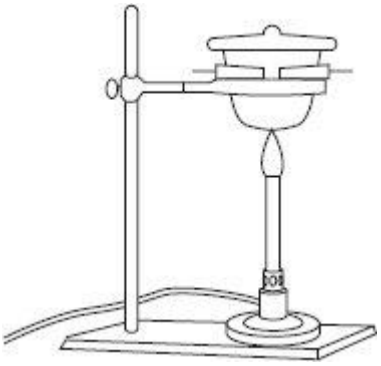
Chemistry Practice Test SAT 30

Q1. 

The lab setup shown above was used for the gravimetric analysis of the empirical formula of MgO. In synthesizing MgO from a Mg strip in the crucible, which of the following is NOT true?

A. The initial strip of Mg should be cleaned.

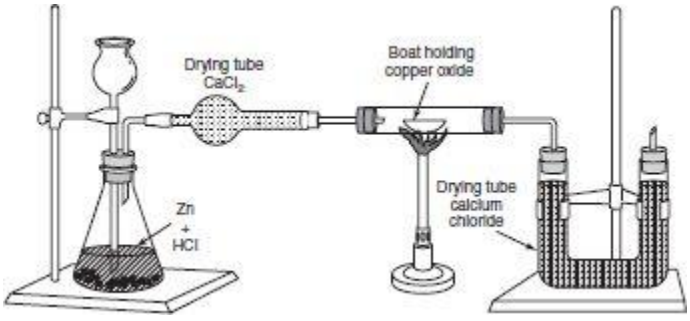
B. The lid of the crucible should fit tightly to exclude oxygen.

C. The heating of the covered crucible should continue until the Mg is fully reacted.

D. The crucible, lid, and the contents should be cooled to room temperature before measuring their mass.

E. When the Mg appears to be fully reacted, the crucible lid should be partially removed and heating continued.

Q2. Question below refers to the following experimental setup and data:



Recorded data:

Weight of U-tube..... 20.36 g

Weight of U-tube and calcium chloride before..... 39.32 g

Weight of U-tube and calcium chloride after..... 57.32 g

Weight of boat and contents (copper oxide) before..... 30.23 g

Weight of boat and contents after..... 14.23 g

Weight of boat.....5.00 g

What is the reason for the first $CaCl_2$ drying tube?

A. Generate water

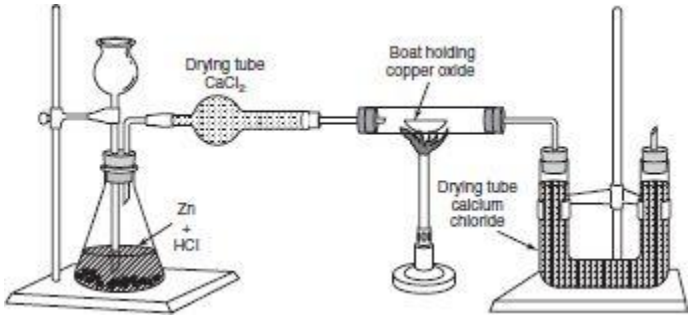
B. Absorb hydrogen

C. Absorb water that evaporates from the flask

D. Decompose the water from the flask

E. Act as a catalyst for the combination of hydrogen and oxygen

Q3. Question below refers to the following experimental setup and data:



Recorded data:

Weight of U-tube..... 20.36 g

Weight of U-tube and calcium chloride before..... 39.32 g

Weight of U-tube and calcium chloride after..... 57.32 g

Weight of boat and contents (copper oxide) before..... 30.23 g

Weight of boat and contents after..... 14.23 g

Weight of boat.....5.00 g

What conclusion can be derived from the data collected?

A. Oxygen was lost from the $CaCl_2$.

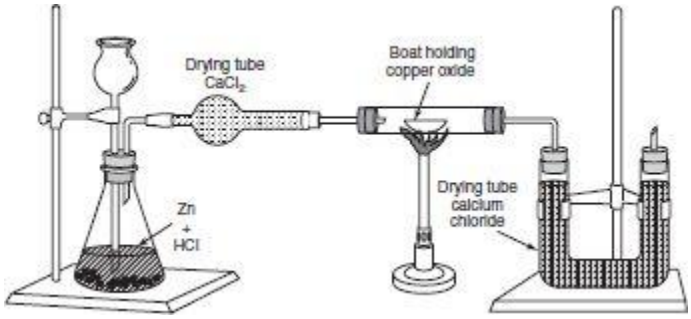
B. Oxygen was generated in the U-tube.

C. Water was formed from the reaction.

D. Hydrogen was absorbed by the $CaCl_2$.

E. CuO was formed in the decomposition.

Q4. Question below refers to the following experimental setup and data:



Recorded data:

Weight of U-tube..... 20.36 g

Weight of U-tube and calcium chloride before..... 39.32 g

Weight of U-tube and calcium chloride after..... 57.32 g

Weight of boat and contents (copper oxide) before..... 30.23 g

Weight of boat and contents after..... 14.23 g

Weight of boat.....5.00 g

What is the ratio of the mass of water formed to the mass of hydrogen used in the formation of water?

A. 1 : 8

B. 1 : 9

C. 8 : 1

D. 9 : 1

E. 8 : 9

Q5. What is the mass, in grams, of 1 mole of $KAl(SO_4)_2 \cdot 12H_2O$?

A. 132

B. 180

C. 394

D. 474

E. 516

Q6. What mass of aluminum will be completely oxidized by 2 moles of oxygen at STP?

A. 18 g

B. 37.8 g

C. 50.4 g

D. 72.0 g

E. 100.8 g

Q7. In general, when metal oxides react with water, they form solutions that are

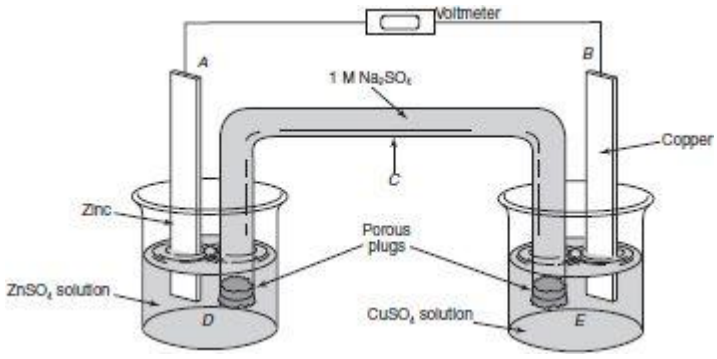
A. acidic

B. basic

C. neutral

D. unstable

E. colored



Q8.

The oxidation reaction will occur at

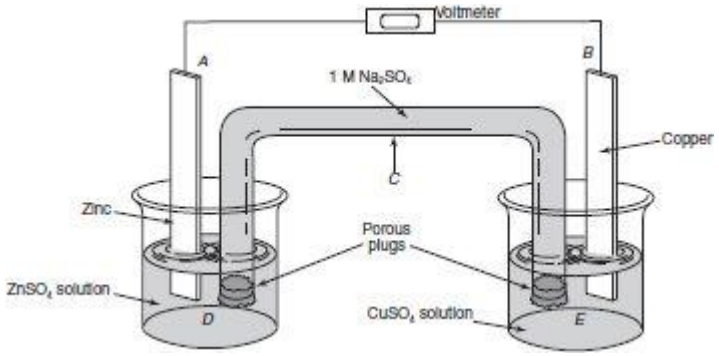
A. A

B. B

C. C

D. D

E. E



Q9.

The apparatus at C is called the

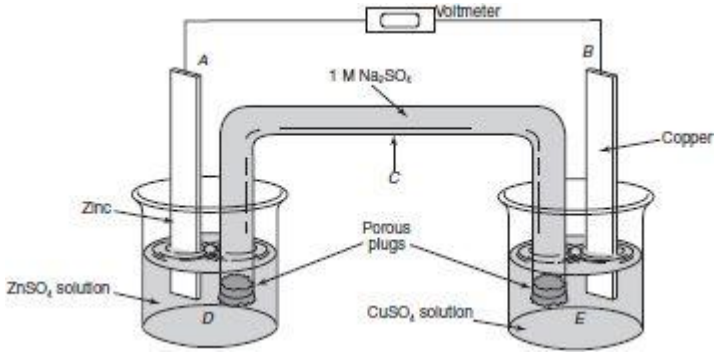
A. anode

B. cathode

C. salt bridge

D. ion bridge

E. osmotic bridge



Q10.

The standard potentials of the metals are:

$Zn^{2+} + 2e^- \rightarrow Zn^0$ E^0 = -0.76 volt

$Cu^0 \rightarrow Cu^{2+} + 2e^-$ E^0 = -0.34 volt

What will be the voltmeter reading for this reaction?

A. +1.10

B. -1.10

C. +0.42

D. -0.42

E. -1.52

Q11. How many liters of oxygen (STP) can be prepared from the decomposition of 212 grams of sodium chlorate (1 mol = 106 g)?

A. 11.2

B. 22.4

C. 44.8

D. 67.2

E. 78.4

Q12. In this equation: $Al(OH)_3 + H_2SO_4 \rightarrow Al_2(SO_4)_3 + H_2O$, the whole-number coefficients of the balanced equation are

A. 1, 3, 1, 2

B. 2, 3, 2, 6

C. 2, 3, 1, 6

D. 2, 6, 1, 3

E. 1, 3, 1, 6

Q13. What is $\Delta H_{reaction}$ for the decomposition of 1 mole of sodium chlorate? (ΔH_f^0 values: $NaClO_3(s)$ = -85.7 kcal/mol, NaCl(s) = -98.2 kcal/mol, $O_2(g)$ = 0 kcal/mol)

A. -183.9 kcal

B. -91.9 kcal

C. +45.3 kcal

D. +22.5 kcal

E. -12.5 kcal

Q14. Isotopes of an element are related because which of the following is (are) the same in these isotopes?

I. Atomic mass

II. Atomic number

III. Arrangement of orbital electrons

A. I only

B. II only

C. I and II only

D. II and III only

E. I, II, and III

Q15. In the reaction of zinc with dilute HCl to form H_2, which of the following will increase the reaction rate?

I. Increasing the temperature

II. Increasing the exposed surface of zinc

III. Using a more concentrated solution of HCl

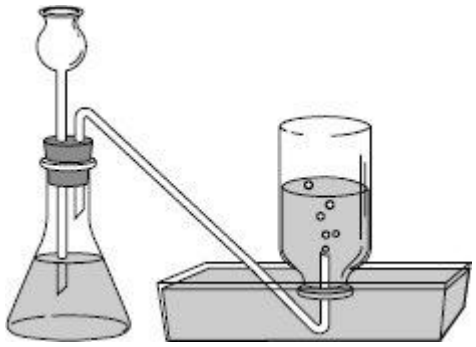
A. I only

B. II only

C. I and III only

D. II and III only

E. I, II, and III

Q16. 

The laboratory setup shown above can be used to prepare a

A. gas lighter than air and soluble in water

B. gas heavier than air and soluble in water

C. gas soluble in water that reacts with water

D. gas insoluble in water

E. gas that reacts with water

Q17. In this reaction: $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$. If 4.0 moles of HCl are available to the reaction with an unlimited supply of $CaCO_3$, how many moles of CO_2 can be produced at STP?

A. 1.0

B. 1.5

C. 2.0

D. 2.5

E. 3.0

Q18. A saturated solution of $BaSO_4$ at 25°C contains 3.9×10^{-5} mole/liter of Ba^{2+} ions. What is the K_{sp} of this salt?

A. 3.9×10^{-5}

B. 3.9×10^{-6}

C. 2.1×10^{-7}

D. 1.5×10^{-8}

E. 1.5×10^{-9}

Q19. If 0.1 mole of K_2SO_4 was added to the solution in question 64, what would happen to the Ba^{2+} concentration?

A. It would increase.

B. It would decrease.

C. It would remain the same.

D. It would first increase, then decrease.

E. It would first decrease, then increase.

Q20. Which of the following will definitely cause the volume of a gas to increase?

I. Decreasing the pressure with the temperature held constant.

II. Increasing the pressure with a temperature decrease.

III. Increasing the temperature with a pressure increase.

A. I only

B. II only

C. I and III only

D. II and III only

E. I, II, and III

Q21. The number of oxygen atoms in 0.50 mole of $Al_2(CO_3)_3$ is

A. 4.5×10^{23}

B. 9.0×10^{23}

C. 3.6×10^{24}

D. 2.7×10^{24}

E. 5.4×10^{24}

Q22. Question below refers to a solution of 1 M acid, HA, with $K_a = 1 \times 10^{-6}$.

What is the H_3O^+ concentration? (Assume [HA] = 1, $[H_3O^+] = x$, $[A^-] = x$.)

A. 1×10^{-5}

B. 1×10^{-4}

C. 1×10^{-2}

D. 1×10^{-3}

E. 0.9×10^{-3}

Q23. What is the percent dissociation of acetic acid in a 0.1 M solution if the $[H_3O^+]$ is 1×10^{-3} mole/liter?

A. 0.01%

B. 0.1%

C. 1.0%

D. 1.5%

E. 2.0%