8.1 Theories & Reactions of Acids & Bases

Question Paper

Course	DP IB Chemistry
Section	8. Acids & Bases
Topic	8.1 Theories & Reactions of Acids & Bases
Difficulty	Easy

Time allowed: 20

Score: /10

Percentage: /100

Question 1

Using your knowledge of the Brønsted-Lowry theory, which of the following correctly describes ammonia?

A. neutral

B. acid

C. base

D. amphoteric

[1 mark]

Question 2

In the Brønsted–Lowry theory of acids and bases, the difference between a conjugate acid and its conjugate base is the presence of which of the following?

A. a positive charge

B. a pair of electrons

C. a proton

D. a hydrogen atom

[1 mark]

Question 3

Which of the following ions or compounds is amphiprotic?

A. P_4O_{10}

B. PO_4^{3-}

C. HCO_3^-

D. Al_2O_3

[1 mark]

Question 4

In the following reaction, identify which two species are acting as Brønsted–Lowry acids

$$H_3PO_4(aq) + OH^-(aq) \rightleftharpoons H_2PO_4^-(aq) + H_2O(l)$$

A. $H_2PO_4^-(aq)$ and $OH^-(aq)$

B. $H_3PO_4(aq)$ and $H_2PO_4^-(aq)$

C. $H_2PO_4^-(aq)$ and $H_2O(l)$

D. $H_3PO_4(aq)$ and $H_2O(l)$

[1 mark]

Question 5

Potassium hydrogen carbonate reacts vigorously with dilute sulfuric acid. Identify the correct formulas of the substances produced in the reaction

A. $K_2SO_4 + H_2O + CO_2$

B. $K_2SO_4 + CO_2$

C. $KSO_4 + H_2O + CO_2$

D. $KSO_4 + H_2CO_3$

[1 mark]

Question 6

Copper(II) sulfate can be made by the reaction between dilute sulfuric acid and which of the following?

I. Cu
II. CuO
III. $CuCO_3$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

[1 mark]

Question 7

Which statement is correct for the following equation?

$$HSO_4^-(aq) + OH^-(aq) \rightleftharpoons SO_4^-(aq) + H_2O(l)$$

A. OH^- and H_2O are an acid and conjugate base pair

B. SO_4^- is acting as Brønsted–Lowry acid

C. HSO_4^- and SO_4^- are a base and conjugate acid pair

D. OH^- and H_2O are a base and conjugate acid pair

[1 mark]

Question 8

Which row shows the correct acid and base needed to make the salt specified?

	Acid	Base	Salt
A	$NaHCO_3$	SO_2	Na_2SO_4
B	HNO_3	SO_3	$(NH_4)_2SO_4$
C	H_2SO_4	ZnO	$ZnSO_3$
D	H_2SO_4	NH_4OH	$(NH_4)_2SO_4$

[1 mark]

Question 9

Which is a conjugate acid-base pair?

$$HCO_3^-(aq) + H_2O(l) \rightleftharpoons CO_3^{2-}(aq) + H_3O^+(aq)$$

A. HCO_3^- / H_3O^+

B. HCO_3^- / CO_3^{2-}

C. H_2O / CO_3^{2-}

D. HCO_3^- / H_2O

[1 mark]

Question 10

Which coefficients balance the following acid-base equation?

$$Al(OH)_3\,(s) + HNO_3\,(aq) \rightleftharpoons Al(NO_3)_3\,(aq) + H_2O\,(l)$$

A	3	1	3	1
B	2	2	1	3
C	1	3	1	3
D	1	2	1	2

[1 mark]