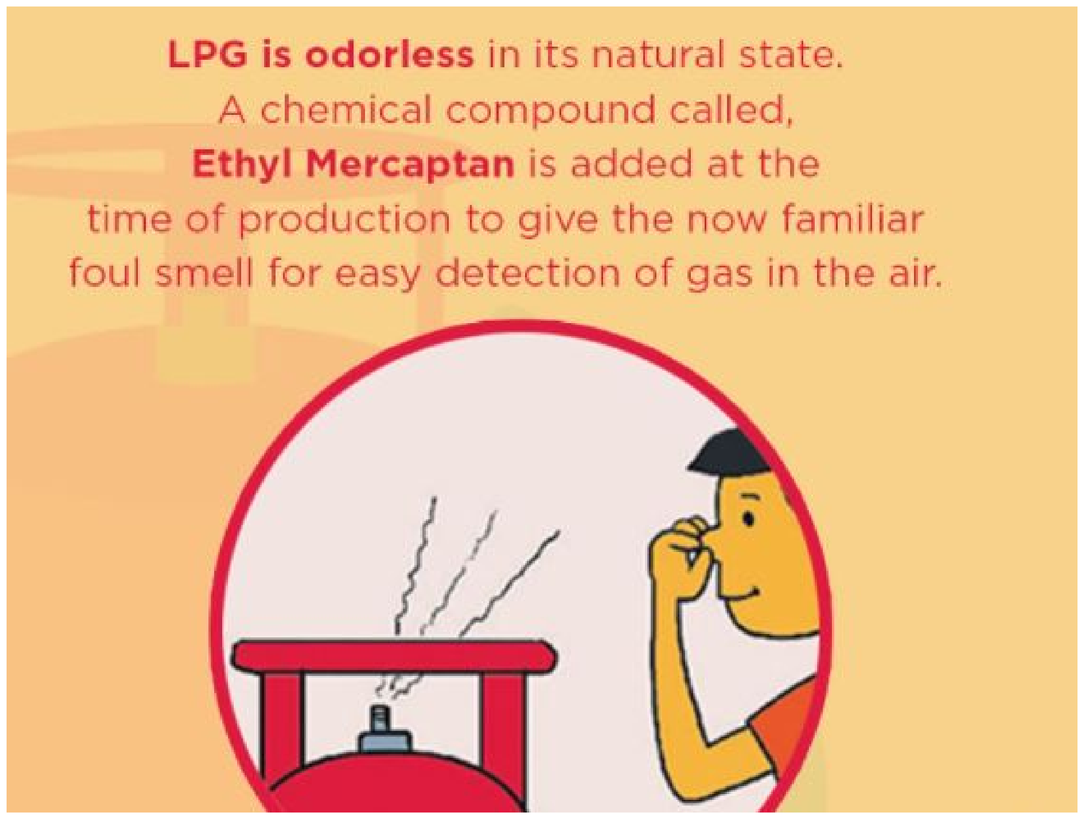
Q 5. A strong smelling substance called ..... is added to LPG cylinders to detect gas leakage.

(1) Ethyl mercaptane
(2) Methyl mercaptane
(3) Hydrogen sulphide
(4) None of these

Passage - 3 **5 Marks**

Worksheet 14.4

Marks - 25



A domestic gas cylinder contains about 14 kilograms of LPG. A strong smelling substance called ethyl mercaptan(C_2H_5SH) is added to LPG cylinders to help in the detection of gas leakage. LPG has a high calorific value.LPG burns with a smokeless flame and so does not cause air pollution. LPG does not produce any poisonous gases on burning. LPG is easy to handle and convenient to store. LPG is a very neat and clean domestic fuel.

Q 1. The chemical formula for ethyl mercaptane is .....

(1) C_2H_6SH
(2) C_2H_5SH
(3) C_2H_5OH
(4) None of these

Q 2. LPG is ..... by compression before filling into the cylinders.

(1) Solidified
(2) Liquefied
(3) Heated
(4) None of these

Worksheet 14.4

Marks - 25

Q 3. The calorific value of LPG is about ..... KJ/g.

(1) 10
(2) 60
(3) 50
(4) 100

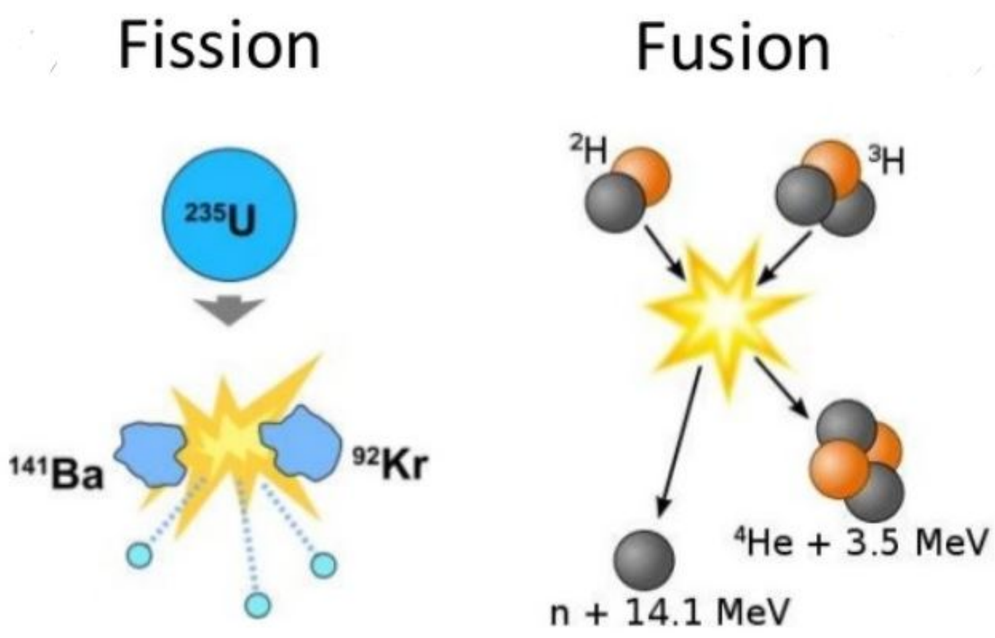
Q 4. LPG is a good fuel because

(1) it has high calorific value
(2) it burns with a smokeless flame
(3) it does not produce any poisonous gases on burning
(4) All of the above

Q 5. When 1 gram of LPG burns in a gas stove, it produces ..... KJ/g of heat energy.

(1) 50
(2) 60
(3) 100
(4) 120

Passage - 4 **5 Marks**



A physical reaction which involves changes in the nucleus of an atom is called a nuclear reaction. The energy released during a nuclear reaction is called nu-

clear energy (because it comes from the nucleus of an atom). Nuclear energy can be obtained by two types of nuclear reactions Nuclear fission and Nuclear fusion.

Q 1. A physical reaction which involves changes in the nucleus of an atom is called a .....

(1) Chemical reaction
(2) Exothermic reaction
(3) Nuclear reaction
(4) None of these

Q 2. The source of nuclear energy is the ..... of nucleus.

(1) Mass
(2) Size
(3) Position
(4) None of these

Q 3. There is a small loss of mass in the ..... process which appears as a tremendous amount of energy.

(1) Nuclear fusion
(2) Combination
(3) Nuclear fission
(4) None of these

Q 4. The easily fissionable isotope of uranium is called .....

(1) Uranium-234
(2) Uranium-235
(3) Uranium-236

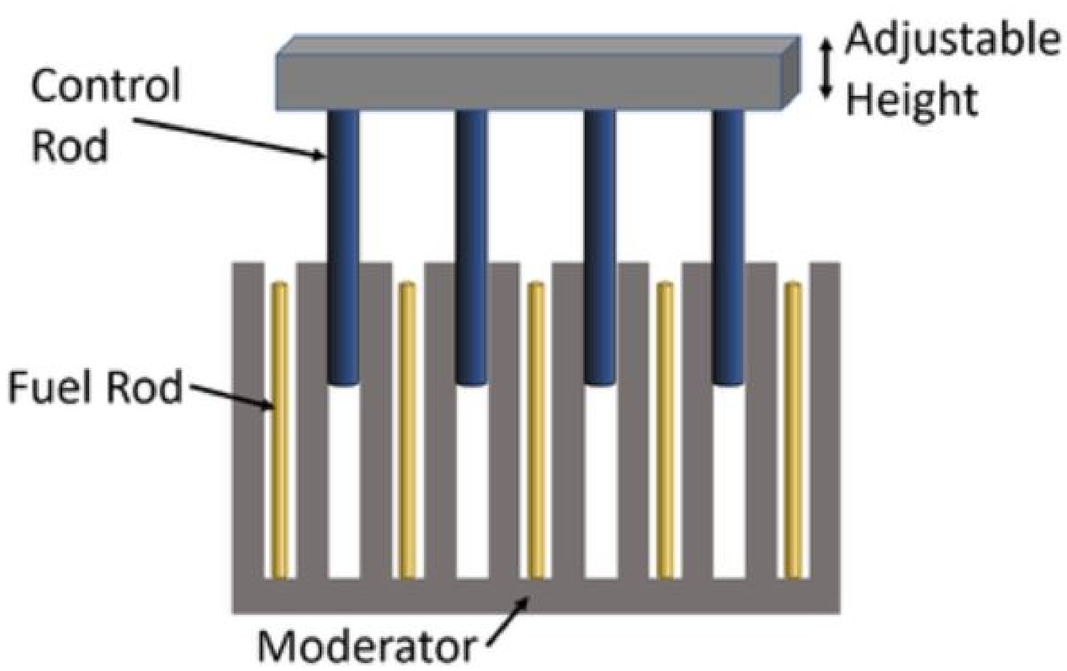
(4) Uranium-237

Q 5. Which of the following is not a radioactive element?

(1) Thorium
(2) Plutonium
(3) Uranium
(4) Boron

Passage - 5

5 Marks



In the nuclear fission of uranium-235, 1 neutron is consumed and 3 neutrons are produced in the fission of each nucleus. We can, however, control a nuclear fission reaction by using control rods made of boron. Boron has a property that it can absorb neutrons. So, when a nuclear fission reaction is carried out in the presence of boron rods, the excess neutrons produced during successive fissions of uranium-235 atoms are absorbed by boron rods.

Q 1. When bombarded with slow moving neutrons, nucleus of uranium-235 atoms breakup to produce .....

(1) Barium-139 and Krypton-94
(2) Barium-139 and Krypton-99
(3) Barium-199 and Krypton-94
(4) None of these

Worksheet 14.4

Marks - 25

Q 2. The energy produced in a fission reaction is due to conversion of mass into energy.

(1) TRUE
(2) FALSE

Q 3. In the nuclear fission of each nucleus of uranium-235, one neutron is consumed to produce ..... neutron.

(1) 4
(2) 3
(3) 1
(4) 2

Q 4. A nuclear fission reaction can be controlled by using rods made of

(1) Beryllium
(2) Barium
(3) Boron
(4) None of these

Q 5. Boron has a special property that it can

(1) release neutrons
(2) stop neutrons
(3) multiply neutrons
(4) absorb neutrons.
