

KEY – FINAL EXAM – Form A (pink)

Multiple Choice

1. (D) 21.20%
2. (B) 5.30 g
3. (A) 113 g
4. (B) $8.82 \cdot 10^{-6}$ m
5. (D) P
6. (B) Fe–Fe
7. (D) PH₃
8. (C) 37.0 mL
9. (C) 2.667 M Ba(OH)₂
10. (C) $\text{Fe} + 2\text{FeBr}_3 \rightarrow 3\text{FeBr}_2$
11. (A) 2.62 L
12. (D) 26.5 g/mol
13. (B) 13.6 atm
14. (A) Dichloromethane
15. (A) 106 g/mol

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Free Response

16. Co_2O_3

17. (a) $\text{Sr}(\text{OH})_2$ – electrolyte

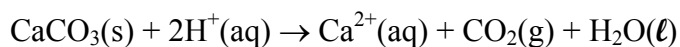
(b) AlPO_4 – nonelectrolyte

(c) $\text{K}_2\text{C}_2\text{O}_4$ – electrolyte

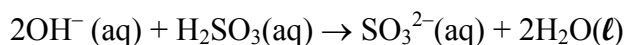
(d) HClO_3 – electrolyte

(e) TiO_2 – nonelectrolyte

18. (a) $\text{CaCO}_3(\text{s}) + 2\text{H}^+(\text{aq}) + 2\text{Cl}^-(\text{aq}) \rightarrow \text{Ca}^{2+}(\text{aq}) + 2\text{Cl}^-(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\ell)$



(b) $2\text{Na}^+(\text{aq}) + 2\text{OH}^-(\text{aq}) + \text{H}_2\text{SO}_3(\text{aq}) \rightarrow 2\text{Na}^+(\text{aq}) + \text{SO}_3^{2-}(\text{aq}) + 2\text{H}_2\text{O}(\ell)$



19. $\ell = 0, 1, 2, 3$

20. (a) $\text{Ge} - 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^2$

(b) $\text{Ni} - 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8$

21. (a) 2 unpaired electrons

(b) 1 unpaired electron

22. (a) Ga +3 F -1

(b) H +1 Se +4 O -2

(b) Na +1 Mo +6 O -2

23. (a) $\text{Ca} \cdot + 2 \cdot \ddot{\text{I}} \cdot \rightarrow [\text{Ca}^{2+}][\ddot{\text{I}}:]_2$

(b) $\cdot \ddot{\text{Cl}} \cdot + \cdot \ddot{\text{Cl}} \cdot \rightarrow \ddot{\text{Cl}}:\ddot{\text{Cl}}:$

24. (a) $[\text{H}:\ddot{\text{N}}:\text{H}]^-$ (b) $\ddot{\text{S}}::\text{C}::\ddot{\text{S}}$

25. (a) Electronic geometry – trigonal planar

Molecular geometry – trigonal planar

Hybridization – sp^2

(b) Electronic geometry – trigonal bipyramidal

Molecular geometry – seesaw

Hybridization – sp^3d

26. (a) $\text{Pd} + \text{H}_2\text{SO}_4 \rightarrow$ no reaction

(b) $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$

$\text{Cu}(\text{s}) + 2\text{Ag}^+(\text{aq}) + 2\text{NO}_3^-(\text{aq}) \rightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{NO}_3^-(\text{aq}) + 2\text{Ag}(\text{s})$

$\text{Cu}(\text{s}) + 2\text{Ag}^+(\text{aq}) \rightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{Ag}(\text{s})$

27. According to the Lewis theory, acid acts as an electron pair acceptor and base acts as an electron pair donor.

28.

Liquid	Normal boiling point	Boiling point at 400 torr
Nitromethane	102°C	85°C
Ethanol	80°C	65°C
Propylamine	48°C	33°C

29. Net ionic equation: $2\text{MnO} + 5\text{PbO}_2 + 8\text{H}^+ \rightarrow 2\text{MnO}_4^- + 5\text{Pb}^{2+} + 4\text{H}_2\text{O}$

Formula unit equation: $2\text{MnO} + 5\text{PbO}_2 + 10\text{HNO}_3 \rightarrow 2\text{HMnO}_4 + 5\text{Pb}(\text{NO}_3)_2 + 4\text{H}_2\text{O}$