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	Medium

Time allowed: 20

Score: /10

Percentage: /100

Question 1

The typical reactions of dilute acids include them being able to react with

I. $NaHCO_3$
II. Mg
III. Cu

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

[1 mark]

Question 2

The following reaction occurs between concentrated sulfuric and nitric acids.

$$H_2SO_4 + HNO_3 \rightleftharpoons H_2NO_3^+ + HSO_4^-$$

Identify the two species which are acting as Brønsted–Lowry bases.

A. $H_2NO_3^+$ and HSO_4^-

B. HNO_3 and $H_2NO_3^+$

C. H_2SO_4 and HSO_4^-

D. HNO_3 and HSO_4^-

[1 mark]

Question 3

What role does each species play in the equilibrium below according to Brønsted-Lowry theory?

$$CH_3COOH + HCl \rightleftharpoons CH_3COOH_2^+ + Cl^-$$

	CH_3COOH	HCl	$CH_3COOH_2^+$	Cl^-
A	acid	base	base	acid
B	acid	base	acid	base
C	base	acid	base	acid
D	base	acid	acid	base

[1 mark]

Question 4

Perbromic acid, $HBrO_4$, is an example of a strong acid when dissolved in water. What is true about perbromic acid?

A. $HBrO_4$ is largely found as molecules in the solution

B. $HBrO_4$ solution reacts only with strong bases

C. $HBrO_4$ is fully dissociated in solution

D. $HBrO_4$ has a pH greater than 7

[1 mark]

Question 5

Potassium hydrogenphosphate has the formula K_2HPO_4. What is the conjugate base of this compound?

A. $H_2PO_4^-$

B. $KHPO_4^{2-}$

C. PO_4^{3-}

D. KH_2PO_4

[1 mark]

Question 6

For the equilibrium equation shown, which species are Brønsted-Lowry acids?

$$H_3NSO_3(aq) + 2NH_3(aq) \rightleftharpoons HNSO_3^{2-}(aq) + 2NH_4^+(aq)$$

A. NH_4^+ and NH_3

B. NH_4^+ and $HNSO_3^{2-}$

C. H_3NSO_3 and $HNSO_3^{2-}$

D. H_3NSO_3 and NH_4^+

[1 mark]

Question 7

Which would be formed when calcium oxide reacts with hydrochloric acid?

A. Calcium chloride and carbon dioxide

B. Calcium chloride, hydrogen gas and water

C. Calcium, hydrogen gas and water

D. Calcium chloride and water

[1 mark]

Question 8

What is the sum of the coefficients when the following acid-base equation is balanced?

$$\_HNO_3\,(aq) + \_Mg(HCO_3)_2\,(s) \rightarrow \_Mg(NO_3)_2\,(aq) + \_H_2O\,(l) + \_CO_2\,(g)$$

A. 5

B. 6

C. 7

D. 8

[1 mark]

Question 9

Which oxides react with calcium oxide?

I. SO_2
II. NO_2
III. K_2O

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

[1 mark]

Question 10

Which row correctly describes the reaction specified?

	Reaction	Energy change
A	metal displacement	endothermic
B	neutralisation	exothermic
C	combustion	endothermic
D	melting ice	exothermic

[1 mark]