

## 8. PHYSICAL AND CHEMICAL CHANGES SOLUTIONS

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### TEACHING TASK

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#### JEE MAINS LEVEL QUESTIONS

1. The original substance can not be obtained in a .

A) Physical change B) Chemical change C) slow change D) desirable change

**Answer: B**

Solution: Chemical changes alter molecular structure, making original substances irrecoverable without another reaction

2. ZnO when heated becomes .

A) yellow B) blue C) red D) green

**Answer: A**

Solution: Zinc oxide turns yellow on heating due to thermal excitation of electrons, reverting to white on cooling

3. Zinc oxide is yellow when hot and white when cold. This is an example of :

A) Physical change B) chemical change C) fast change D) none

**Answer: A**

Solution: This color change is reversible and does not involve a new substance being formed, so it's a physical change.

4. Which of the following statements is incorrect about physical change

A) In most cases, a physical change is reversible in nature

B) the chemical composition of the constituents remains the same

C) products exhibit the properties of the parent constituents

D) product formed has completely different properties as compared to its constituents

**Answer: D**

Solution: Physical changes retain the substance's properties; this describes chemical changes

5. During the white wash lime reacts with ..... in the air.

A)  $O_2$  B)  $N_2$  C)  $NH_3$  D)  $CO_2$

**Answer: D**

Solution: Calcium hydroxide (lime) reacts with  $CO_2$  to form calcium carbonate, which gives the white coating

6. Which of the following reactions burns with a brilliant white light

A) Reaction between Magnesium and Oxygen B) Reaction between lime and water

C) Reaction between Iron and Copper sulphate D) All the above

**Answer: A**

Solution: Burning magnesium in oxygen produces an intense white flame.

7. Blue vitriol is

A) Magnesium B) Copper sulphate C) Ferrous Sulphate D) Iron

**Answer: B**

Solution: Blue vitriol is the common name for  $CuSO_4 \cdot 5H_2O$  (hydrated copper sulphate).

8. The gas released when Acetic acid reacts with Baking soda

- A) Oxygen B) Carbon Dioxide C) Water vapour D) All

**Answer:B**

Solution: Acetic acid + Sodium bicarbonate  $\rightarrow$  Sodium acetate +  $\text{CO}_2$  +  $\text{H}_2\text{O}$

9. Substance "A" on reaction with "B" gives a gas which on passing through lime water which converts it to milky white, then the substances "A" and "B" are

- A) Acetic acid and Baking soda B) lime and water  
C) Magnesium and Oxygen D) Copper and Iron sulphate

**Answer:A**

Solution:(The reaction produces  $\text{CO}_2$ , which turns limewater milky ( $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$ ).

10. Which is the standard test to detect carbon dioxide

- A) Reaction with Magnesium B) Passing through lime water  
C) Reaction with lime stone D) Reaction with Iron

**Answer:B**

Solution: $\text{CO}_2$  turns limewater milky due to  $\text{CaCO}_3$  formation.

### **JEE ADVANCED LEVEL QUESTIONS**

#### **Multi correct answer type:**

11. Which of the following statements are incorrect

- A) Rusting of iron is a chemical change.  
B) Magnesium oxide is basic in nature  
C) Reaction of copper sulphate with iron gives blue solution  
D) Rust formula is  $2\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$

**Answer:C,D**

Solution:C) Reaction of copper sulphate with iron gives blue solution.

(Incorrect: Iron displaces copper, forming colorless  $\text{FeSO}_4$  and brown Cu precipitate.)

D) Rust formula is  $2\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$ .

(Incorrect: Rust is hydrated ferric oxide,  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ , not  $2\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$ .)

- A) Rusting of iron is a chemical change. (Correct: Forms new substance,  $\text{Fe}_2\text{O}_3$ .)  
B) Magnesium oxide is basic in nature. (Correct:  $\text{MgO}$  is a basic oxide.)

12. Which of the statements is true about chemical change

- A) Heat, light or radiation such as ultraviolet may be given off or absorbed.  
B) Production of sound may occur  
C) A change in smell may happen  
D) Formation of a bubble of gas may be accompanied

**Answer:A,B,C,D**

Solution:All four options are true signs of a chemical change:

- A) Heat/light is often involved in chemical reactions (ex: combustion).  
B) Sound can be produced (e.g., explosions).  
C) Change in smell occurs when new substances are formed (e.g., rotten egg smell in hydrogen sulfide).  
D) Gas formation with bubbles is a key indicator (e.g., acid + carbonate reaction).

**Statement Type:**

- A) Both Statements are true, Statement II is the correct explanation of Statement I.  
 B) Both Statements are true, Statement II is not correct explanation of Statement I.  
 C) Statement I is true, Statement II is false.  
 D) Statement I is false, Statement II is true.

13. Statement-I : Reaction between Copper and Iron sulphate gives green solution

Statement-II : Iron reacts with Copper sulphate

**Answer:D**

Solution:

Statement-I (False): Copper does not react with Iron sulphate (Cu is less reactive than Fe). No green solution forms.

Statement-II (True): Iron does react with Copper sulphate ( $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$ ), but this is irrelevant to Statement-I.

14. Statement-I : Rusting of iron is considered to be a chemical change

Statement-II : Rust formula is  $2\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$

**Answer:C**

Solution:Statement I is true: Rusting involves the formation of new substances — a chemical change.

Statement II is false: The correct formula of rust is  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ , not  $2\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$

**Matrix Matching Type:**

Column I

Column II

15. a) Zincite

1)  $\text{NaHCO}_3$

b) neela thotha

2)  $\text{CH}_3\text{COOH}$

c) Veniger

3)  $\text{ZnO}$

d) Baking soda

4)  $\text{CuSO}_4$

A) a - 2, b - 1, c - 4, d - 3 B) a - 3, b - 4, c - 2, d - 1

C) a - 2, b - 3, c - 4, d - 1 D) a - 3, b - 1, c - 4, d - 2

**Answer:B**

Solution:

a) Zincite

3)  $\text{ZnO}$

b) neela thotha

4)  $\text{CuSO}_4$

c) Veniger

2)  $\text{CH}_3\text{COOH}$

d) Baking soda

1)  $\text{NaHCO}_3$

16. Column I

Column II

a)  $\text{Mg} + \text{O}_2$

1) Rust

b)  $\text{CH}_3\text{COOH}(\text{aq}) + \text{NaHCO}_3(\text{aq})$

2) Milky

c)  $\text{CO}_2 + \text{Ca}(\text{OH})_2$

3) Gas with hissing sound

d)  $4\text{Fe} + 3\text{O}_2 + 2\text{H}_2\text{O}$

4) powdery ash

A) a - 4, b - 1, c - 4, d - 3 B) a - 3, b - 4, c - 2, d - 1

C) a - 4, b - 3, c - 2, d - 1 D) a - 3, b - 1, c - 4, d - 2

**Answer:C**

Solution:

a)  $\text{Mg} + \text{O}_2$

4) powdery ash

b)  $\text{CH}_3\text{COOH}(\text{aq}) + \text{NaHCO}_3(\text{aq})$

3) Gas with hissing sound

- c)  $\text{CO}_2 + \text{Ca(OH)}_2$   
d)  $4\text{Fe} + 3\text{O}_2 + 2\text{H}_2\text{O}$

- 2) Milky  
1) Rust

### Comprehension Type:

Rusting of iron can be prevented by not allowing iron to come in contact with the moist air. Coating iron with oil, grease or paint is the simplest method to prevent the process of rusting.

17. Generally metals used to prevent rusting is

- A) Zinc B) Chromium C) Copper D) Both A & B

### Answer:D

Solution:Zinc (A): Used in galvanization (coating iron with zinc) because it sacrificially corrodes before iron.

Chromium (B): Forms a passive oxide layer (e.g., in stainless steel or chrome plating).

Copper (C): Not used for rust prevention; it can even accelerate iron's corrosion (galvanic corrosion).

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## LEARNERS TASK

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### CONCEPTUAL UNDERSTANDING QUESTIONS

1. Beating of metals into sheets or drawing metals into wires.

- A)temporary change B)reversible change C)Physical change D)all

### Answer:D

Solution: Physical Change:The process does not change the chemical composition of the metal.Only shape and size are altered (e.g., iron rod ? wire or sheet).“Hence, it is a physical change.

Reversible Change:The metal can be remelted and re-shaped, so the change is reversible.

Temporary Change:Since no new substance is formed and the original metal can be regained, it is temporary.

2. Evaporation of water by the heat of sun .

- A)Physical change B)chemical change C)fast change D)none

### Answer:A

Solution: Water changes from liquid to gas — no new substance formed.

3. Physical change is a.

- A)temporary change B)permanent change C) both a & b D)none

### Answer:A

Solution: Most physical changes can be reversed, hence they are temporary.

4. Melting of ice is a.

- A)reversible change B)Physical change C)chemical change D)both a & b

### Answer:D

Solution:Melting of ice is a Reversible and physical change.

5. A chemical change involves .

- A)change of state only B)change of colour only  
C)change of state as well as composition D)none

### Answer:C

Solution:New substances form with different properties

6. An example of chemical change is .

A)melting of sulphur B)formation of snow C)earth quakes D)burning of coal

**Answer:D**

Solution: Burning produces new substances like  $\text{CO}_2$  and heat.

7. During physical and chemical changes .

A)energy is always absorbed. B)energy is always released

C)no energy is absorbed or released D)energy is either absorbed or released

**Answer:D**

Solution: Energy changes (heat/light) often accompany both types of changes.

8. Burning of coal is a .

A)chemical change B)physical change C)fast change D)non periodic change

**Answer:A**

Solution: Chemical change (Combustion produces  $\text{CO}_2$  and ash.)

9. Action of heat on paraffinwax is .

A)chemical change B)permenent change C)physical change D)desirable change

**Answer:C**

Solution: Physical change (Melts reversibly; no chemical reaction.)

10. Changing of iron wire into a magnet involves

A) Chemical change B) Permanent change

C) Temporary change D) Physical change

**Answer:C,D**

Solution: Physical change (No new substance; temporary magnetic property.)

### **JEE MAINS LEVEL QUESTIONS**

11. Which of the follwoing statement is correct

A) A physical change is one that changes the shape ,size,physical state,and appearance of a substance with chemical composition

B) changes which involve breaking and physical deformation might be irreversible under normal circumstances

C)fermentation of grapes

D) All the above

**Answer:B**

Solution:B)Some physical changes like breaking glass or tearing paper are irreversible in practice, even though they don't change the chemical identity.

So, this statement is true.

12. Thermo-chromic means

A) change in colour on heating the compound

B) change in state on heating the compound

C) change in odour on heating the compound

D) All the above

**Answer:A**

Solution:"Thermo" = heat, "chromic" = color.

Thermochromic substances change color with temperature.

Example:  $\text{ZnO}$  turns white (cold) to yellow (hot).

13. "A" on heating converts to Yellow and white on cooling, the substance "A" is

A)  $\text{ZnO}$  B) $\text{CaO}$  C) $\text{CaCO}_3$  D)  $\text{NaHCO}_3$

**Answer:A**

Solution: Zinc oxide appears yellow when hot and turns white when cooled — a reversible physical change.

14. Which of the following are not physical change

A) Dissolving Salt in Water B) Mixing Water and Oil C) Heating Zinc Oxide D) None

**Answer: D**

Solution: All are physical changes

15. "A" burns with dazzling white light by burning and gives powdered ash. The ash formed is

A) ZnO B) CaO C)  $\text{CaCO}_3$  D) MgO

**Answer: D**

Solution: Burning magnesium ribbon in air produces bright white light, and leaves behind a white powdery ash, which is magnesium oxide (MgO).

### **JEE ADVANCED LEVEL QUESTIONS**

**Multi correct answer type:**

16. Which of the following is incorrect statement(s)

A) A physical change cannot be reversed.

B) Heat is not given off during a chemical change.

C) Burning candle does not give heat and light energy.

D) Rust is mainly formed due to moisture

**Answer: A, B, C**

Solution: A) Incorrect: Many physical changes are reversible, e.g., melting ice or dissolving salt.

B) Incorrect: Chemical changes often release/absorb heat, e.g., combustion releases heat.

C) Incorrect: Burning candles release both heat and light via combustion, a chemical change.

D) Correct: Rust requires moisture (water) + oxygen. This statement is true, so it doesn't belong in the "incorrect" list.

**Statement Type:**

A) Both Statements are true, Statement II is the correct explanation of Statement I.

B) Both Statements are true, Statement II is not correct explanation of Statement I.

C) Statement I is true, Statement II is false.

D) Statement I is false, Statement II is true.

17. Statement-I : Burning of candle involves both physical and chemical change

Statement-II : Physical change is due to melting of wax and chemical change is due to burning of wick

**Answer: A**

Solution: Statement-I (True): A burning candle undergoes:

Physical change: Melting of wax (solid  $\rightarrow$  liquid; reversible).

Chemical change: Combustion of wax vapor ( $\text{wax} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{heat/light}$ ; irreversible).

Statement-II (True & Correct Explanation):

Precisely breaks down the dual changes:

Melting wax = physical change (no new substance).

Burning wick/wax vapor = chemical change (new substances form).

**Matrix Matching Type:**

18.

- a) Galvanisation      1) Promotes rusting  
b) Fermentation      2) Prevents rusting  
c) Snow formation    3) Chemical Change  
d) salt in water      4) Physical Change

A) a - 2, b - 4, c - 1, d - 3 B) a - 2, b - 3, c - 4, d - 1

C) a - 4, b - 3, c - 2, d - 1 D) a - 3, b - 1, c - 4, d - 2

**Answer:B**

Solution:

- a) Galvanisation  
2) Prevents rusting → Galvanisation is coating iron with zinc to prevent rusting.  
b) Fermentation  
3) Chemical change → Fermentation involves chemical breakdown by microbes  
c) Snow formation  
4) Physical change → Snow forms from water vapor condensing a physical change.  
d) Salt in water  
1) Promotes rusting → Salt solution accelerates rusting by increasing conductivity.

**Comprehension Type:**

When a teaspoonful of vinegar is mixed with a pinch of baking soda, then a hissing sound is produced with the formation of gas. This obtained gas is called carbon dioxide gas.

19. The following chemical equation represents the following chemical change:

A)  $\text{CH}_3\text{COOH}(\text{aq}) + \text{NaHCO}_3(\text{aq}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) + \text{CH}_3\text{COONa}(\text{aq})$

B)  $\text{CO}_2 + \text{Ca}(\text{OH})_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$  C) Both A & B D) None

**Answer:C**

Solution:A)  $\text{CH}_3\text{COOH}(\text{aq}) + \text{NaHCO}_3(\text{aq}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) + \text{CH}_3\text{COONa}(\text{aq})$

B)  $\text{CO}_2 + \text{Ca}(\text{OH})_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$

Both reactions are chemical changes

20. Baking soda is chemically called

- A) Sodium Carbonate B) Sodium Hydrogen Carbonate  
C) Acetic Acid D) Sodium dihydrogen carbonate

**Answer:B**

Solution:Baking Soda =  $\text{NaHCO}_3$ , which is called sodium hydrogen carbonate

# KEY

			TEACHING TASK							
			JEE MAINS LEVEL QUESTIONS							
1	2	3	4	5	6	7	8	9	10	
B	A	A	D	D	A	B	B	A	B	
			JEE ADVANCED LEVEL QUESTIONS							
11	12	13	14	15	16	17				
C,D	A,B,C,D	D	C	B	C	D				
			LEARNERS TASK							
1	2	3	4	5	6	7	8	9	10	
D	A	A	D	C	D	D	A	C	C,D	
			JEE MAINS LEVEL QUESTIONS							
11	12	13	14	15						
B	A	A	C	D						
			JEE ADVANCED LEVEL QUESTIONS							
16	17	18	19	20						
A,B,C	A	B	C	B						