



## CHEMISTRY

### BOOKS - MTG IIT JEE FOUNDATION

### FOOTSTEPS TOWARDS (JEE MAIN)

#### Questions

1. The position of elements A and B are shown in the periodic table below.

		A															
													B				

Which of the following statements is correct about the two elements?

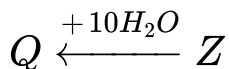
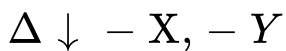
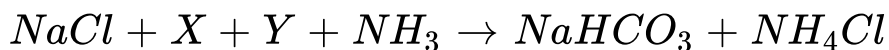
- A. A and B have the same electron structure.
- B. A and B have the same number of filled electron shells.
- C. A is a metal and B is a non-metal.
- D. A is in period 2 and B is in group III.

**Answer: C**



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2. For the given series of reactions,



Following statements are given :

(i) This reaction is a Solvay's process.

(ii) X and Y are  $CO_2$  and  $H_2O$  respectively.

(iii) Z is  $(NH_4)_2CO_3$ .

Identify the correct option.

A. (i) and (ii)

B. only (iii)

C. (i) and (iii)

D. All statements are correct.

**Answer: A**

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3. P is produced by the action of chlorine on dry slaked lime.

Q is a non-corrosive base and used for faster cooking.

On heating R at 373 K, it becomes calcium sulphate hemihydrate.

Identify P, Q and R respectively.

A.  $CaOCl_2$ ,  $NaHCO_3$ , gypsum

B.  $CaO$ ,  $Na_2CO_3$ ,  $CaOCl_2$

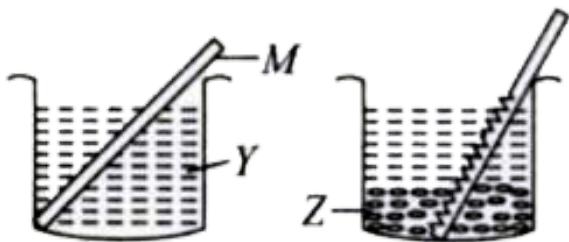
C.  $Ca(OH)_2$ ,  $NaHCO_3$ ,  $CaSO_4$

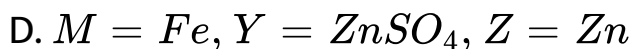
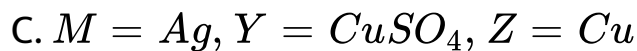
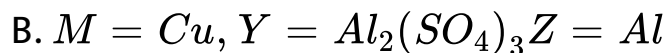
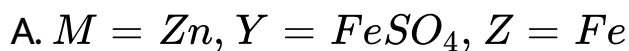
D.  $\text{CaOCl}_2$ ,  $\text{NaCO}_3$ ,  $\text{NH}_4\text{Cl}$

Answer: A

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4. A metal rod M was dipped in a coloured solution Y. After some time it was observed that the metal rod starts dissolving in the solution and the solution starts fading in colour. However, a coloured precipitate Z was seen at the bottom of the beaker. M, Y and Z could be





**Answer: A**



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5. Students were asked to study the reaction between barium chloride and sodium sulphate. Four different reports of the experiment are given below. Choose the correct one.

	Procedure	Observation
A.	Mix powder of barium chloride and sodium sulphate.	The colour of the mixture becomes yellow.

	Procedure	Observation
B.	Mix solution of barium chloride to the solution of sodium sulphate.	White precipitate is formed

	Procedure	Observation
C.	Add solution of barium chloride to sodium sulphate powder.	Solution becomes turbid.

D.

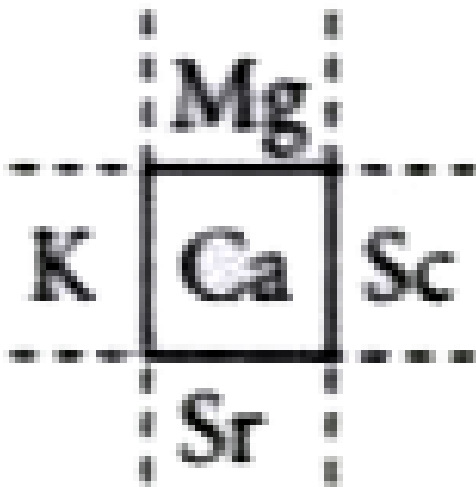
	Procedure	Observation
	Add powder of barium chloride to sodium sulphate solution.	The colour of the mixture becomes bluish green.

**Answer: B**



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6. In the Modern Periodic Table, calcium ( $Z = 20$ ) is surrounded by the elements with atomic numbers 12, 19, 21 and 38. Which of the following will have physical and chemical properties resembling calcium?



A. 12, 38

B. 12, 19, 38

C. 19, 38



D. 12, 19

**Answer: A**



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7. What will be the pH value of a solution if salt of a strong base and weak acid undergoes hydrolysis?

A.  $\text{pH} = 7$

B.  $\text{pH} > 7$

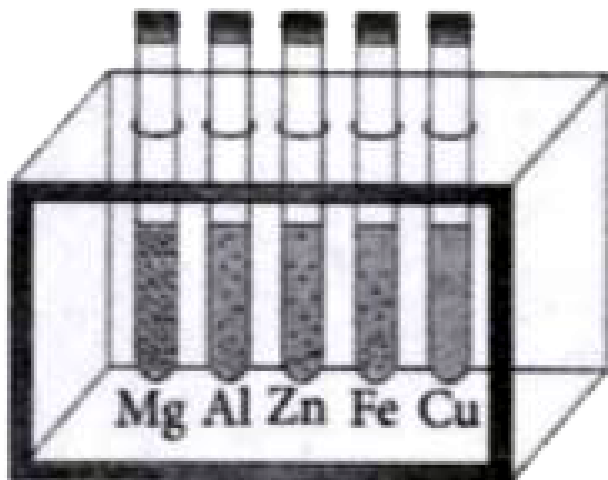
C.  $\text{pH} < 7$

D.  $\text{pH} = 1$

**Answer: B**

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8. Clean small pieces of magnesium, zinc, aluminium, iron and copper by rubbing them with a piece of sand paper. Take them in separate test tubes. Add about 10 mL of dilute hydrochloric acid to each of them.

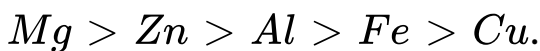


Consider the following statements.

(i) The rate of evolution of hydrogen gas bubbles is not same in all the test tubes.

(ii) The rate of formation of bubbles is the fastest in the case of magnesium.

(iii) The reactivity decreases in the order:



(iv) In the case of copper, no bubbles are seen and the temperature also remains unchanged. This shows that copper does not react with dilute HCl.

Identify the correct option.

A. Only (i) and (iv)

B. Only (iii) and (iv)

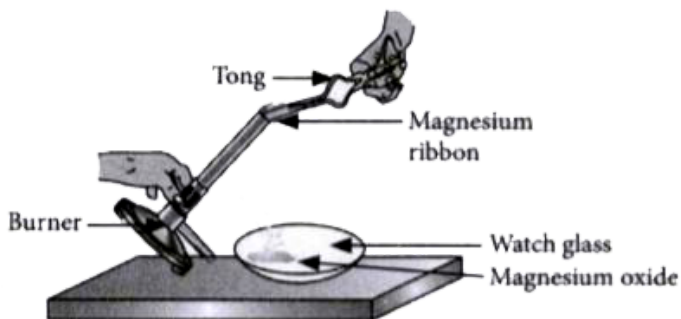
C. Only (iii)

D. Only (i), (ii) and (iv)

**Answer: D**

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9. Observe the given figure and identify the correct statements.



(i) Magnesium ribbon burns in air with a dazzling white flame.

(ii) It is a displacement reaction.

(iii) Magnesium oxide is basic in nature and turns most red litmus paper blue.

(iv) It is an exothermic reaction.

A. (i) and (iii)

B. (ii) and (iv)

C. (i), (iii) and (iv)

D. (i) and (iv)

**Answer: C**



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10. Ethanoic acid was added to sodium bicarbonate solution and the gas evolved was tested with a burning splinter. The correct observation is

- A. the gas burns with the pop sound and the flame gets extinguished
- B. the gas does not burn but the splinter burns with a pop sound
- C. the flame extinguishes and the gas does not burn
- D. the gas burns with a blue flame and the splinter burns brightly.

**Answer: C**



11. Four students performed the reactions of dil. hydrochloric acid and solution of sodium hydroxide with zinc metal and solid sodium carbonate separately. They reported the possible reaction by  $\checkmark$  and no reaction by (x).

Students	HCl + Zn	HCl + Na <sub>2</sub> CO <sub>3</sub>	NaOH + Zn	NaOH + Na <sub>2</sub> CO <sub>3</sub>
A	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
B	x	x	$\checkmark$	$\checkmark$
C	$\checkmark$	$\checkmark$	x	x
D	$\checkmark$	$\checkmark$	$\checkmark$	x

Which student has report the correct observation?

A. A

B. B

C. C

D. D

**Answer: D**



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**12.** The ion of an element has 3 positive charge. Mass number of the atom is 27 and the number of neutron is 14, what is the number of electrons in the ion?

A. 13

B. 10

C. 14

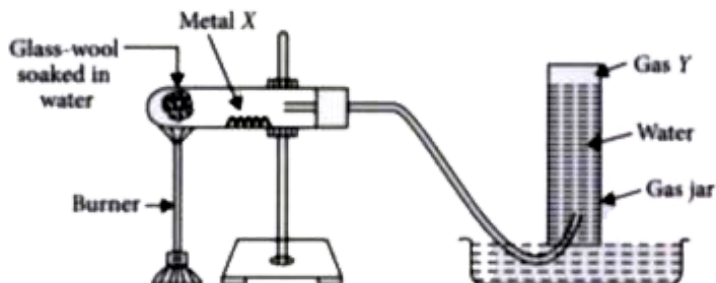
D. 16



Answer: B

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13. Identify the metal (X) and gas (Y) respectively in the figure.

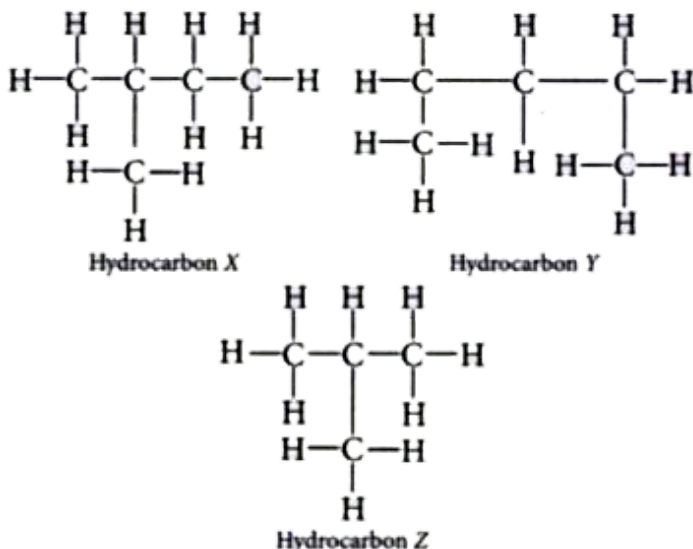


- A. Zinc,  $H_2$  gas
- B. Copper,  $CO_2$  gas
- C. Aluminium,  $CO_2$  gas
- D. Platinum,  $H_2$  gas

Answer: A

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14. The structures of three hydrocarbons, X, Y and Z are shown below:



By considering the following statements, identify the correct option.

1. X and Y are isomers.
2. X and Y have the same percentage composition by mass.
3. Y is the isomer of alkane having formula,  $C_5H_{12}$ .
4. Z has the same boiling point as n-butane.

A. 1, 2 and 3

B. 2 and 4

C. 1 and 4

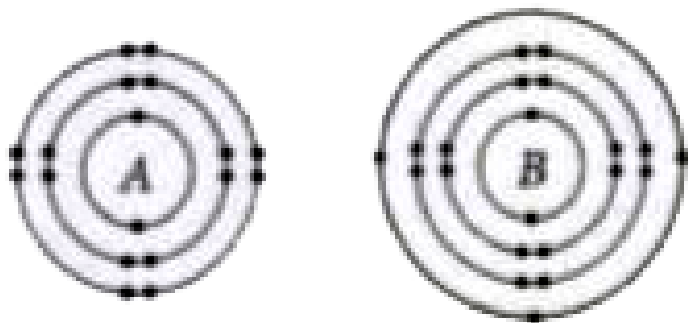
D. 1, 3 and 4

**Answer: A**



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15. The given diagram shows the electron arrangement of two elements, A and B.



By considering the following information, identify the correct option.

- (i) A is a period 3 element.
- (ii) B is a group III element.
- (iii) Both A and B have strong metallic characteristics.
- (iv) Both A and B form positive ions.

A. Only (ii)

B. Only (i) and (ii)

C. Only (iii) and (iv)

D. (i), (ii), (iii) and (iv)

**Answer: B**



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**16.** Reaction between X and Y, forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?

A. Has high melting point.

B. Has low melting point.

C. Conducts electricity in molten state.

D. Occurs as solid.

**Answer: B**



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**17.** Consider the following statements.

(i) Dry hydrogen chloride gas turns dry blue litmus paper red.

(ii) Dry hydrochloric acid does not turn moist blue litmus paper red.

(iii) If dry HCl gas is passed through benzene, it will not turn dry blue litmus paper red.

(iv) When HCl gas is passed through water, the solution

turns dry blue litmus paper red.

Identify the incorrect option.

A. (i) and (ii)

B. (iii) and (iv)

C. (i) and (iii)

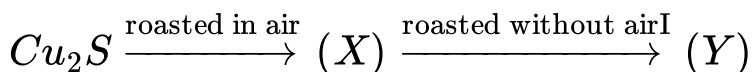
D. (ii) and (iv)

**Answer: A**



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**18.** Study the following steps.



Based on the above steps, identify X and Y.

	X	Y
(a)	Mixture of Cu and CuO	Mixture of Cu and SO <sub>2</sub>
(b)	Mixture of Cu <sub>2</sub> O, Cu <sub>2</sub> S and SO <sub>2</sub>	Mixture of Cu and SO <sub>2</sub>
(c)	Mixture of CuO and SO <sub>2</sub>	Mixture of Cu and SO <sub>2</sub>
(d)	Mixture of Cu and CuO	Mixture of CuO and CuS



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**19.** There are four metals P, Q, R and S. Identify them by using the hints given below.

P forms basic oxide.

Q forms amphoteric oxide.

Oxide of R dissolves in water to form alkali.

S does not react with water at all.



A.  $P \rightarrow Fe, Q \rightarrow Na, R \rightarrow K, S \rightarrow Zn$

B.  $P \rightarrow Zn, Z \rightarrow Al, R \rightarrow Na, S \rightarrow Fe$

C.  $P \rightarrow Cu, Q \rightarrow Zn, R \rightarrow K, S \rightarrow Pb$

D.  $P \rightarrow K, Q \rightarrow Cu, R \rightarrow Pb, S \rightarrow Na$

**Answer: C**



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20. Which of the following flames is produced by a candle?

A. Blue flame

B. non-luminous

C. light giving flame

D. yellow luminous flame

**Answer: D**



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## Integer Numerical Value Type

1. From the given list, how many pairs of elements form ionic bonds when they react?

Bromine, Carbon, Iron, Sodium, Sulphur



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2. An element X belongs to group 14 and 2<sup>nd</sup> period of the periodic table. Its atomic number will be

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3. The pH of two solutions A and B are 2 and 4 respectively. What is the ratio of  $H^+$  ion concentration of the two solutions?

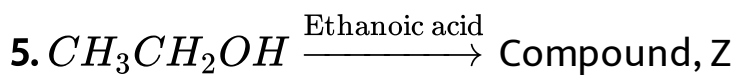
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4. Copper(II) oxide reacts with ammonia to give copper, water and nitrogen.



The value of  $(x + y + z)$  is

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Number of hydrogens in compound, Z is

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