Chemical Reactions
Practice Test

75/75

Part A: Multiple Choice (10 marks)
Select the best answer and then transfer your answers to the SCANTRON provided.

1. When a piece of magnesium metal is placed into a test tube of hydrochloric acid, bubbles from. What type of reaction is this?
(a) synthesis **(c) single displacement**
(b) decomposition (d) double displacement

2. When sodium bicarbonate is heated in a test tube, water vapour, carbon dioxide gas and a solid remains. What type of reaction is this?
(a) synthesis (c) single displacement
(b) decomposition (d) double displacement

3. Barium oxide added to water will undergo what type of reaction?
(a) synthesis (c) single displacement
(b) decomposition (d) double displacement

4. Which cation would be able to displace lead in a solution of $PbCl_{2(aq)}$
(a) Cr^{+3} (c) Ag^{+1}
(b) Hg^{+1} (d) H^{+1}

5. If sodium nitrate is added to potassium iodide, you would see:
(a) bubbles (c) colour change
(b) precipitate **(d) no change**

6. Which anion would be able to displace fluorine in a solution of sodium fluoride?
(a) I^{-1} (c) N^{-3}
(b) O^{-2} **(d) none of the above**

7. When the following equation is balanced correctly, what is the sum of all the coefficients in front of the reactants and products?
$H_2SO_{4(aq)} + Al(OH)_{3(aq)} \rightarrow Al_2(SO4)_{3(aq)} + H_2O$
(a) 5 (c) 7
(b) 11 **(d) 12**

8. When balanced correctly, what is the sum of all the coefficients in front of the reactants and products?
$C_3H_{6(g)} + O_{2(g)} \rightarrow CO_{2(g)} + H_2O_{(g)}$
(a) 18 (b) 21 **(c) 23** (d) 10

9. What is the charge of Sn in SnO_2
(a) +4 (c) +2
(b) -2 (d) - 4

10. The correct name for $CoHBO_3$ is
(a) cobaltic biborate
(b) cobaltous hydrogenbromate
(c) cobalt(III)hydrogenborate
(d) cobalt(II)biborate

Part B: True/False (10 marks) Select A for True and B for False.

11. During single displacement reactions, hydrogen should be treated as a non-metal. FALSE

12. Ammonium hydroxide decomposes into ammonia gas and water. TRUE

13. Carbonic acid decomposes into water and carbon dioxide gas. TRUE

14. Most reactions need energy, pressure, or a catalyst added to them to react. TRUE

15. The products of complete combustion are $CO_{2(g)}$, $H_2O_{(g)}$, $CO_{(g)}$, and $C_{(s)}$ FALSE

16. The solubility table is used to predict the states of a double displacement reaction. TRUE

17. There is only one correct name for $CuCl_2$ FALSE

18. In a reaction of $Li_{(s)} + PbCl_{2(aq)}$, Li's sound would be ROARRRRRR! (i.e. more reactive) TRUE

19. Colour change is one of the three clues that a double displacement reaction has occurred. FALSE

20. A reaction will occur between $NaOH_{(aq)}$ and $H_2SO_{4(aq)}$ TRUE

Part C: Short Answer (55 marks)

Answer the following questions in the space provided.

21. Complete the following chart by either writing the chemical formula or name. (15 marks)

Chemical Name	**Chemical Formula**
sodium borate	**Na_3BO_3**
lithium carbide	Li_4C
manganese(III)thiosulphite	**$Mn_2(S_2O_2)_3$**
rubidium nitride	Rb_3N
auric phosphate	**$AuPO_4$**
ammonium chlorite	NH_4ClO_2
nitrogen pentaiodide	**NI_5**
Mercury(I)hyponitrite OR mercurous hyponitrite	HgNO
Magnesium bicarbonite	**$Mg(HCO_2)_2$**
triphosphorus hexoxide	P_3O_6
chlorine gas	**$Cl_{2(g)}$**
hydroselenic acid	$H_2Se_{(aq)}$
sulphurous acid	**$H_2SO_{3(aq)}$**
$HFO_{(aq)}$	hypofluorous acid
stannous perbromate	**$Sn(BrO_4)_2$**

22. Balance the following equation **AND** then write its word equation (4 marks)

√ balanced equation (nice you didn't have to do anything this time

√ reactants √ products √ states

___ $MgO_{(s)}$ + ___$H_2O_{(l)}$ → ___ $Mg(OH)_{2(aq)}$

Solid magnesium oxide + liquid dihydrogen monoxide produces aqueous magnesium hydroxide

23. Balance the following equations and identify the type of reaction (6 marks)

(a) **_2_** C_3H_6 + **_9_**$O_{2(g)}$ → **_6_**$CO_{2(g)}$ + **_6__**$H_2O_{(g)}$ Type: **__c.c.__**

(b) ___$Al_2(SO_4)_{3(aq)}$ + **_3_**$Ba(NO_3)_{2(aq)}$ → **_2_**$Al(NO_3)_3$ + **_3_**$BaSO_{4(s)}$ Type: **__d.d._____**

(c) ___$S_{8(s)}$ + **_8_**$O_{2(g)}$ → **_8_**$SO_{2(g)}$ Type: **__synthesis__**

24. Predict the **products** for the reactions below. Then **BALANCE** the reaction. (10 marks)

(a) ___ $CO_{2(g)}$ + ___ $H_2O_{(l)}$ → ____**$H_2CO_{3(aq)}$**_____

(b) **_2_** $NaHCO_{3\,(s)}$ → _____**$Na_2CO_{3(s)}$ + $CO_{2(g)}$ + $H_2O_{(g)}$**_____

(c) **_2_** $Ba_{(s)}$ + ___ $O_{2(g)}$ → **_2_$BaO_{(s)}$**_____

(d) ___ $Be_{(s)}$ + ___ $I_{2(g)}$ → ___**$BeI_{2(s)}$**_____

(e) **_2_** $C_5H_{10(g)}$ + **_15_** $O_{2(g)}$ (excess) → **_10_$CO_{2(g)}$** + 10 **$H_2O_{(g)}$**_____

√ for products √ for balancing

25. With use of the activity series, predict the products for each reaction. **If there is no reaction,** write **NR, meaning no reaction**. If a reaction occurs, **complete the equation and balance it**!!! (5 marks)

a) **2**$HCl_{(aq)}$ + $Mg_{(s)}$ → ___**$MgCl_{2(aq)}$ + $H_{2(g)}$**_____

b) $BaCl_{2(aq)}$ + $Pb_{(s)}$ → _____**NR**_____

c) $F_{2(g)}$ + **2**$CsCl_{(aq)}$ → **__2_$CsF_{(aq)}$ + Cl_2**_____

d) $Au_{(s)}$ + $LiNO_{3(aq)}$ → ___**NR**_____

e) $PbCl_{2(aq)}$ + $Br_{2(q)}$ → ___**NR**_____

26. Predict the products of the following reactions and then if required, use the solubility chart provided to predict if a reaction will occur. **Make sure to include states and BALANCE the equation.** (6 marks) **√ products, √ balance, √ states**

a) **_2_** $Al(OH)_{3\,(aq)}$ + **_3_** $H_2S_{\,(aq)}$ → **_____$Al_2S_{3(aq)}$ + $6H_2O_{(l)}$_____**

b) ____ $PbCl_{2\,(aq)}$ + ____ $K_2Cr_2O_{7\,(aq)}$ → **__2_$KCl_{(aq)}$ + $PbCr_2O_{7(s)}$_____**

27. If a toilet had just been cleaned with toilet bowl cleaner, $HCl_{(aq)}$, describe what would happen to a pair of silver earings (including a balanced chemical equation, if one occurs) if the earings fell into the toilet while it was being cleaned.
(3 marks)

√ $Ag_{(s)}$ + $HCl_{(aq)}$ → NR
√ hydrogen is higher on the activity series and therefore silver will not displace H
√ the earings will remain unaffected.

28. Identify the most reactive non-metal on the periodic table. Explain why the element you chose is the most reactive metal. (3 marks)

√ most reactive non-metal is Fluorine
√ metals want to gain electrons to become stable. Fluorine is a halogen only needs 1 more e^- so this is easier than gaining two
√ Fluorine has the greatest electron affinity and EN so it can gain the 1 valence e^- the easiest and thus is the most reactive.

29. A chemical manufacturing plant accidently spilt toxic lead(II)sulphate into a tributary that feeds a city's local drinking water supply. Explain chemically (include a chemical equation), why water quality engineers chose to add calcium fluoride to the tributary in order to clean the spill.

√ $CaF_{2(aq)}$ + $PbSO_{4(aq)}$ → $CaSO_{4(aq)}$ + $PbF_{2(s)}$
√ by adding $CaF_{2(aq)}$ to the water PbF_2 will precipitate and then they can collect the precipitate by filtration and remove it from the water.
√ CaF_2 is non-toxic and if it enters the drinking water it would be the same as fluoridation in water.