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|----|-------------------|--------------------|
| A. | Food Adulteration | Food Contamination |
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| | | |
|---|---|--|
| ① | Food adulteration is intentional addition of harmful substances to increase quantity or improve color of the product. | Food contamination is the unintentional addition of harmful substances such as microbes, chemicals etc due to negligence or lack of resources. |
| ② | It is an unlawful act | It occurs due to negligence or deficiency of resources for preservation. |
| ③ | It is practised for more economic gains | It results due to lack of hygiene, mishandling or environmental factors. |
| ④ | Examples include addition of water in milk, addition of colour in turmeric, injecting watermelons to make them look more red. | Examples include bacterial or fungal growth on food products |
| ⑤ | It reduces quality of product and is harmful for health. | It may cause gastro gastrointestinal infections such as diarrhea, stomach ache etc. |
| ⑥ | Prevented through implementation of strict laws and policies | Prevented through strict adherence to safety measures. |

Controlling measures of food adulteration



Strict regulatory measures

Promoting awareness and education

Testing and monitoring

Encouraging whistleblowing

Promoting ethical practices

Public-private partnership

① Strict regulatory measures

Promote regulation authorities to ensure food safety such as FDA regulations. To control food adulteration, government should persecute the offenders with imprisonment and fines.

② Promoting awareness and education

Educate the consumers about common adulterants and aware them about testing methods such as iodine test for starch in milk.

③ Testing and monitoring

Routine testing of food can prevent such illegal practices. Conduct frequent checks on food processing markets. Use modern techniques such as chromatography to detect adulteration of food.

④ Encouraging whistleblowing

Introduce whistleblowing act to get reports of suspected cases of adulteration.

⑤ Promoting ethical practices

Encourage companies and provide incentives for ethical practices and self-regulation.

⑥ Public private partnerships

Governments can collaborate with non-governmental agencies, industries to address this issue collectively.

B.

Five Food Preservation Methods

①

Refridgeration
and Freezing

Low temperatures slow down the growth of bacteria, preserving for longer period of time.

Example: storage of fresh fruits, vegetable, frozen meat etc.

②

Canning

Food is heated at high temperature to kill bacteria and then sealed in airtight containers to prevent contamination.

Example: canned soups, sauces
Canned fruits.

③

Dehydration

Removal of water from food prevents growth of bacteria

Example: Powdered milks dried
raisins, dried apricots.

④

Pickling

Food is preserved by immersing it in acidic solutions such as vinegar to create low-PH environment

Example: Pickled cucumbers,
Pickled onions

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Vacuum Packing

→ Air is completely removed from containers to prevent or slow microbial growth

→ Example: vacuum packed coffee beans

Food Preservation methods increase life of food and prevent its quick contamination.

c.

Weather Variables

①

Temperature

Temperature measures hotness or coldness of a body, measured through kinetic energy of its molecules.

Units: Kelvin (K), centigrade ($^{\circ}\text{C}$), Fahrenheit (F)

Significance

- i) Temperature determines type of weather (hot weather, cold weather or moderate weather)
- ii) Temperature changes with altitude - Higher altitudes have lower temperature.
- iii) It is mostly higher at equator.
- iv) It affects the evaporation process, humidity and atmospheric stability.

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②

Pressure

Defination: Force per unit area is called pressure.

Units = mmHg, atmosphere (atm), pascal.

Significance

- i) It is higher at ~~hi~~ lower altitudes and pressure becomes low at higher altitudes.
- ii) ~~Pressure~~ Pressure becomes low in cloudy and humid weather
- iii) Warm air creates lower pressure, whereas cold air creates higher pressure.

③

Humidity

Defination: It is the amount of water vapours in earth's atmosphere. It is measure of amount of moisture in air

Unit: percentage is used to measure humidity.

significance

- i) Higher humidity feels warmer and cause ~~disf~~ discomfort and health problems.

- (ii) lower humidity leads to dry skin and respiratory problems.

D.

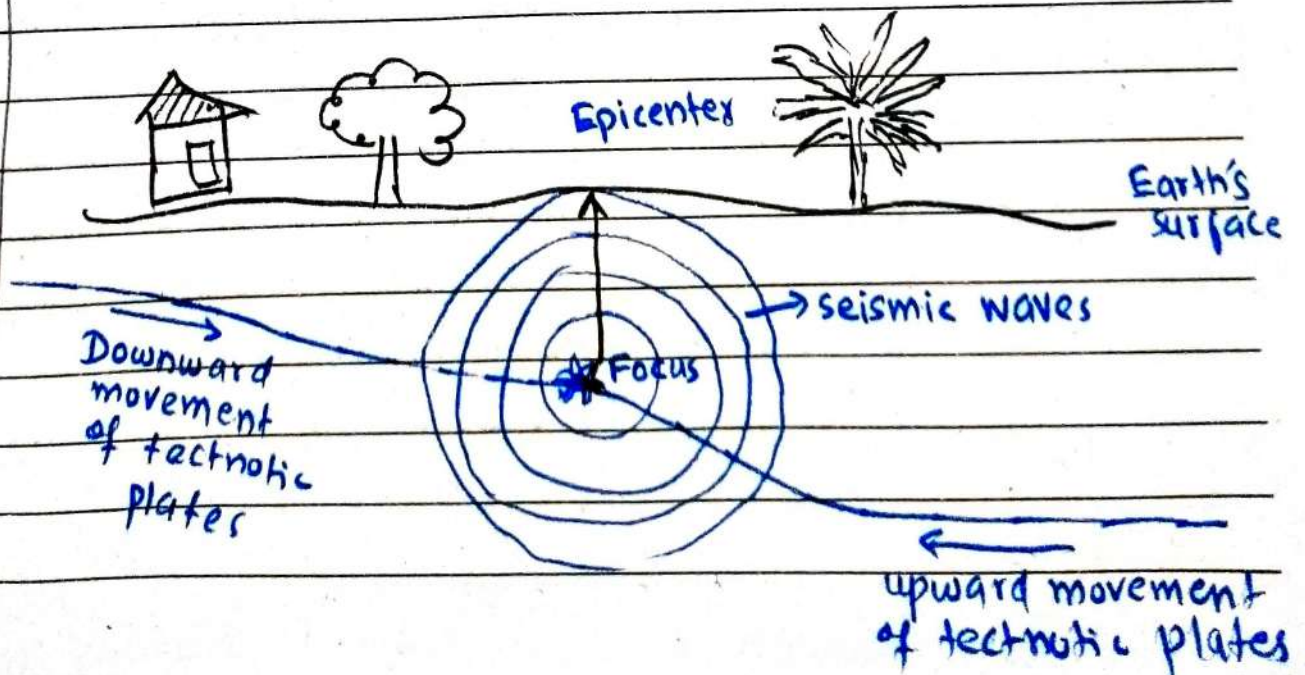
Phenomenon Of Earthquake

Earthquake

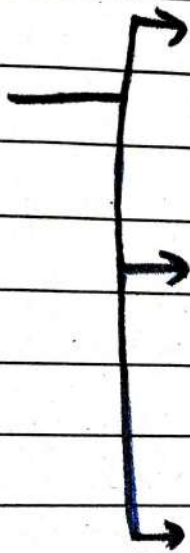
It is a phenomenon of temporary shaking of earth caused by release of energy by tectonic plates. The energy stored in the earth crust is suddenly released due to stress of tectonic plates or external forces.

Seismic waves

The released energy propagates as seismic waves, causing ground shaking



Mitigation of Earthquake effects



Monitoring and Early warning systems

Earthquake-resistant buildings

Pre-active preparedness



Q2

A.

Renewable Energy Resources

Renewable energy resources

These are the resources that are reusable, non-depleting and environmental friendly. The examples include solar energy, hydropower, wind energy, geothermal, and biomass.

Importance with respect to the environment

① Reduce Greenhouse gas emission

Renewable resources release little or no greenhouse gases, hence beneficial for environment

② Prevent depletion of Resources

Unlike fossil fuels, these resources have no risks of depletion as they are reusable

③ Reduction in the air pollution

These resources don't release toxic gases such as sulphur dioxide, carbon dioxide, which play significant role in causing air pollution.

④ Reduce Dependency on Fossil Fuels

Use of renewable resources reduce dependency on fossil fuels and conserve the natural resources of coal, oil and natural gas.

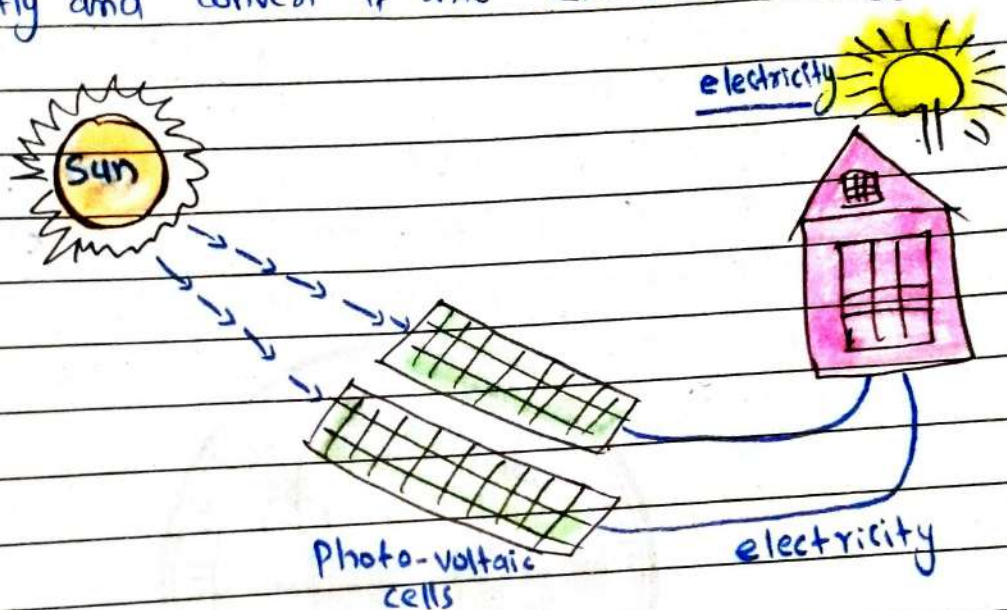
⑤ Preservation of Ecosystem

They help in preservation of ecosystem, habitat and biodiversity. The fossil fuels combustion has produced harmful pollutants, that greatly contributes to biodiversity loss.

molten & semimolten rocks
inside the earth

Solar Energy

This system uses solar heat or energy directly and convert it into electrical energy



B.

Rocks

Defination

They are naturally occurring solid aggregates of minerals, mineraloids or organic materials. They form earth's crust.

Types Of Rocks

- ① Igneous rocks
- ② sedimentary rocks
- ③ metamorphies rocks.

Igneous rocks: They are formed by cooling and solidification of magma or lava

Example: Granite

metamorphous rocks:

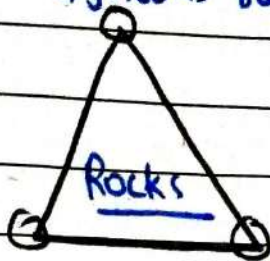
They are formed when existing rocks are subjected to high temperatures and pressures or chemical processes.

Example: Marble

sedimentary rocks

They are formed by deposition, compaction and cementation of sediments.

Example: sandstone, limestone.



The Rock Cycle

The rock cycle is a continuous process in the earth's crust. In rock cycle one type of rock is converted into another type due to changes in temperature, pressure and environmental factors.

Steps Of Rock Cycle

① Magma formation

Rocks in the earth's crust or mantle melt due to intense temperature and pressure, forming magma.

② Cooling and solidification

Magma cools down and transform into igneous rocks.

③ Erosion and formation of sedimentary rocks

Igneous rocks are broken into smaller pieces and deposited as sediments.

④ compaction and cementation

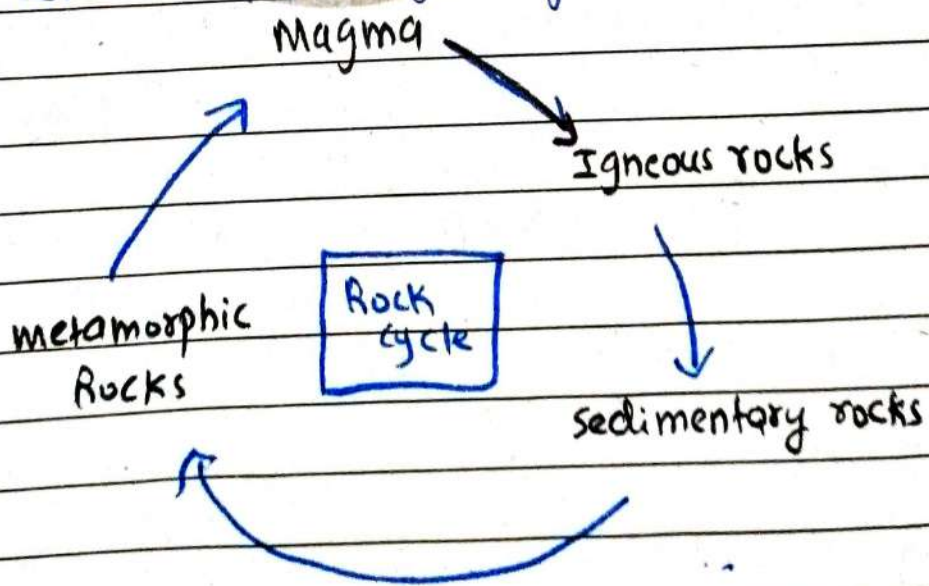
Sediments accumulate in layers due to pressure, to form sedimentary rocks.

⑤ Metamorphism

sedimentary rocks under high temperatures and pressures transform into metamorphic rocks.

⑥ Melting

Metamorphic rocks melt again due to extreme conditions, forming magma and completing the cycle.



C.

| | Saturated Fats | Unsaturated Fats |
|---|--|--|
| ① | These are fats in which no double bond exists. | They may contain one or more double bonds. |
| ② | Carbon is saturated with four hydrogen atoms through single bond. | Fewer hydrogen atoms are present due to double bonds between carbon atoms. |
| ③ | They are present in straight chains. | They may contain several branches. |
| | They are mostly solids. | They are mostly liquid. |
| | Mostly animal based such as dairy products, meat etc. | Mostly plant based such as nuts, sunflower oil, seeds. |
| | They are associated with higher LDL cholesterol and harmful for heart. | They are associated with higher HDL and lower LDL and beneficial for health. |

Importance of Fats

- ① They serve as energy reservoirs and important source of energy.
- ② They are essential for absorption of fat-soluble vitamins (D, E, K and A)
- ③ They provide insulation to the body, maintaining metabolism and protecting vital organs.
- ④ Fats are necessary for important hormone production in the body such as estrogen, testosterone and cortisol.
- ⑤ Fats such as omega-3 Fatty acids are important for Brain health and development.

D.

Water Soluble Vitamins

Water soluble vitamins are insoluble in fats and organic materials and soluble in water. They are not stored in the body in significant amount hence, they are needed in the body in daily diet. These vitamins are essential for body growth, immunity, health and cell function. Excess amount of water-soluble vitamins are excreted through urine.

Types of Water-soluble Vitamins

① Vitamin B-complex

They are group of vitamins that play key role in energy production and other physiological functions.

- ① Vitamin B₁ (Thiamine)
- ② Vitamin B₂ (Riboflavin)
- ③ Vitamin B₃ (Niacin)
- ④ Vitamin B₅ (Pantothenic acid)
- ⑤ Vitamin B₆ (Pyridoxine)
- ⑥ Vitamin B₇ (Biotin)
- ⑦ Vitamin B₉ (Folic acid)
- ⑧ Vitamin B₁₂ (Cobalamin)

② Vitamin C (Ascorbic Acid)

It is important for immune system, collagen synthesis and iron absorption.

Sources of Water Soluble Vitamins

Green leafy vegetables, broccoli, spinach, meat, milk, ~~car~~ citrus fruits, strawberries, nuts, seeds, eggs, avocados etc.

Deficiency

Their deficiency may produce disease depending upon type of vitamin such as :

- ① Beri-beri (due to vitamin B1)
- ② Anemia (due to vitamin B9)
- ③ Scurvy (due to vitamin C deficiency)
- ④ Megaloblastic anemia due to deficiency of cobalamins
- ⑤ Cheilosis due to Riboflavin deficiency
- ⑥ Pellagra due to Niacin deficiency