سلطنة عمان
وزارة التربية والتعليم

امتحان دبلوم التعليم العام للمدارس الخاصة (ثنائية اللغة)
للعام الدراسي ١٤٣٨/١٤٣٩ هـ - ٢٠١٧ / ٢٠١٨ م
الدور الأول - الفصل الدراسي الثاني

تنبيه:
- المادة: الكيمياء.
- الأسئلة في (١٥) صفحة.
- زمن الإجابة: ثلاث ساعات.
- الإجابة في الورقة نفسها.

تعليمات مهمة:

- يجب الحضور إلى قاعة الامتحان قبل عشر دقائق على الأقل من بدء زمن الامتحان.
- يجب إحضار أصل ما يثبت الهوية وإبرازها للعاملين بالامتحانات.
- يجب الالتزام بالزي (الدشداشة البيضاء والمصر أو الكمة للذكور) والزي المدرسي للطالبات ، ويستثنى من ذلك الدارسون من غير العمانيين بشرط الالتزام بالذوق العام، ويمنع على جميع المتقدمات ارتداء النقاب داخل المركز وقاعات الامتحان.
- يحظر على الممتحنين اصطحاب الهواتف النقالة وأجهزة النداء الآلي وآلات التصوير والحواسيب الشخصية والساعات الرقمية الذكية والآلات الحاسبة ذات الصفة التخزينية والمجلات والصحف والكتب الدراسية والدفاتر والمذكرات والحقائب اليدوية والآلات الحادة أو الأسلحة أياً كان نوعها وأي شيء له علاقة بالامتحان.
- يجب على الممتحن الامتثال لإجراءات التفتيش داخل المركز طوال أيام الامتحان.
- يجب على الممتحن التأكد من استلام دفتر امتحانه، مغلفاً بغلاف بلاستيكي شفاف وغير ممزق ، وهو مسؤول عنه حتى يسلمه لمراقبي اللجنة بعد الانتهاء من الإجابة.
- يجب الالتزام بضوابط إدارة امتحانات دبلوم التعليم العام وما في مستواه وأية مخالفة لهذه الضوابط تعرضك للتدابير والإجراءات والعقوبات المنصوص عليها بالقرار الوزاري رقم ٥٨٨ / ٢٠١٥.
- يقوم المتقدم بالإجابة عن أسئلة الامتحان المقالية بقلم الحبر (الأزرق أو الأسود).
- يقوم المتقدم بالإجابة عن أسئلة الاختيار من متعدد بتظليل الشكل (▭) وفق النموذج الآتي:

س - عاصمة سلطنة عمان هي:

▭ القاهرة ▭ الدوحة

■ مسقط ▭ أبوظبي

ملاحظة: يتم تظليل الشكل (■) باستخدام القلم الرصاص وعند الخطأ، امسح بعناية لإجراء التغيير.

صحيح ■ **غير صحيح** ▭ ◉ ◔ ☒ ☑

مُسَوَّدَة، لا يتم تصحيحها

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Question 1: Multiple Choice Items (28 marks)

There are 14 multiple-choice items worth two marks each.
Shade in the bubble (⬭) next to the **correct** answer for each of the following items.

1) Which of the following conditions are the best for the contact process?

	Temperature (°C)	Pressure (kPa)	Catalyst
⬭	900	700	Platinum/ rhodium
⬭	450	103	Vanadium(v) oxide
⬭	300	150	Platinum/ rhodium
⬭	250	500	Vanadium(v) oxide

2) In the equilibrium system below:

$$2SO_{3(g)} \rightleftharpoons 2SO_{2(g)} + O_{2(g)}$$

Which of the following statements is correct about the rate of decomposition of $SO_{3(g)}$ at equilibrium?

⬭ It is double the rate of formation of $O_{2(g)}$.
⬭ It is half the rate of formation of $SO_{2(g)}$.
⬭ It equals the rate of formation of $SO_{3(g)}$.
⬭ It is double the rate of formation of $SO_{3(g)}$.

Question 1 continued

Consider the following equilibrium system to answer questions 3 and 4:

$$2CrO_{4\,(aq)}^{2-} + 2H^{+}_{(aq)} \rightleftharpoons Cr_2O_{7\,(aq)}^{2-} + H_2O_{(l)}\,, \quad \Delta H > 0$$

3) When a solution of $Ba(NO_3)_2$ is added, some of $CrO_{4\,(aq)}^{2-}$ ions are precipitated as $BaCrO_{4(s)}$. What will be the change in the concentrations of $CrO_{4\,(aq)}^{2-}$ and $Cr_2O_{7\,(aq)}^{2-}$ as a result of adding $Ba(NO_3)_2$?

	$[CrO_{4\,(aq)}^{2-}]$	$[Cr_2O_{7\,(aq)}^{2-}]$
☐	Increases then decreases	Decreases
☐	Increases then decreases	Increases
☐	Decreases then increases	Increases
☐	Decreases then increases	Decreases

4) Which of the following changes will increase the precipitating of $BaCrO_{4(s)}$ if more $Ba(NO_3)_2$ is added?

I. Adding 2.0M KOH.

II. Increasing $[Cr_2O_{7\,(aq)}^{2-}]$.

III. Decreasing the pressure.

IV. Increasing the temperature.

☐ I and II ☐ I and III

☐ II and III ☐ II and IV

5) Certain conditions provide less than 10% yield of NH_3 in Haber process at equilibrium. Which of the following options describes this equilibrium?

	K_{eq}	Equilibrium position
☐	Large	Favours products
☐	Small	Favours products
☐	Large	Favours reactants
☐	Small	Favours reactants

Question 1 continued

6) The reaction shown below is at equilibrium:

$$N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)} \quad K_{eq} = 0.133 \text{ mol.dm}^{-3}$$

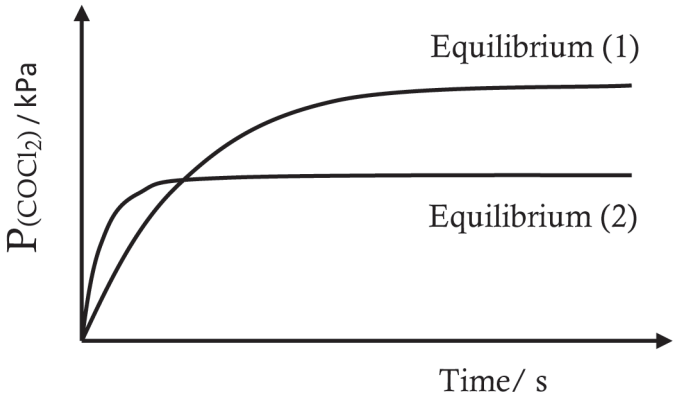
Which of the following expressions represents the concentration of $[N_2O_{4(g)}]$?

- ☐ $[N_2O_{4(g)}] = \dfrac{0.133}{[NO_{2(g)}]}$
- ☐ $[N_2O_{4(g)}] = \dfrac{[NO_{2(g)}]}{0.133}$
- ☐ $[N_2O_{4(g)}] = \dfrac{0.133}{[NO_{2(g)}]^2}$
- ☐ $[N_2O_{4(g)}] = \dfrac{[NO_{2(g)}]^2}{0.133}$

7) Consider the following equilibrium system:

$$CO_{(g)} + Cl_{2(g)} \rightleftharpoons COCl_{2(g)}$$

The graph below shows the partial pressure of $COCl_2$ at equilibrium (1) at temperature (T_1) and at equilibrium (2) at temperature (T_2).



Which of the following conclusions is correct?

	Temperature	The forward reaction	Equilibrium constant
☐	$T_2 > T_1$	Endothermic	$K_p2 < K_p1$
☐	$T_2 > T_1$	Exothermic	$K_p2 < K_p1$
☐	$T_2 < T_1$	Exothermic	$K_p2 > K_p1$
☐	$T_2 < T_1$	Endothermic	$K_p2 > K_p1$

Question 1 continued

8) Which of the following is a strong acid?

- ☐ HNO_3
- ☐ HCOOH
- ☐ HF
- ☐ C_6H_5OH

9) Which of the following properties is correct about a solution with concentration of 0.1 mol dm^{-3} and pH = 8.0?

- ☐ It is a weak acid.
- ☐ It dissociates partially in water.
- ☐ It accepts protons easily.
- ☐ It turns blue litmus paper to red.

10) Two clear solutions of equal concentrations are placed in two separate beakers. The first solution has a pH of 4.0, and the pH of the second solution is unknown. When the two solutions are mixed, the resulting pH is 5.0

Which of the following conclusions about the second solution is correct?

- ☐ It has a higher concentration of OH^-.
- ☐ It is more acidic than the first solution.
- ☐ Its pH is lower than 5.0.
- ☐ It has greater K_a.

11) What is the base/ conjugate acid pair in the following reaction?

$HClO_4 + H_2O \longrightarrow H_3O^+ + ClO_4^-$

- ☐ H_2O/ ClO_4^-
- ☐ $HClO_4$/ ClO_4^-
- ☐ H_2O/ H_3O^+
- ☐ $HClO_4$/ H_3O^+

Do not write in this space

Question 1 continued

Use the following information about five hypothetical half cells to answer questions (12), (13) and (14):

Half cell	E^0/ V
$W^{2+}(aq) \mid W(s)$	– 0.13
$Y^{2+}(aq) \mid Y(s)$	– 1.18
$Z^{+}(aq) \mid Z(s)$	+ 0.80
$M^{3+}(aq) \mid M(s)$	– 0.74
$X^{2+}(aq) \mid X(s)$	– 0.14

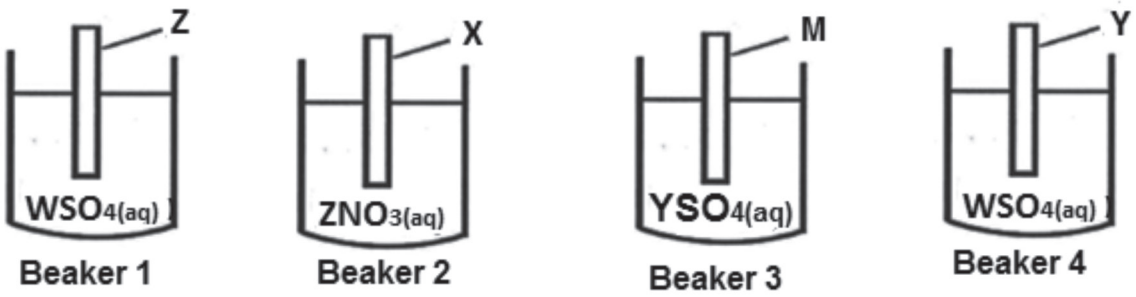
12) Which two metals would construct an electrochemical cell with the lowest electromotive force (E^0 Cell)?

- ☐ W(s) and X(s)
- ☐ Y(s) and Z(s)
- ☐ Y(s) and M(s)
- ☐ W(s) and Z(s)

13) Which metal has the strongest tendency to liberate hydrogen gas from an acid?

- ☐ Z
- ☐ M
- ☐ Y
- ☐ W

14) In which of the following beakers no reactions take place?



- ☐ Beakers 1 and 2.
- ☐ Beakers 3 and 4.
- ☐ Beakers 2 and 4.
- ☐ Beakers 1 and 3.

Extended Questions (42 marks)

Write your answer for each of the following questions in the space provided.
Be sure to show all your work, including the correct units where applicable.

15) The production of ammonia by Haber process involves the following equilibrium system:

$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ $\Delta H < 0$

The table below indicates the percentages of ammonia in the equilibrium mixtures at various temperatures:

Temperature °C	% Ammonia in the equilibrium
200	98
350	80
400	51

a. What is the catalyst used in this process?

b. Explain why the lower temperature results in a higher percentage of ammonia in the equilibrium mixtures.

c. Explain why a temperature of 400°C is used in Haber process rather than a lower temperature.

Question 2 continued

16) a. The reaction between copper (II) ions and chloride ions is as follows:

$$\underset{\text{blue}}{Cu^{2+}_{(aq)}} + 4Cl^-_{(aq)} \rightleftharpoons \underset{\text{yellow}}{CuCl^{2-}_{4\ (aq)}}$$

The equilibrium mixture appears blue when it placed in an ice bath.

Is the backward reaction endothermic or exothermic? Explain your answer.

☐ Endothermic

☐ Exothermic (Shade in one box)

Explanation: _____

_____

_____

b. Consider the following equilibrium system in a closed vessel:

$$N_2H_{4(g)} + 2O_{2(g)} \rightleftharpoons 2NO_{(g)} + 2H_2O_{(g)}$$

What is the effect on the position of the equilibrium if the volume of the reaction vessel is increased? Explain your answer.

Effect: _____

Explanation: _____

_____

_____

Question 2 continued

17) During a thunderstorm, lightning enables nitrogen to react with oxygen to form nitrogen monoxide in a reversible reaction. At 827°C the K_p of this reaction is 4×10^{-8}.

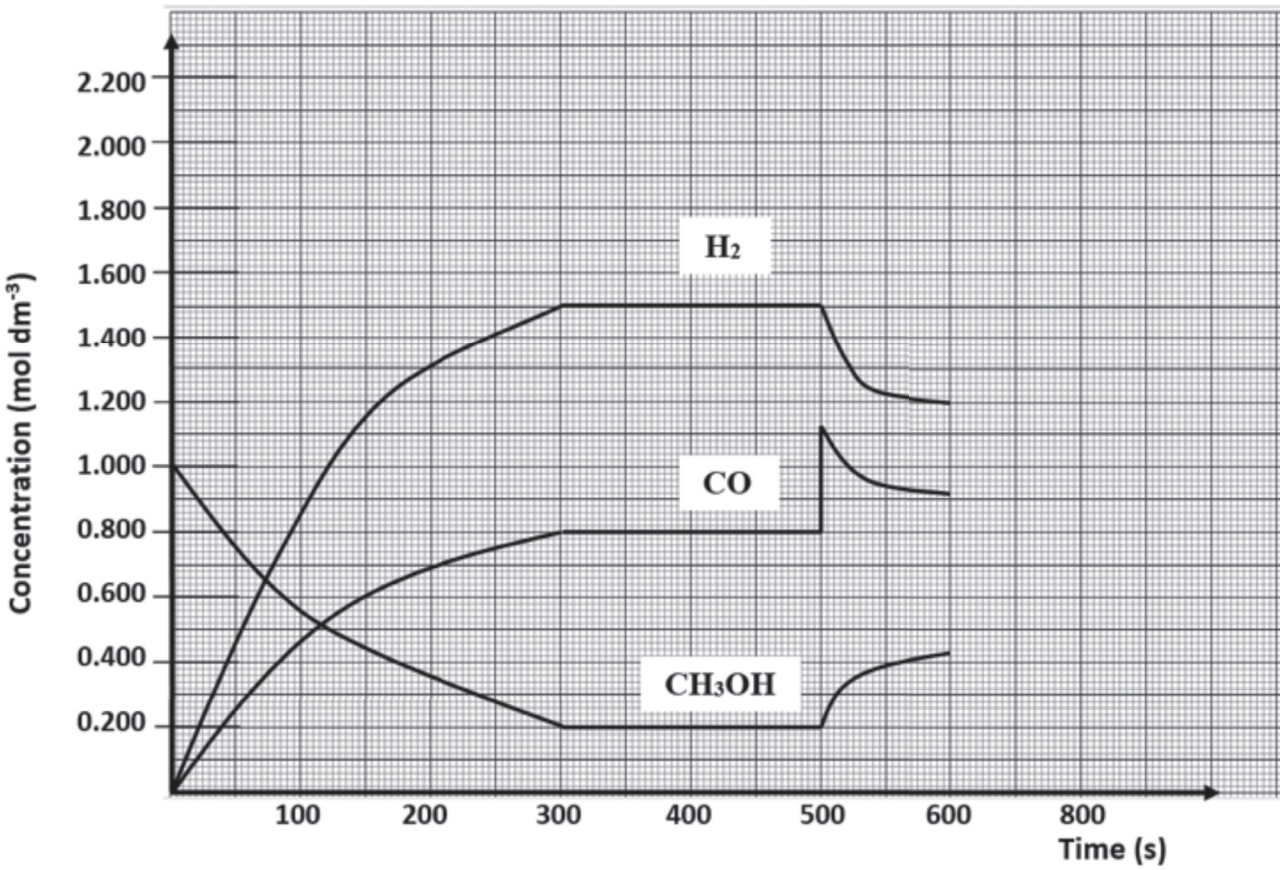
a. Calculate the value of K_p for the following reaction at 827°C.

$2NO_{(g)} \rightleftharpoons N_{2(g)} + O_{2(g)}$

b. What will happen to the value of K_p of formation of $NO_{(g)}$ at the high temperatures generated by a flash of lightning? Explain your answer.

Question 2 continued

18) The graph below shows the changes in concentrations of $H_{2(g)}$, $CH_3OH_{(g)}$ and $CO_{(g)}$ in an equilibrium mixture with time at 25°C. Study it to answer the following questions:



a. Write the chemical equation for this equilibrium system.

_____

b. Write the equilibrium constant K_c expression for this reaction.

_____

c. At what time the reaction reaches equilibrium?

_____

d. What is the action that causes the concentration changes at 500 seconds?

_____

Question 2 continued

e. When the same reaction is repeated in another experiment with the same temperature condition (25°C), 1.400 mol dm^{-3} of $CO_{(g)}$ and 1.800 mol dm^{-3} of $H_{2(g)}$ were in the equilibrium mixture. Calculate the concentration of $CH_3OH_{(g)}$.

19) Formic acid (HCOOH) is stronger than acetic acid (CH_3COOH) with equal concentrations at 25°C and its conjugate base is $HCOO^-$. Use this information to answer the following questions.

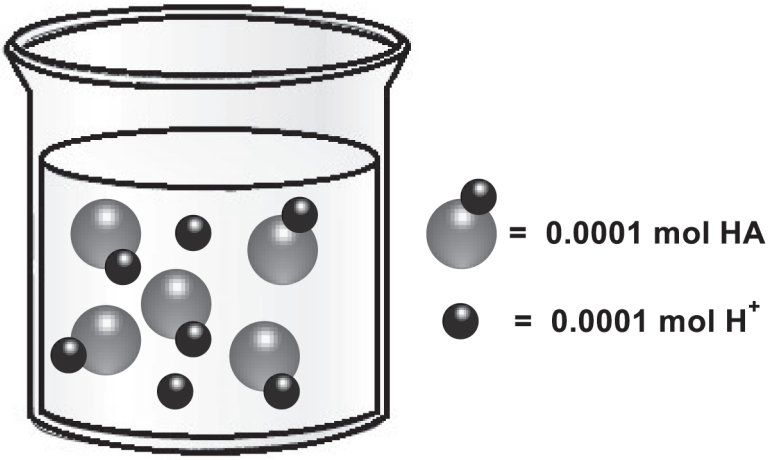
a. What is meant by conjugate base?

b. Write the dissociation equation for formic acid.

c. Which one has more tendency to accept protons ($HCOO^-$ or CH_3COO^-)? Justify your answer.

Question 2 continued

20) HA is a weak acid added to water to make a solution of 1.0 L. It dissociated as shown in the diagram below (only H^+ and HA are shown). Study the diagram to answer the following questions.



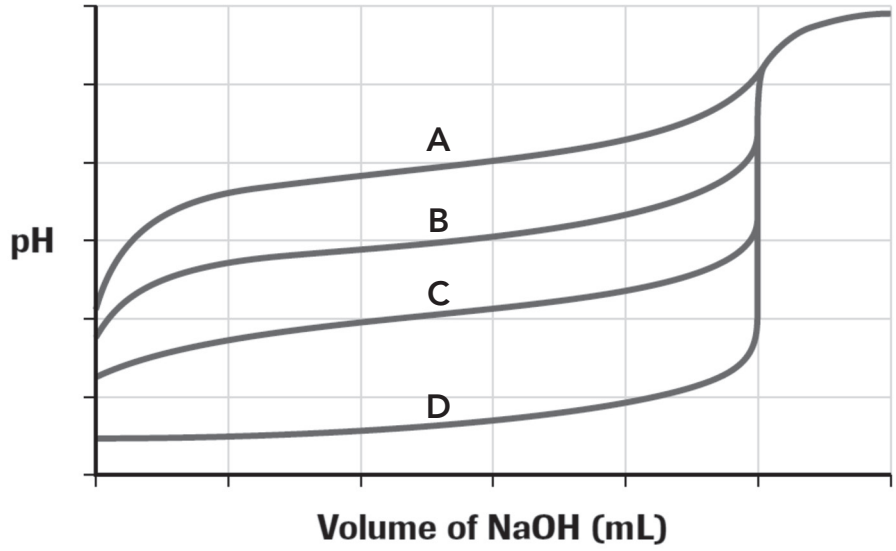
a. Explain why weak acids produce less H^+ ions than strong acids.

b. Calculate the K_a of this acid.

c. What species could be added to this solution to make a buffer?

Question 2 continued

21) The graph below shows four curves for the titrations of four different acids with NaOH solution (Note: the concentration of each acid and NaOH solution is 0.1 mol.dm^{-3})



a. What is meant by equivalence point?

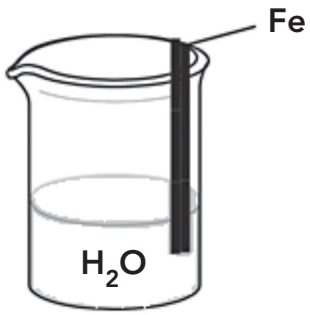
b. Which titration curve represents the titration of strong acid with NaOH? Explain your answer.

c. In which titration curve the acid used has the smallest K_a value?

Question 2 continued

22) The following diagram shows the reaction of (Fe) with water to form rust.

Study it to answer the questions below:



a. What is the oxidizing agent in this reaction?

b. Write the oxidation half reaction that takes place in the beaker.

c. What are the conditions required for rusting to take place?

d. Write the chemical formula of the complex compound of the rust formed on iron.

e. Why crystals of zinc are bolted onto the bin made of Iron?

Question 2 continued

23) Study the table below to answer the following questions:

	Z	X	Y
$X^{2+}_{(aq)}$	Reaction		Reaction
$Y^{+}_{(aq)}$	Reaction	No reaction	
$Z^{3+}_{(aq)}$		No reaction	No reaction

a. Arrange the standard electrodes X, Y and Z according to their strength as reducing agents from the weakest to the strongest.

_____ , _____ , _____

(Weakest) (Strongest)

b. For the electrochemical cell setup between (Z) and (X) half cells.

(i) Write the balanced equation for the overall cell reaction?

_____

_____

(ii) Write the cell diagram as a short-hand way for this cell?

_____

_____

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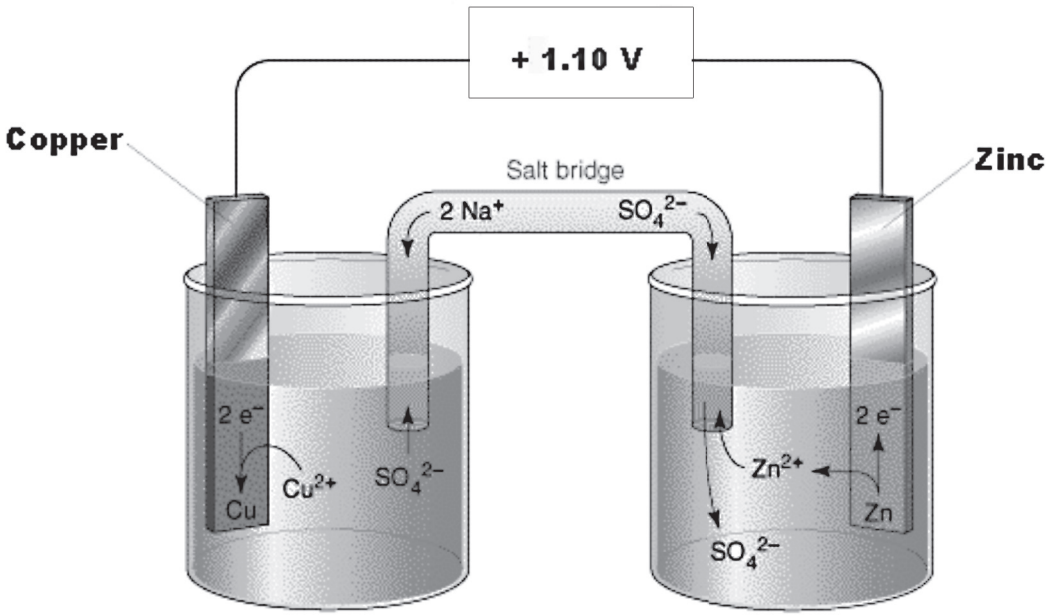
Question 2 continued

24) The following diagram shows an electrochemical cell setup between copper electrode and zinc electrode. Study it then answer the following question.



What is the direction of electron flow through the wire in this cell?
Explain your answer.

[End of Examination]

مُسَوَّدَة

MARKING GUIDE

GENERAL EDUCATION DIPLOMA

BILINGUAL PRIVATE SCHOOLS

SEMESTER TWO - FIRST SESSION

CHEMISTRY

2017 / 2018

General Education Diploma, Semester Two, First Session
Bilingual Private Schools, Chemistry, 2017/2018

Exam Specifications:

Topics of the units	Weighting	Multiple choice (40%)		Extended response (60%)		Cognitive levels			Total
		Number of questions	Marks	Number of questions	Marks	Knowing (30%)	Applying (50%)	Reasoning (20%)	
Equilibrium mixture	26 %	4	8	3	10	5	9	4	18
Equilibrium constant	19 %	3	6		7	4	7	2	13
Acid/base equilibria	31 %	4	8		14	7	11	4	22
Electrode potential	15 %	3	6		11	5	8	4	17
Total	100 %	14	28	3	42	21	35	14	70

General Education Diploma, Semester Two, First Session
Bilingual Private Schools, Chemistry, 2017/2018

Distribution of cognitive domains and marks.

Serial No	Question number	Item	Mark	Unit	Page	Cognitive domain	Output
1	1	1	2	Equilibrium mixture	361	Knowing	4
2	1	2	2	Equilibrium mixture	357	Applying	2
3	1	3	2	Equilibrium mixture	358	Applying	3
4	1	4	2	Equilibrium mixture	359-360	Reasoning	3
5	1	5	2	Equilibrium constant	363	Knowing	3
6	1	6	2	Equilibrium constant	368	Applying	1
7	1	7	2	Equilibrium constant	370,375	Reasoning	5
8	1	8	2	Acid/base equilibria	388	Knowing	1
9	1	9	2	Acid/base equilibria	392	Applying	5
10	1	10	2	Acid/base vequilibria	388	Reasoning	4
11	1	11	2	Acid/base equilibria		Applying	3
12	1	12	2	Electrode Potentials	412	Applying	5ii
13	1	13	2	Electrode Potentials	411	Applying	6
14	1	14	2	Electrode Potentials	411	Reasoning	5i
15	2	15.a	1	Equilibrium mixture	363	Knowing	4
16	2	15.b	1	Equilibrium mixture	363	Knowing	4
17	2	15.c	1	Equilibrium mixture	363	Knowing	4
18	2	16.a	2	Equilibrium mixture	360	Applying/ Reasoning	3
19	2	16.b	2	Equilibrium mixture	359	Applying/	3
20	2	17.a	1	Equilibrium constant	368,376	Knowing	2,6
21	2	17.b	1	Equilibrium constant	375,376	Knowing	5,6
22	2	18.a	1	Equilibrium constant	365	Applying	1
23	2	18.b	1	Equilibrium constant	368	Applying	1
24	2	18.c	1	Equilibrium mixture	357	Applying	3
25	2	18.d	1	Equilibrium mixture	358	Applying	3
26	2	18.e	5	Equilibrium constant	373,375	Applying/ Reasoning	4
27	2	19.a	1	Acid/base equilibria	382	Knowing	3
28	2	19.b	1	Acid/base equilibria	384	Knowing	6
29	2	19.c	2	Acid/base equilibria	384	Applying	2
30	2	20.a	1	Acid/base equilibria	384	Knowing	2

31	2	20.b	3	Acid/base equilibria	385	Reasoning	6
32	2	20.c	1	Acid/base equilibria	392	Applying	9
33	2	21.a	1	Acid/base equilibria	389	Knowing	7
34	2	21.b	2	Acid/base equilibria	391	Applying	7
35	2	21.c	1	Acid/base equilibria	391	Applying	7
36	2	22.a	1	Electrode Potentials	413	Knowing	7
37	2	22.b	1	Electrode Potentials	413	Knowing	7
38	2	22.c	1	Electrode Potentials	413	Knowing	7
39	2	22.d	1	Electrode Potentials	413	Knowing	7
40	2	22.e	1	Electrode Potentials	414	Knowing	8
41	2	23.a	1½	Electrode Potentials	411	Reasoning	5i
42	2	23.b.i	2	Electrode Potentials	408	Applying	6
43	2	23.b.ii	1	Electrode Potentials	409	Applying	3
44	2	24	1½	Electrode Potentials	408	Knowing	2

TOTAL PAGES: (5)

MARKS: 70

Question One **(28 Marks)**

There are 14 multiple-choice items. Each correct answer is worth TWO marks.

Item	Correct option	
1	b	450 103 Vanadium(v) oxide
2	c	It equals the rate of formation of $SO_{3(g)}$.
3	d	Decreases then increases Decreases
4	a	I and II
5	d	Small Favours reactants
6	d	d) $[N_2O_{4(g)}] = \frac{[NO_{2(g)}]^2}{0.133}$
7	b	T2 > T1 Exothermic $K_p2 < K_p1$
8	a	HNO_3
9	b	It dissociates partially in water.
10	a	It has a higher concentration of OH^-
11	c	H_2O/ H_3O^+
12	a	W(s) , X(s)
13	c	Y
14	d	Beaker 1 and 3.

Question Two (42 Marks)

Part	Section	The answer	The mark
15	a	Iron catalyst **or** Iron catalyst with traces of other metal oxides.	1
	b	The forward reaction is exothermic, giving out heat. So if the temperature is decreased the forward reaction is favoured, as this will raise the temperature. Therefore, at low temperature, the equilibrium mixture will have more NH_3.	1
	c	The rate of the reaction will be slower and the cost will be higher if a lower temperature is used.	1
16	a	The backward reaction is exothermic. (1 mark) When the system is cooled, it appears blue because the concentration of $Cu^{2+}_{(aq)}$ ions increases. It can be deduced that when the temperature is decreased, the system will undergo a net backward reaction so as to raise the temperature. Thus, the backward reaction should be an exothermic reaction. (1 mark)	2
	b	The position of equilibrium shifts to the right (products). (1 mark) Decreasing the pressure by increasing the volume, the position of equilibrium shifts to try to increase the pressure. It moves to the right, to the side with the more moles of gas molecules. (1 mark)	2
17	a	$K'_p = \frac{1}{K_p} = \frac{1}{4 \times 10^{-8}} = 25 \times 10^6$	1
	b	K_p increases. (½ mark) The forward reaction is endothermic as the temperature increases the position of the equilibrium will shift to the right, thereby reducing the temperature. The new equilibrium mixture will contain more of the products, and less reactants, than the original mixture. (½ mark)	1
18	a	$CH_3OH_{(g)} \rightleftharpoons CO_{(g)} + 2H_{2(g)}$ * *Balancing is unnecessary.*	1
	b	$K_c = \frac{[CO_{(g)}]\,[H_{2(g)}]^2}{[CH_3OH_{(g)}]}$	1
	c	300 s	1
	d	Adding $CO_{(g)}$	1

	e	$K_c = \frac{[CO_{(g)}]\,[H_{2(g)}]^2}{[CH_3OH_{(g)}]}$ $K_{c\,(1)} = \frac{(0.800)\,(1.500)^2}{(0.200)}$ 1 mark $= 9.00$ $mol^2\ dm^{-6}$ 1 mark 1 mark At constant temperature $K_{c\,(1)} = K_{c\,(2)}$ so $\frac{(1.400)\,(1.800)^2}{[CH_3OH_{(g)}]} = 9.00$ 1 mark $[CH_3OH_{(g)}] = 0.504$ mol dm^{-3} 1 mark	5
19	**a**	The associated base of an acid. Or the substance formed by the donation of proton of an acid.	1
	b	$HCOOH_{(aq)} \longrightarrow HCOO^-_{(aq)} + H^+_{(aq)}$ ** To get the mark all components should be correct.*	1
	c	CH_3COO^- (1 mark) Because $HCOO^-$ is a base coming from stronger acid, so it is weaker as a proton acceptor. (1 mark) Or: CH_3COO^- is a base coming from the weaker acid, so it is stronger as a proton acceptor.	2

20	**a**	- When weak acid molecules split up, the H^+ ions and negative ions in solution join up again to form the original un dissociated acid molecules. - It dissociates partially producing less H^+ ions compared to strong acids. - Its K_a is smaller than of strong acid. * *Any answer from the above mark is given.*	1
	b	$K_a = [H^+][A^-]/[HA]$ (½) $[H^+] = [A^-] = 2 \times 0.0001/1.0\ L$ $= 0.0002\ mol.dm^{-3}$ (1) $[HA] = 5 \times 0.0001/1.0\ L$ $= 0.0005\ mol.dm^{-3}$ (1) $K_a = (0.0002)^2/0.0005$ $= 8 \times 10^{-5}\ mol.dm^{-3}$ (½)	3
	c	Any salt of HA that has the ions (A^-).	1
21	**a**	The point where the concentration of the indicator equals the concentration of its conjugate base. Or The point at which acid and base neutralize each other. * *Any answer of the above mark is given.*	1
	b	D (1 mark) Because as shown in the diagram, the curve (D) starts from the lowest pH and hence the strongest acid. Or it has the largest sudden change in pH at end point. Or it has the largest vertical section at end point. (1 mark) * *Any answer of the above mark is given.*	2
	c	A	1

Continue Question Two

Part	Section	The answer	The mark
22	a.	Oxygen Or $O_{2(g)}$	1
	b.	$Fe_{(S)} \longrightarrow Fe^{2+}_{(aq)} + 2e$	1
	c.	Oxygen Or $O_{2(g)}$ or Air, Water Or $H_2O_{(l)}$ ½ mark ½ mark	1
	d.	$Fe(OH)_{3(s)}$ Or $Fe_2O_3.\times H_2O$	1
	e.	To protect iron from rusting Or to galvanise iron to protect it from rusting.	1

Part	Section	The answer	The mark
23	a	X , Y , Z (weakest) (strongest) *½ mark for each metal in its correct order*	1½
	b. i	$2Z_{(s)} + 3X^{2+}_{(aq)} \longrightarrow 2Z^{3+}_{(aq)} + 3X_{(s)}$ ** 1 mark for correct components and 1 mark for balancing.*	2
	b.ii	$Z_{(s)} \mid Z^{3+}_{(aq)} \vdots\vdots X^{2+}_{(aq)} \mid X_{(s)}$	1

Part	Section	The answer	The mark
24		From Zn electrode to Cu electrode. (½ mark) - Because $Zn_{(s)}$ is oxidized or $Cu^{2+}_{(aq)}$ is reduced. -Or Because Zn is anode and Cu is cathode. -Or Because E^o of Zn^{2+}/Zn is lower than of Cu^{2+}/Cu. ** Any other correct answer with reference to E^o or strength of reducing or oxidising agents mark is given.* (1 mark)	1½

This is the end of the Marking Guide