SAMPEL PERCUMA

Trial STPM 2023 Kimia Semester 1 Terengganu

Set penuh: Kertas Percubaan STPM

Sem 1 · Kimia

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- 3 fail PDF
- Semester 1: kertas percubaan (trial) negeri, subjek yang dipilih + skema
- Blueprint 30 hari Semester 1 (setiap subjek)
- Semester 3: percubaan 2024, 10 subjek, banyak negeri, soalan + skema dalam satu fail

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KEMENTERIAN PENDIDIKAN
JABATAN PENDIDIKAN NEGERI TERENGGANU

STPM 2023

PEPERIKSAAN PERCUBAAN SEMESTER 1

CHEMISTRY

962/1

Nama :.....

Kelas :.....

DIBIAYAI OLEH KERAJAAN NEGERI TERENGGANU

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

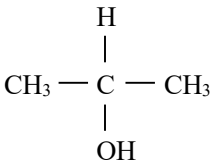
ANJAKAN MUAFAKAT NEKAD

Section A [15 marks]

*Answer **all** questions.*

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

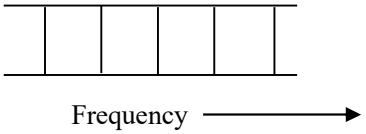
1 Which of the following species does not produce a peak in the mass spectrum of propane-2-ol?



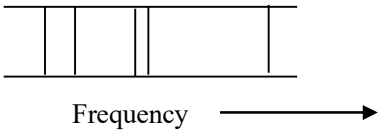
A $CH_3CHCH_3^+$
B $CH_3CH_2OH^+$
C $CH_3CH(OH)^+$
D $CH_3CH(OH)CH_3^+$

2 Which of the diagrams correctly represents the line spectrum of hydrogen in the visible region?

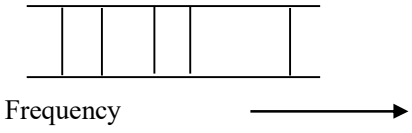
A



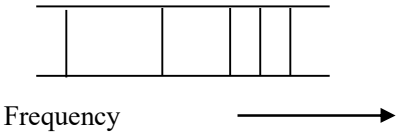
B



C



D



8 Which of the following statements explains why liquids have densities that are quite similar to their solids for most substances?

A The particles in liquids and solids have nearly the same size.
B The distance between particles in liquids and solids are nearly the same.
C The attractive forces between particles in liquids and solids are nearly the same.
D The mass of particles in liquids and solids are nearly the same.

9 Which of the following is correct with regard to a catalyst?

A It decreases the temperature of the reaction.
B It alters the mechanism of the reaction.
C It increases the yield of the products.
D All catalytic actions can be explained by the Collision Theory.

10 Which statements about the activation energy of an endothermic reaction is true?

A The activation energy of the reaction varies with temperature.
B The rate of the reaction is higher if the activation energy of the reaction is larger.
C The presence of a catalyst has no effect on the activation energy of the reaction.
D The activation energy for the forward reaction is larger than that of the backward reaction.

11 Which of the following is correct with regard to the equilibrium constant, K_c and K_p of a reversible reaction?

A Both have the same value under the same pressure.
B Both have the same value for gaseous system only.
C Both are constant under all conditions.
D Both will change when temperature changes.

12 The partial pressure of nitrogen, hydrogen and ammonia for the reaction $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ are a, b and c respectively. If the pressure is increased to twice its original value, at constant temperature, the expression for the equilibrium constant, K_p is given by

A $K_p = \dfrac{c^2}{4ab^3}$

B $K_p = \dfrac{c^2}{2ab^3}$

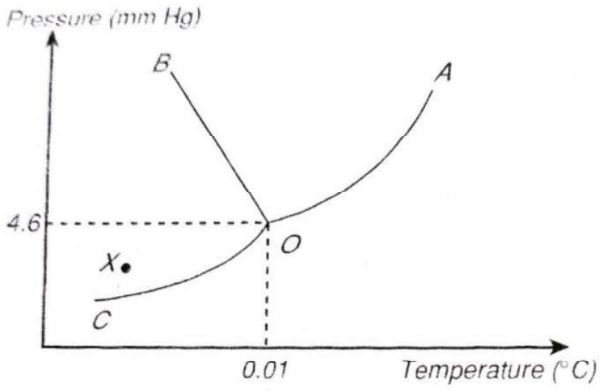
C $K_p = \dfrac{c^2}{ab^3}$

D $K_p = \dfrac{2c^2}{ab^3}$

Section B [15 marks]

*Answer **all** questions.*

Write the answers in the spaces provided.



16 The phase diagram for water is shown above.

(a) Write the position of curved OB. [1]

……

……

(b) Discuss the slope of the curve OB in melting point and density of ice. [3]

……

……

……

(c) What happens when water at point X is slowly heated under constant pressure. Draw on the graph above and explain. [4]

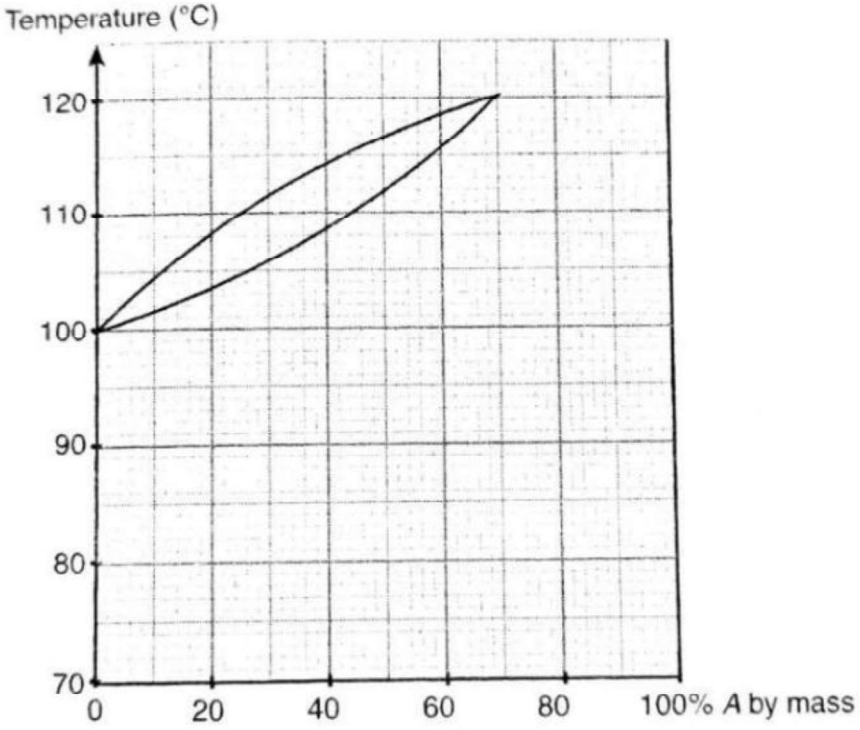
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17 The figure below shows a partly completed boiling point against composition diagram at constant pressure for two miscible liquids A and B



(a) Given the boiling point of pure A is 86°C and that pure B is 100°C, complete the diagram with label boiling point of pure A. [2]

(b) A liquid mixture consisting of 50% of A by mass is subjected to fractional distillation.

(i) What is the boiling point of the mixture? [1]

……

(ii) What is the composition of the vapour of A and B in equilibrium with the liquid mixture at its boiling point? [2]

……

……

(c) On the boiling point against composition diagram you would expect to obtain at constant temperature for mixtures of A and B on the graph above. Label your diagram where appropriate. [2]

Section C [30 marks]

*Answer **two** questions only.*

*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 (a) Boron trifluoride, BF_3 is a Lewis acid and ammonia, NH_3 is a Lewis base.

(i) Explain the formation of BF_3 and NH_3 molecule using the concept of overlapping and hybridization. [8]

(ii) Using the Lewis structure, deduce the formation of bonding between the BF_3 and NH_3 molecule. [2]

(b) Hydrogen bonding can affect the boiling point of a substance. Both ammonia and water molecules can form hydrogen bonding. Which molecule has higher boiling point? Explain your answer. [5]

19 (a) The half-life of thorium is 2600 years. Calculate the time taken for a sample of thorium to decay to 25% of the initial concentration. [3]

(b) The table below shows the results of an experiment for the reaction

$$X(aq) + Y(aq) \rightarrow Z(aq)$$

that was carried out at 42 °C.

Time / Second	**Concentration of X(aq) / mol dm^{-3}**
0	1.38
500	1.24
1200	1.07
2000	0.82
2800	0.61

(i) Plot a graph to determine the order of this reaction with respect to the concentration of X. [5]

(ii) What is meant by the term order of reaction? [2]

(c)

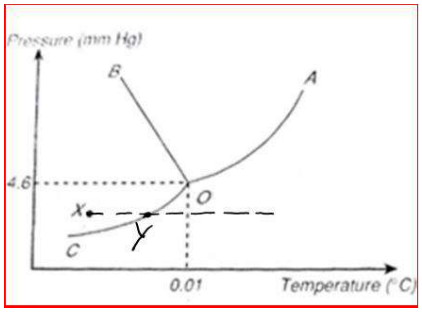
Temperature / K	**Rate constant, k / s^{-1}**
300	1.86×10^{-5}
400	7.74×10^{-5}

The rate constants for the decomposition of N_2O_5 at two different temperatures are shown above. Determine the order of reaction and calculate the activation energy, E_a for the reaction. [5]

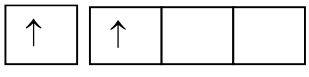
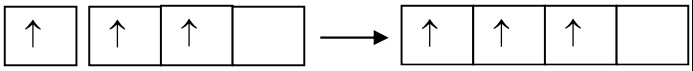
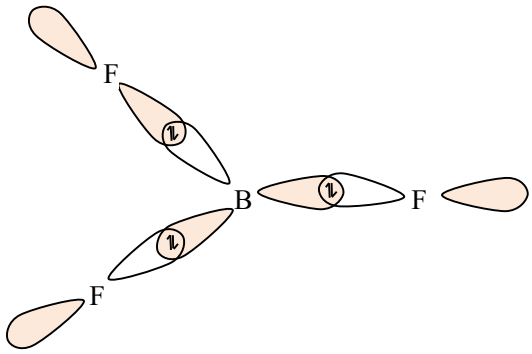
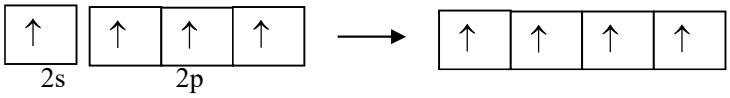
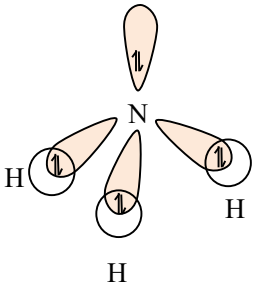
SECTION A [15 marks]

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

SECTION B [15 MARKS]

QUESTION NO.	SUGGESTED ANSWERS	SUGGESTED MARKS
16 (a)	The curve slopes to the left.	1
16 (b)	This shows that the **melting point decreases as the pressure increases**. It also shows that as **ice melts, its volume decreases**, indicating that the **density of ice is lower than that of liquid water**	1 1 1
16 (c)	When solid water (ice) at X is heated under constant pressure, its' temperature increases as indicated by the dotted line on the graph below.  **Y OR ANY SYMBOL** At Y, ice starts to sublime, changing from the solid state into the gaseous state without passing through the liquid state. **During sublimation, the temperature remains constant**. When all the ice has sublimed, continued heating will cause the temperature of the water vapour to rise.	Draw 1 1 1 1
	TOTAL	**8**

SECTION C [30 MARKS]

QUESTION NO.	SUGGESTED ANSWERS	SUGGESTED MARKS
18 (a) (i)	The valence shell of configuration of Boron is $2s^2\,2p^1$  2s 2p	1
	To form three covalent bonds with fluorine atoms, three unpaired electrons are required. One electron from 2s orbital will be excited to 2p orbitals. sp^2 hybridizations between the 2s and 2p orbitals produces 3 equivalent hybrid orbitals arranged in trigonal planar geometry.	1
	 2s 2p	1
	Boron needs 3 hybridized orbitals to make bonds with 3 atoms of F where the 2p orbitals get overlapped with these hybridized sp^2 orbitals and bonds are formed.	1
		1 1
	The valence shell of configuration of nitrogen is $2s^2\,2p^3$  2s 2p	1
	sp^3 hybridizations between the 2s and 2p orbitals produces 4 equivalent hybrid orbitals arranged in tetrahedral geometry. Overlapping between three of the hybrid orbitals with the 1s orbital of hydrogen atoms gives the NH_3 molecule with trigonal pyramidal geometry	
		

TAMAT SAMPEL

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