Acid/Base I Multiple Choice Provincial Practice

1.

Which of the following solutes is a non-electrolyte?

A. H_2CO_3
B. $H_2C_2O_4$
C. CH_3OCH_3
D. CH_3COOH

A. 1
B. 2
C. 3
D. 4

2.

Which solution will have the greatest electrical conductivity?

A. 0.50M HCl
B. 0.10M RbOH
C. 0.50M K_3PO_4
D. 2.0M $C_6H_{12}O_6$

A. 1
B. 2
C. 3
D. 4

3.

Which of the following is a characteristic that is common to bases?

A. They react with metals to produce OH^-.
B. They produce a yellow colour in bromthymol blue solution.
C. They produce solutions with $[OH^-]$ smaller than 1.0×10^{-7}M.
D. They produce solutions with $[H_3O^+]$ smaller than 1.0×10^{-7}M.

A. 1
B. 2
C. 3
D. 4

4.

What is a common substance found in solid drain cleaner?

A. Na
B. HCl
C. NaCl
D. NaOH

A. 1
B. 2
C. 3
D. 4

5.

Which of the following best describes a weak base?

	K_b	% Ionization
A.	very small	low
B.	very small	high
C.	very large	low
D.	very large	high

A. 1
B. 2
C. 3
D. 4

6.

Which acid has the strongest conjugate base?

A. H_2O_2
B. H_2CO_3
C. HCO_3^-
D. $HC_2O_4^-$

A. 1
B. 2
C. 3
D. 4

7.

Which equation represents the reaction of a Brønsted-Lowry base with water?

A. $2Na + 2H_2O \rightarrow 2NaOH + H_2$
B. $N_2H_4 + H_2O \rightleftarrows N_2H_5^+ + OH^-$
C. $HPO_4^{2-} + H_2O \rightleftarrows H_3O^+ + PO_4^{3-}$
D. $H_2C_2O_4 + H_2O \rightleftarrows H_3O^+ + HC_2O_4^-$

A. 1
B. 2
C. 3
D. 4

8.

Given the equilibrium:

$$H_2BO_3^- + H_2PO_4^- \rightleftarrows H_3BO_3 + HPO_4^{2-}$$

Which is the strongest acid?

A. HPO_4^{2-}

B. H_3BO_3

C. $H_2PO_4^-$

D. $H_2BO_3^-$

A. 1
B. 2
C. 3
D. 4

9.

What is produced when CH_3NH_2 acts as a base in water?

A. CH_3NH^-

B. $CH_3NH_3^+$

C. $CH_3NH_2^+$

D. $CH_2NH_2^-$

A. 1
B. 2
C. 3
D. 4

10.

What is the conjugate acid of the base $HAsO_4^{2-}$?

A. AsO_4^{3-}

B. $H_2AsO_4^{2-}$

C. $H_2AsO_4^-$

D. H_3AsO_4

A. 1
B. 2
C. 3
D. 4

11.

The following equilibrium favours the formation of products:

$$NH_2OH + CH_3NH_3^+ \rightleftarrows CH_3NH_2 + NH_3OH^+$$

Which species is the strongest acid?

A. NH_3OH^+

B. NH_2OH

C. CH_3NH_2

D. $CH_3NH_3^+$

A. 1
B. 2
C. 3
D. 4

12.
What is the equilibrium expression for the water ionization constant?

A. $K_w = K_a \times K_b$

B. $K_w = 1.0 \times 10^{-14}$

C. $K_w = pH + pOH$

D. $K_w = [H_3O^+][OH^-]$

A. 1
B. 2
C. 3
D. 4

13.
What is the $[H_3O^+]$ in 100.0 mL of 0.0050 M NaOH?

A. 5.0×10^{-17} M

B. 2.0×10^{-13} M

C. 2.0×10^{-12} M

D. 2.0×10^{-11} M

A. 1
B. 2
C. 3
D. 4

14.

Given that the ionization of water is endothermic, which of the following is true if temperature is decreased?

	K_w	Reason
A.	decreases	equilibrium shifts left
B.	decreases	equilibrium shifts right
C.	increases	equilibrium shifts left
D.	increases	equilibrium shifts right

A. 1
B. 2
C. 3
D. 4

15.
At a given temperature a sample of pure water has a pH = 7.10. Which of the following is true?

	Sample	Reason
A.	acidic	pH > 7.00
B.	basic	pH > 7.00
C.	neutral	pOH < pH
D.	neutral	$[H_3O^+] = [OH^-]$

A. 1
B. 2
C. 3
D. 4

16.

What is the pH of a 2.5 M KOH solution?

A. −0.40
B. 0.40
C. 13.60
D. 14.40

A. 1
B. 2
C. 3
D. 4

17.

What is the [KOH] in a KOH solution that has a pH = 12.00?

A. 0.010 M
B. 0.56 M
C. 2.0 M
D. 1.0×10^{-12} M

A. 1
B. 2
C. 3
D. 4

18.

A 25.0 mL sample of a diprotic weak acid is titrated with 20.2 mL of 0.10 M NaOH. What is the concentration of the acid?

A. 0.040 M
B. 0.080 M
C. 0.16 M
D. 0.12 M

A. 1
B. 2
C. 3
D. 4

19.

A 25.0 mL sample of the weak acid H_2S is titrated with 31.8 mL of 0.30 M NaOH (a strong base). What is the concentration of the acid?

A. 0.19 M
B. 0.24 M
C. 0.38 M
D. 0.76 M

A. 1
B. 2
C. 3
D. 4

20.

Oxalic acid dihydrate is a pure, stable, crystalline substance. Which of the following describes one of its uses in acid-base titrations?

A. buffer
B. primary standard
C. chemical indicator
D. stoichiometric indicator

A. 1
B. 2
C. 3
D. 4

21.

When 25.0 mL samples of the strong acid H_2SO_4 were titrated with 0.25 M NaOH the following results were obtained:

Titration	Volume of NaOH(aq)
1	47.2 mL
2	39.9 mL
3	40.1 mL

What is the concentration of the H_2SO_4 sample?

A. 0.20 M
B. 0.21 M
C. 0.40 M
D. 0.42 M

A. 1
B. 2
C. 3
D. 4