



Answer all the questions below then check your answers.

1. *What are clay ceramics primarily made from?*
2. *Briefly describe the process of making clay ceramics.*
3. *Name a few common items made of clay ceramics.*
4. *Describe three common properties of clay ceramics.*
5. *Explain how glass is made.*
6. *Why are sodium carbonate and calcium carbonate added in the production of glass?*
7. *Describe the structure of silicon dioxide.*
8. *Compare the structure of silicon dioxide (silica) with diamond.*
9. *What are the main differences between soda-lime glass and borosilicate glass?*
10. *Which of the following is a primary material used in making clay ceramics?*
 - a) *Limestone*
 - b) *Clay minerals*
 - c) *Sand*
 - d) *Gypsum*

11. What is the role of sodium carbonate in glass making?

- a) To add colour b) To increase hardness c) To lower the melting point
d) To improve transparency

12. What type of bond is found in the structure of silicon dioxide?

- a) Ionic b) Metallic c) Covalent d) Hydrogen

13. Fill in the gaps to complete the sentences below:

- a. The primary material used to make ceramics is _____.
- b. _____ lowers the melting point of the mixture in glass making.)
- c. Silicon dioxide has a ____ structure.

13. Compare and contrast the properties and uses of soda-lime glass and borosilicate glass. Include their composition, thermal properties, and common applications in your answer.

Answers

1. What are clay ceramics primarily made from?

Answer: Clay ceramics are primarily made from natural clay minerals.

2. Briefly describe the process of making clay ceramics.

Answer: Clay ceramics are made by shaping clay into the desired form and then heating it at high temperatures in a kiln.

3. Name a few common items made of clay ceramics.

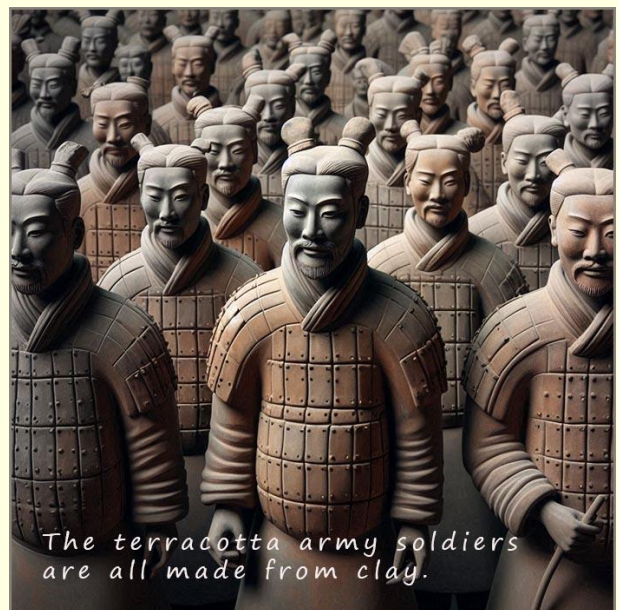
Answer:

pottery: This includes a wide variety of items used for everyday purposes, such as plates, bowls, mugs, cups, pitchers, vases, and cooking vessels like pots and casserole dishes.

Sculptures and figurines: Clay is a versatile medium for creating sculptures and figurines of all shapes and sizes. These can be purely decorative or serve a functional purpose, such as religious statues or architectural ornaments.

Architectural elements: Clay bricks are a common and traditional building material used for walls, floors, and other structural elements. Clay tiles are also used for roofing, flooring, and decorative purposes.

Industrial ceramics: There's a wide range of industrial applications for ceramics, including electrical insulators, spark plugs, crucibles for high-temperature processes, and components for engines and machines.



The terracotta army soldiers are all made from clay.

Sanitary ware: Clay is used to make toilets, sinks, and other bathroom fixtures.

4. Describe three common properties of clay ceramics.

Answer: Properties of clay ceramics include:

High hardness and strength.

Resistance to high temperatures.

Brittle nature, which makes them prone to breaking under impact.

Electrical and thermal insulator

5. Explain how glass is made.

Answer: Glass is made by melting a mixture of sand (silicon dioxide), soda (sodium carbonate), and limestone (calcium carbonate) at high temperatures. The molten mixture is then cooled and solidified into the desired shape.

6. Why are sodium carbonate and calcium carbonate added in the production of glass?

Answer: Sodium carbonate lowers the melting point of the sand, making it easier to melt, while calcium carbonate improves the chemical durability and workability of the glass.

7. Describe the structure of silicon dioxide.

Answer: Silicon dioxide has a giant covalent structure where each silicon atom is covalently bonded to four oxygen atoms in a tetrahedral arrangement, forming a continuous 3D network.

8. Compare the structure of silicon dioxide (silica) with diamond.

Answer: Similarities:

Both have a giant covalent structure.

Both have high melting points and are very hard.

Differences:

Silicon dioxide is made of silicon and oxygen atoms, while diamond is made entirely of carbon atoms.

Diamond has a tetrahedral lattice of carbon atoms, whereas silicon dioxide forms a lattice of silicon and oxygen atoms.

9. What are the main differences between soda-lime glass and borosilicate glass?

Answer: Soda-lime glass is made from sand, soda, and lime and is used for windows and bottles. Borosilicate glass (Pyrex) contains boron trioxide, making it more resistant to thermal shock, and is used for laboratory glassware and cookware.

10. Which of the following is a primary material used in making clay ceramics?

a) Limestone b) Clay minerals c) Sand d) Gypsum

Answer: b) Clay minerals

11. What is the role of sodium carbonate in glass making?

a) To add colour b) To increase hardness c) To lower the melting point
d) To improve transparency

Answer: c) To lower the melting point

12. What type of bond is found in the structure of silicon dioxide?

- a) Ionic b) Metallic c) Covalent d) Hydrogen

Answer: c) Covalent

13. Fill in the gaps to complete the sentences below:

- a. The primary material used to make ceramics is _____.

Answer: clay minerals

- b. _____ lowers the melting point of the mixture in glass making.

(Answer: Sodium carbonate)

- c. Silicon dioxide has a ____ structure.

Answer: giant covalent

13. Compare and contrast the properties and uses of soda-lime glass and borosilicate glass. Include their composition, thermal properties, and common applications in your answer.

Answer: Soda-lime glass is composed of sand, sodium carbonate, and calcium carbonate. It is the most common form of glass, used in windows and bottles due to its low cost and adequate durability. However, it has poor thermal shock resistance, meaning it can crack under sudden temperature changes.

Borosilicate glass, also known as Pyrex, includes boron trioxide in its composition. This addition provides excellent thermal shock resistance, making it suitable for laboratory glassware and cookware that undergoes rapid heating and cooling. While borosilicate glass is more expensive to produce, its enhanced durability and resistance to temperature changes make it ideal for specific high-performance applications. Both types of glass are transparent and

chemically inert, but borosilicate glass has superior thermal stability compared to soda-lime glass.