SAMPEL PERCUMA

Trial STPM 2021 Kimia Semester 1 Terengganu

Set penuh: Kertas Percubaan STPM

Sem 1 · Kimia

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JABATAN PENDIDIKAN NEGERI TERENGGANU

STPM 2021

PEPERIKSAAN PERCUBAAN SEMESTER 1

CHEMISTRY
962/1

Nama :.....

Kelas :.....

DISEDIAKAN OLEH PANEL AKRAM NEGERI TERENGGANU

Tidak dibenarkan menyunting atau mencetak mana-mana bahagian dalam modul ini tanpa kebenaran Pengarah Pendidikan Negeri Terengganu

Name : ..... NRIC : .....

962/1 **STPM 2021**

MODUL PERKEMBANGAN PEMBELAJARAN 1

CHEMISTRY

PAPER 1

Instructions to candidates:

Tear off pages 7 and 8 of your answer sheets of Section B and tie them together with your answer sheets of Section C.

Arahan kepada calon:

Koyakkan halaman 7 dan 8 helaian jawapan anda bagi Bahagian B dan ikatkannya bersama-sama dengan helaian jawapan anda bagi Bahagian C.

This question paper consists of **10** printed pages

For examiner's use (Untuk kegunaan pemeriksan)		
Section A (Bahagian A)		
Question Number	**Marks**	**Marks Obtained**
1 – 15	**15**	
Section B (Bahagian B)		
16	**8**	
17	**7**	
Section C (Bahagian C)		
18	**15**	
19	**15**	
20	**15**	
Total (Jumlah)	**60**	

Section A [15 *marks*]

Answer **all** *questions.*

Indicate the correct answer on the Multiple-choice Answer Sheet provided.

1 The Avogadro constant is defined as

A the amount of particles present in one mole of the substance
B the number of atoms in 12 g of carbon
C the number of atoms in 12 g of carbon-12
D the number of atoms in 12 g of an element

2 Which of the following species will be deflected the most in a mass spectrometer?

A $^{35}Cl_2^+$
B $^{37}Cl_2^+$
C $^{35}Cl^{-37}Cl^+$
D $^{35}Cl_2^{2+}$

3 Which of the following particles will have, on losing an electron, a half-filled orbitals?

A N
B N^-
C O^+
D O^-

4 Which one of the following molecules has an unpaired electron in its structure.

A N_2O_4
B BCl_3
C NO
D PH_3

5 What is the shape of the H_3O^+ ion?

A Tetrahedron
B Trigonal planar
C Trigonal pyramidal
D Linear

6 Which of the following compounds is expected to have the highest boiling point?

A $CH_3CH_2CH_2CH_2CH_2OH$
B $CH_3COCH_2CH_2CH_3$
C $(CH_3)_3CCH_2OH$
D $CH_3CH_2CH_2CH_2CH_3$

7 A gaseous of A and B contains N_A mol of A and N_B mol of B, has a total pressure of P. What is the partial pressure of gas B in the mixture?

A N_BP
B $(1-N_B)P$
C $\frac{N_BP}{N_A + N_B}$
D $\frac{N_AP}{N_A + N_BP}$

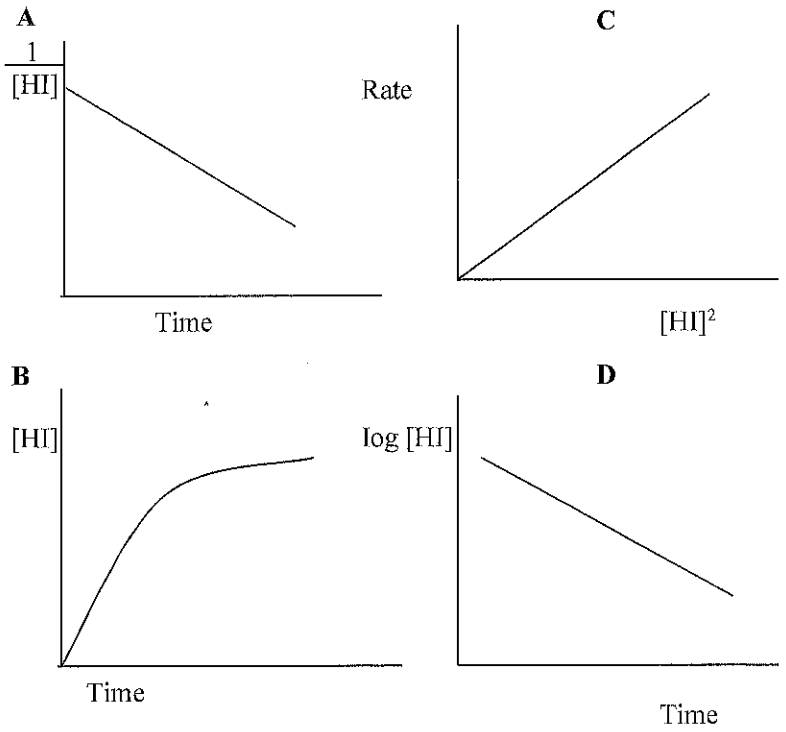
8 Which of the following statement is **not** true when ice melts?

A Melting point of ice decreases with increasing pressure.
B The distance between the H_2O molecules decreases.
C Its volume decreases.
D Heat is given off.

9 The thermal decomposition of hydrogen iodide is a second order reaction

$$2HI\ (g) \longrightarrow H_2\ (g) + I_2$$

Which is the following graphs is correct for this reaction?



10 Consider the following reaction:

$$2X + Y \longrightarrow Z$$

It is first order with respect to X and second order with respect to Y. What is the unit of the rate constant?

A s^{-1}
B mol dm^{-3} s^{-1}
C mol^{-1} dm^3 s^{-1}
D mol^{-2} dm^6 s^{-1}

11 Which of the following statements is correct for K_c and K_p of a reaction?

A Both have the same values under constant pressure
B Both have the same values for gaseous system only
C Both of them are constant under any conditions
D Both are temperature dependent

12 The equilibrium constants, at 823 K, for two reactions are given below.

$$CoO(s) + H_2(g) \rightleftharpoons Co(s) + H_2O(g) \quad K_1 = 67$$

$$CoO(s) + CO(g) \rightleftharpoons Co(s) + CO_2(g) \quad K_2 = 490$$

Calculate the equilibrium constant for the following reaction.

$$CO_2(g) + H_2(g) \rightleftharpoons CO(g) + H_2O(g)$$

A 0.137
B 7.313
C 423
D 557

13 Which of the following statements is **not** true regarding the buffer capacity of an acidic buffer solution?

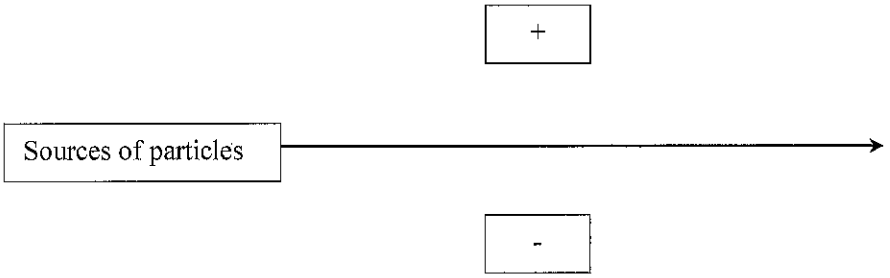
A It depends on the actual amount of weak acid and its conjugate base in the solution
B The buffer capacity is maximum when the ratio $\frac{[\text{acid}]}{[\text{conjugate base}]}$ is equal to 1
C The buffer capacity is maximum when the pH of the buffer is equal to the pK_a of the weak acid
D The buffer capacity is maximum when weak acid and its conjugate base neutralized each other completely

Section B [15 marks]

*Answer **all** questions in this section.*

Write the answers in the space provided.

16 Diagram below shows the deflection of sub-particles from different sources are passed through the electric field.



(a) (i) Name the sub-atomic particles Y. [1]

.....

(ii) Draw the paths of the beam of electrons and hydrogen ions in the above diagram. [2]

(iii) If a beam of deuterium ions is passed through the electric field, state the difference in deflection angle between the beam of hydrogen ions and that of deuterium ions. [1]

.....

(b) (i) Define relative atomic mass. [1]

.....

(ii) The relative atomic mass of X is 30.97. By how many times is an atom of X heavier than one atom of carbon-12? [2]

Section C [30 marks]

*Answer **two** questions only in this section.*

*You may answer all the questions **but**, only the first **two** answers will be marked. Write the answers on the answer sheets provided. Begin each answer on a new page of the answer sheet*

18 Carbon dioxide is a gas at 25.0 °C and 1.00 atm. Its triple point is at -56.4 °C and 5.11 atm, and its critical point is at 31.1 °C and 73.0 atm.

(a) Sketch and label the phase diagram for carbon dioxide. [3]

(b) Carbon dioxide gas can be liquefied under suitable conditions. Using the kinetic theory of gases, explain the liquefaction of gaseous carbon dioxide at 25.0 °C by increasing the pressure. [4]

(c) Carbon dioxide gas from a fire extinguisher is often used to put out small fires. A white fog is observed when carbon dioxide is released from the fire extinguisher.

(i) Explain the formation of the white fog. [2]

(ii) A fire extinguisher cylinder has an internal volume of 2.00 dm^3 and contains 1.80 kg of carbon dioxide. Calculate the pressure of carbon dioxide gas in the cylinder at 25.0 °C. [3]

(iii) The actual pressure in the fire extinguisher is 2.50×10^4 kPa under similar conditions as in (c) (ii). Explain the difference between the actual pressure and the calculated value. [3]

19 (a) The Contact process in the manufacture of sulphuric acid involves the oxidation of sulphur dioxide to sulphur trioxide. Sulphur dioxide is a polar molecule whereas sulphur trioxide is a non-polar molecule. Explain this statement by using Lewis diagram. [7]

(b) Explain the following statements.

(i) Nitrogen is inert. [2]

(ii) Carbon dioxide is a gas while silicon dioxide is a solid under room conditions. [6]

20 (a)When steam is passed over carbon at 700 °C, the equilibrium partial pressure for water and hydrogen is 90 kPa and 183 kPa respectively.

(i) Calculate Kp at 700 °C. [3]

(ii) What is the new equilibrium partial pressure of hydrogen if after the system had achieved equilibrium, the partial pressure of steam is increased to 150 kPa at the same temperature? [5]

STPM CHEMISTRY 962/1
BAHAN KECEMERLANGAN STPM 2021

1st Semester Year 2021

MARKING SCHEME PAPER 1

SECTION A [15 MARKS]

Question No	Answer	Question No	Answer
1	C	9	C
2	D	10	D
3	B	11	D
4	C	12	A
5	C	13	D
6	A	14	A
7	C	15	A
8	D		

TAMAT SAMPEL

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