



CHEMISTRY

BOOKS - PEARSON IIT JEE FOUNDATION

CARBON AND ITS COMPOUNDS

Very Short Answer Type Question

1. What is meant by allotropy ?

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2. Mention any three physical properties of graphite.

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3. _____ is used in the manufacture of black carbon papers.

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4. Bone charcoal contains maximum percentage of _____.

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5. What is meant by carbonization ?

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6. Describe a method of preparing carbon dioxide .

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7. Give any two uses of calcium carbonate.

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8. The major components of CNG is _____

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9. Discuss any two chemical properties of methane.

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10. Give three uses of diamond.

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11. _____ acid on reaction with H_2SO_4 gives only carbon monoxide gas.

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12. Explain how sugar charcoal is prepared.

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13. What is fire extinguisher? Mentions its types.

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14. Mention two physical properties of methane.

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15. Give the chemical properties of calcium carbide ?

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16. How is bone charcoal prepared ?

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17. Melting point of diamond is _____.

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18. Explain the structure of graphite.

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19. What are fullerenes ?

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20. Name the purest form of charcoal.

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21. Explain the reducing property of wood charcoal.

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22. Mention the chemical properties of sodium carbonate.

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23. Name different allotropes of carbon.

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24. Colour is imparted to diamond due to the presence of _____.

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25. How is coke formed ? Give two uses of coke.

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26. Write the reaction involved in the preparation of silicon carbide .

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27. The composition of lime mortar is _____

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28. The poisonous gas, phosgene is prepared from _____ and _____ gases.

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29. Mention any two physical properties of carbon dioxide.

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30. Give two properties and two uses of lamp black.

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Short Answer Type Question

1. Describe a laboratory method of the preparation of wood charcoal.

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2. Describe the structure of diamond

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3. Why is soda acid fire extinguisher used to extinguish fire caused by solid inflammable materials ?

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4. Explain the reactivity of graphite with oxygen and sodium carbonate with chemical equation .



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5. What are the different products formed when methane and chlorine are made to react in the presence of sunlight.



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6. Mention the chemical properties of diamond.



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7. How is methane prepared in the laboratory ?



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8. Write short note on gas carbon.

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9. Discuss the reactivity of carbon monoxide with metal and non-metals.

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10. Explain the reactivity of carbon dioxide with metals.

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11. What are the physical properties of carbon monoxide ?

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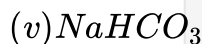
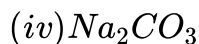
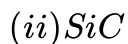
12. State the physical properties of diamond.

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13. Give the preparation method of the following compounds

(i)



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14. Discuss three importance uses of

(i) Graphite (ii) Wood Charcoal

(iii) Carbon monoxide (iv) Sugar charcoal

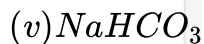
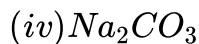
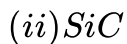
(v) Bone charcoal (vi) Carbon dioxide

(vii) Methane.

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15. Discuss the physical properties of

(i)



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Easy Type Question

1. Write a note on

(i) calcium carbide (ii) silicon carbide.

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2. Explain the manufacture of graphite by Acheson process.

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3. Discuss the laboratory preparation of carbon monoxide .

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4. Discuss carbon cycle in nature.

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5. Explain the working of the two types of fire extinguishers.

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Concept Application Level 1

1. Graphite is used in the manufacture of crucibles as it possesses high electrical resistance.

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2. Fullerenes is the amorphous allotrope of carbon. True or False?

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3. Lamp black is used as a filler in making rubber tyres. True or False

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4. Carbon monoxide is neither combustible nor a supporter of combustion. True or False

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5. In methane, all the hydrogens can be replaced by chlorine atoms when the reaction takes place in presence of sunlight. True or False?

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6. Sugar charcoal is good reducing agents. True or false?

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7. Foam type extinguisher is used to extinguish any kind of fire. True or False?

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Concept Application Level 1 Fill In The Blanks

1. Crystallisation of carbon to form diamonds takes place when ____ metal expands during solidification.

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2. Carbon monoxide is slightly _____ than air.

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3. Fill in the blank.

The compound of carbon used to soften hard water is _____ .

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4. _____ acid on reaction with H_2SO_4 gives only carbon monoxide gas.

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5. Fill in the blank.

Methane is prepared in a laboratory by heating anhydrous sodium

acetate with _____ .

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6. Fill in the blank.

Sugar on reaction with _____ gives sugar charcoal.

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7. Fill in the blank.

Gas carbon is used as _____ in dry cells.

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Concept Application Level 1 For Each Of The Question Four Choices Have Been Provided Select The Correct Alternatives

1. The existence of an element in different allotropic forms is due to the

A. different arrangement of atoms

B. different amounts of energy associated in the formation of each allotope.

C. different methods of formation.

D. All of the above.

Answer: D

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2. Which among the following properties of coke is exploited in the preparation of graphite by Acheson process ?

A. Bad conductor of electricity

B. Good conductor of electricity

C. Highly porous nature

D. Low melting point

Answer: A

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3. Which of the following substances is used in place of H_2SO_4 in foam type fire extinguishers?

A. Saponin

B. Aluminium sulphate

C. Sodium carbonate

D. Alcohol .

Answer: B



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4. Generally $CaCO_3$ is insoluble in water but in the presence of carbon dioxide it is soluble. This is because.

- A. of the formation of carbonic acid.
- B. of the formation of soluble $Ca(HCO_3)_2$.
- C. CO_2 makes $CaCO_3$ porous thus dissolving it in water.
- D. of the formation of highly concentrated acids.

Answer: B

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5. Identify endothermic reaction among the following.

- A. Passage of CO_2 through red hot carbon.

B. Passage of O_2 through red hot carbon.

C. Burning of methane.

D. Burning of water gas.

Answer: A

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6. Nature of the products obtained by complete combustion of methane are

A. acidic, basic

B. acidic, neutral

C. basic , neutral

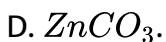
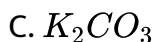
D. Both are neutral.

Answer: B



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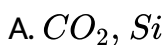
7. Which of the following carbonates will not decompose on heating?



Answer: C

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8. A compound 'X' made of two non-metals, in a reaction with another non-metal 'Y' gives the hardest substance and carbon monoxide. Identify the compound X and non-metal Y.



B. SiO_2 , C

C. SiC , O_2

D. CO , Si

Answer: B

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9. Which of the following allotropes of carbon is used for the manufacture of fullerenes ?

A. Graphite

B. Diamond

C. Coke

D. Charcoal.

Answer: A

10. Graphite cannot be used as a lubricant in space because

- A. absence of external pressure transforms crystalline graphite to amorphous form .
- B. there is no atmosphere in sapce and hence graphite sublimes in space.
- C. there is no atmosphere in space and hence there is no adsorbed air and water between layers of graphite.
- D. None of the above.

Answer: C

11. Coke can be used as

A. an oxidizing agent

B. a household fuel

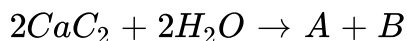
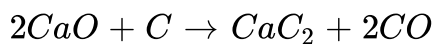
C. printer ink

D. electrodes.

Answer: B

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12. Reaction :



If A is involved in the neutralisation reaction with acid, then B may be

A. CH_4

B. C_2H_2

C. $Ca(OH)_2$

D. CaH_2

Answer: B

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13. Carbon occurs as the native element in the earth's crust in the form of.

A. diamond

B. methane

C. carbon dioxide

D. gas carbon.

Answer: A

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14. Why shouldn't we light a candle in a closed room with people ?

A. The CO_2 formed causes breathlessness.

B. Carbon particles are formed which are dangerous for respiratory tract.

C. Methane gas which is poisonous is formed.

D. Carbon monoxide gas which reduces the ability of blood to carry oxygen is formed.

Answer: D



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15. Why do black shoe polishes have an oily feel ?

A. Shoe polish is a mixture of oil and powdered graphite

B. On exposure to air, these undergo chemical changes and produce oily substances.

C. Vapour of some amount of oil is left over after its preparation.

D. These are formed by dissolving charcoal in oil.

Answer: C

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16. Arrange the steps in the process of carbon cycle, starting from the abundant state of existence of carbon in the combined state, in their correct sequence.

(a) Dead remains (b) CO_2 in atmosphere

(c) Organic matter (d) Plants.

(e) Fossil fuels

A. bacde

B. bdace

C. dbcae

D. debaca

Answer: B



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17. Arrange the step in the process of carbon cycle, starting from the substance which possess a mixture of hydrocarbons, in a proper sequence.

(a) Sea water (b) Dead remain

(c) Aquatic plants (d) CO_2 in atmosphere

(e) Organic matter (f) Fossil fuels.

A. cadefb

B. fcdabe

C. dacbef

D. fdacbe

Answer: D



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18. Graphite fibres are used to reinforce plastic as they

A. have weak carbon bonds

B. have high tensile strength

C. are brittle

D. have weak forces of attraction between layers.

Answer: B



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19. In the manufacture of graphite by Acheson process, the charge filled between the cathode and anode consist of

- A. powdered coke, sand and ferric oxide
- B. powdered coke
- C. sand
- D. ferric oxide

Answer: A

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20. The compound which builds up the greenhouse effect is

- A. carbon monoxide
- B. gas carbon
- C. carbon dioxide

D. none of these

Answer: C

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21. The use of diamond as a gem depends on its

A. extreme hardness

B. poor conductance

C. low density

D. high refractive index.

Answer: D

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22. To a small quantity of X, few drops of HCl are added. Consequently, a colourless, odourless gas is produced. This gas on passing through lime water turns it milky proving the presence of _____ in X.

- A. carbonate
- B. bicarbonate
- C. carbide
- D. Either (1) or (2)

Answer: D

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23. _____ is used extensively in the manufacture of washing soda.

- A. Carbon dioxide
- B. Carbon monoxide

C. Methane

D. Lamp black

Answer: A

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24. Which of the following can be considered as spontaneous combustion?

A. Burning of LPG

B. Burning of magnesium ribbon

C. Burning of camphor

D. Burning of potassium in moist air.

Answer: D

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25. Water gas is a mixture of

A. CO_2 and H_2

B. H_2 and CH_4

C. CO and H_2

D. CO and N_2

Answer: C



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26. Heating of methane in the absence of air is called.

A. combustion

B. decarboxylation

C. pyrolysis

D. photolysis

Answer: C

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27. Arrange the different type of coal in sequence in the increasing order of the quality coal.

(a) Lignite (b) Peat (c) Anthracite (d) Bituminous

A. acdb

B. dbca

C. badc

D. bcda

Answer: C

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28. Graphite is greasy, soft lubricant because it

- A. has low density
- B. has weak forces of attraction between layers
- C. is greyish-black in colour
- D. has three dimensional structure.

Answer: B

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29. Arrange the given combustible substances in decreasing order of calorific value:

- (1) hydrogen
- (2) charcoal
- (3) petrol
- (4) LPG
- (5) wood

A. bcade

B. adcbe

C. badec

D. baced

Answer: B



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30. Graphite is used in a nuclear reactor as

A. moderator

B. Fuel

C. electrode

D. lubricant.

Answer: A

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Concept Application Level 2

1. Why is graphite used as a pencil lead?

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2. Can molten copper be used in place of molten iron for the manufacture of artificial diamonds? Give a reason in support of your answer.

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3. Diamond is a good thermal conductor like metal. However it is a poor electrical conductor unlike metals. How do you account for this ?

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4. Why is activated charcoal widely used in water purifiers?

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5. Burning more and more fossil fuels creates an imbalance in the natural carbon cycle as well as in the natural water cycle. Give reasons.

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6. Carbon monoxide gas can be detected by passing it through a blood sample. Explain.

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7. A building constructed from mortar becomes stronger on long standing. Give a reason.

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8. Why is CNG replacing petrol as an automobile fuel?

A. Dry ice should not be stored in a sealed bottle. Explain with appropriate reason.

B.

C.

D.

Answer:

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9. Dry ice should not be stored in a sealed bottle. Explain with an appropriate reason.

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10. Two non-metal atoms contain same number of electrons in their valence shells. One of the non-metal in its most abundant form react with the other non-metal forming a very stable compound 'A' . Compound 'A' on reaction with oxygen and fused sodium hydroxide gives tow products B and C. 'B' is used as raw material for the manufacture of glass and 'C' is the major constituents of glass. Identify A,B and C. Write balanced chemical eqations for the above reactions.

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11. Burning more and more fossil fuels creates an imbalance in the natural carbon cycle as well as in the natural water cycle. Give reasons.

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12. Tiny diamonds find applications in coating the tips and edges of cutting tools. Which properties of diamonds are made use of for this purpose ?

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13. Explain the role of baking soda as a leavening agent and as an antacid ?

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14. An oxide of a bivalent metal on heating with coke gives a compound 'X' and a gas 'Y'. The gas 'Y' reacts with chlorine gas to give a poisonous gaseous compound. 'X' undergoes hydrolysis to give a hydrocarbons 'Z' with two carbon atoms. Identify the compound X,Y, and Z. Also give the reactions involved.

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15. Graphite is used as a solid lubricant. Give reasons.

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16. How does a dry powder type fire extinguisher work?

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17. A naturally occurring minerals of sedimentary rocks on heating to high temperatures decomposes giving a solid 'A' and a gas. The solid on dissolution in water undergoes chemical reactions which is associated with hissing sound and the solution appears to be boiling. Compound 'B' formed during this reaction on long standing forms a layer of white powder. When excess CO_2 is passed through this milky white solution, a clear solution is formed again. Identify the substances and justify the above observations. Give reasons wherever required.



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18. In the manufacture of silicon carbide by Acheson process, sawdust is used along with sand and coke in the electric furnace. What is the main purpose of using sawdust as one of the constituents of the mixture ?



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19. The genuineness of a pearl can be verified by dipping it in lemon juice. Why?

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20. Why does fogging occur while using a soda acid fire extinguisher?

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21. Why is wood charcoal considered to be an excellent household fuel?

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22. Two compounds X and Y, when dissolved in water, produced sodium bicarbonate. If hydrochloric acid is added to compound 'X', compound Y is liberated. Identify X and Y.

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23. A student of VIII class broke a dry cell to examine its parts and correlate them with his teacher's explanations about dry cells. In the chemistry class, the student asked his teacher that though graphite is a nonmetal, why is it used as electrodes in the electrolytic process, especially where a high temperature is maintained. Write down the explanation the teacher gave to the student.

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24. Sam and his family went to watch a Hollywood movie in which the hero along with his friends rescues 76 people trapped in mines were

poisonous gas was being released. During the process, gas masks containing wood charcoal were given to the people. In the movie the , hero and his friends were research students in the nearby university. Sam asked his scientist father the role of wood charcoal in gas masks. Write the scientist's explanation on the above.

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25. An eleven-year old naughty boy Krish took keys of his father's car without his father's permission. He went inside the garage, closed it and started the ignition. After a few minutes, he started coughing. His father fortunately went into the garage, opened it , immediately brought him out and rescued him. Krish's mother asked her husband- the reason for Krish's condition. What explanation did the father give ?

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1. Explain the role of dry ice in the occurrence of artificial rain.

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2. Wood charcoal floats on water, but if it is boiled in water it sinks.

Explain with appropriate reasons.

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3. Compare and contrast the principle involved in the usage of $NaHCO_3$ and dry ice for cleaning industrial equipments by blasting the given substances with compressed air.

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4. Why is molten iron used in the preparation of artificial diamond ?

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5. What is the advantage of liquid CO_2 fire extinguisher over soda-acid fire extinguisher? Explain.

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6. Though coke is made from coal, it is used for metallurgical processes instead of coal. Give reason.

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7. Draw a comparison among petrol, LPG and CNG as automobile fuels.

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8. Compare and contrast the principle involved in the usage of of $NaHCO_3$ and dry ice for cleaning industrial equipments by blasting the given substances with compressed air.

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9. Pinku and Rinku are TIME IIT-F students. They went to a jewellery shop with their mother. They were delighted to see the lustrous gold ornaments. Pinku peeped through the showcase to see a diamond necklace and total Rinku- Really, the glitterance of diamonds is incomparable to the lustre of gold ! Rinku complained that their chemistry teacher explained the lustre of metals in detail but didn't mention about diamonds at all. They both decided to ask their chemistry teacher the next day. What Explanation will the teacher give ?

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10. Ocean acidification due to the disposal of industrial waste has a negative effect on oceanic calcifying organisms. Why?



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