

IRON-2

1. List down the main differences of transition metals from other metals.

2. Write down three physical properties of iron metal.

3. Write down the spdf electron configuration of iron.

4. Explain from where iron metal is obtained.

5. What are the common iron minerals, and why is pyrite mineral called "fool's gold"?

6. Explain how iron is obtained in industry and in laboratory.

7. Write down the formula of oxides, hydroxides and a salt of iron metal.

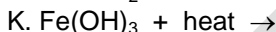
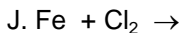
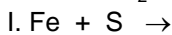
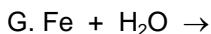
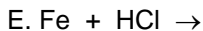
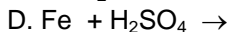
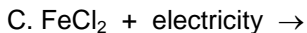
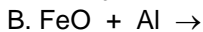
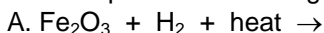
8. What are the chemical properties of iron metal?

9. What are the common names of iron minerals below?

Fe₃O₄, FeS₂, FeCO₃

10. List down the common uses of iron and its compounds.

11. Complete the following reactions below,



12. Complete the following transformations below.



13. Calculate the mass percentage of iron metal in the following compounds.



14. Find the oxidation states of Fe and C atoms in the following compounds.



15. Calculate the mass of iron and chlorine gases required to produce 650 grams of iron (III) chloride.
(Ans: 224 g Fe and 426 g Cl₂)

16. 224 L of hydrogen gas is obtained from the reaction of excess iron with 10% sulfuric acid solution by mass. Calculate the mass of sulfuric acid solution required.
(Ans: 9800 g H₂SO₄ solution)

17. In a thermite reaction the mass of molten iron produced is 280 grams. Calculate the mass of aluminum powder used, if the reaction efficiency is 95%. (Ans: 142.1 g Al)

18. The carbon in typical steel alloys may contribute up to 2.14% of its weight. Calculate the volume of hydrogen gas obtained at STP from the reaction of 250 g of steel with excess sulfuric acid. (Ans: 97.86 L H₂)

19. Pyrite reacts with oxygen as follows;



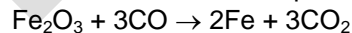
Calculate the volume of air at STP required reacting with 150 g of pyrite with 20% impurity. (Ans: 293.3 L air)

20. Pig iron has very high carbon content, typically up to 4.7%. Calculate the volume of oxygen gas at STP needed to oxidize 235 g of pig iron completely according to the reactions below;



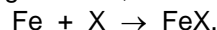
(Ans: 87.82 L O₂)

21. The main chemical reaction producing the molten iron is;



Calculate the mass of iron produced at most from the reaction of 480 g of Fe₂O₃ and 280 g of CO.
(Ans: 336 g Fe)

22. When 224 g of iron metal combines with a nonmetal element it forms a 352 g compound according to the following reaction;



Find the nonmetal in the reaction. (Ans: S)

23. Calculate the volume of hydrogen gas at STP required to reduce completely 100 kg of 65% magnetite by mass.
(Ans: 25100 L H₂)

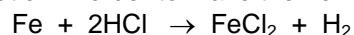
24. When a 150 g sample of iron (III) hydroxide is heated 80 g of iron (III) oxide is obtained with the reaction as follow;



Calculate the percentage purity of iron (III) hydroxide initially.

(Ans: 71.3% Fe(OH)₃)

25. A 2.8 g iron nail is placed into 36.5% of HCl solution by mass with a density of 1.02 g/mL. Calculate the volume of the solution in order to make the iron nail react completely.



(Ans: 10.2 mL HCl solution)