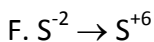
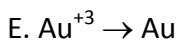
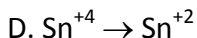
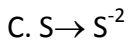
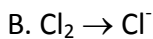
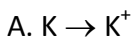


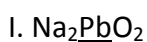
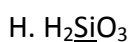
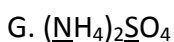
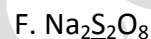
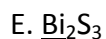
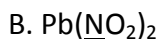
ELECTROCHEMISTRY

1. What does Redox mean?

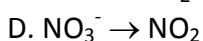
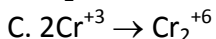
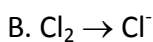
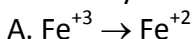
2. Complete and balance the following half-reactions. In each case indicate whether oxidation or reduction occurs.



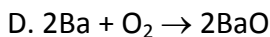
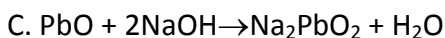
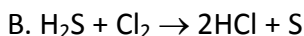
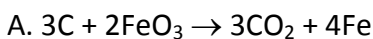
3. Find the oxidation numbers of the species underlined in these formulas



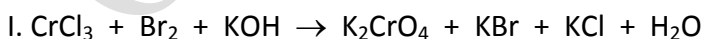
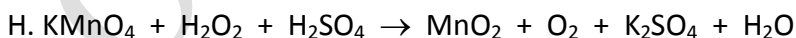
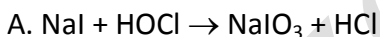
4. Classify each of the following changes as an oxidation or reduction.



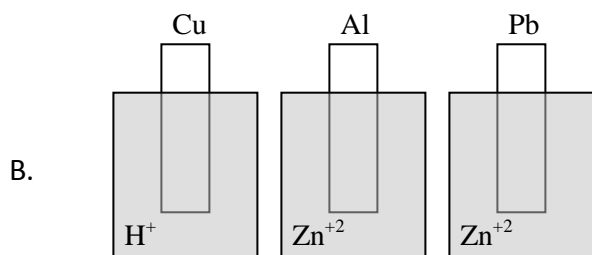
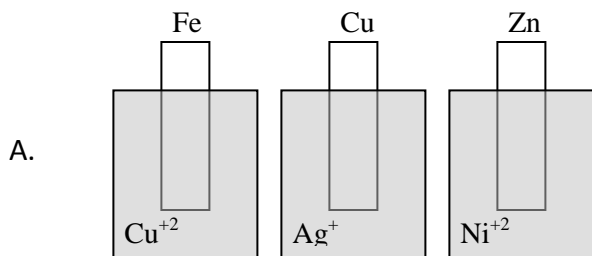
5. Identify the redox reactions, and indicate the oxidized substance, reduced substance, oxidizing and reducing chemicals for each redox reactions.



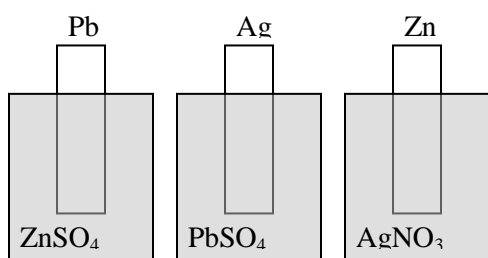
6. Balance the following redox reactions.



7. Write down the reactions in the following beakers if occurs.



8. Write down the reactions in the following three containers.

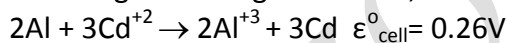


9. Write the cell reactions and calculate the standard cell potentials for the followings.

A. Sn/Sn⁺² and Pb/Pb⁺² electrodes

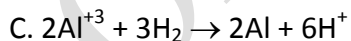
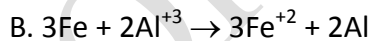
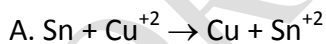
B. Mg/Mg⁺² and Cl₂/Cl⁻ electrodes

10. Using the data given below, calculate the standard oxidation potential of Cd to Cd⁺².



11. Is the reaction, $\text{Cr}^{+3} + \text{Fe}^{+2} \rightarrow \text{Cr}^{+2} + \text{Fe}^{+3}$, spontaneous under standard conditions?

12. Which of the following reactions are spontaneous under standard conditions?



13. Decide, by consulting the table, which one of the Cu, Ni, Ag produces H₂ gas from 1M HCl solutions?

14. Will Cadmium (II) ions oxidize metallic zinc to zinc ions or will zinc ions oxidize cadmium to cadmium (II) ions?

15. What is an electrochemical chemical cell?

16. Why is a salt bridge necessary in voltaic cell?

17. Draw an electrochemical cell in which the reaction is $3\text{Cd}_{(s)} + 2\text{Au}^{+3}_{(aq)} \rightarrow 3\text{Cd}^{+2}_{(aq)} + 2\text{Au}_{(s)}$

A. Show the anode and cathode.

B. Show the direction in which ions move in the salt bridge.

C. Show the direction in which the electrons move in the external circuit.

18. Calculate the standard cell potentials of the following cells. (Consult ϵ^0 table)

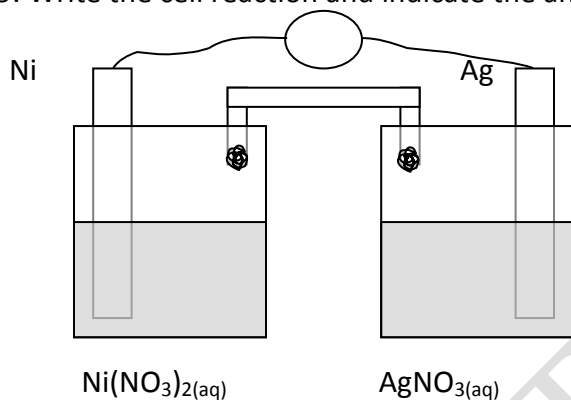
A. Zn/Zn^{+2} and Ni/Ni^{+2}

B. Al/Al^{+3} and Cu/Cu^{+2}

C. $\text{Pt}/(\text{Cl}_2/\text{Cl}^-)$ and Co/Co^{+2}

D. Pb/Pb^{+2} and $\text{Pt}(\text{H}_2/\text{H}^+)$

19. Write the cell reaction and indicate the anode and cathode.



20. Write the reaction and indicate the anode and cathode

