

2008-CE
CHEM

PAPER 2

MC



HONG KONG CERTIFICATE OF EDUCATION MOCK EXAMINATION 2008

CHEMISTRY PAPER 2

by Chris Suen

Subject Code: 170

Time allowed : 1 hour

1. Read carefully the instructions on the Answer Sheet. Stick a barcode label and insert the information required in the spaces provided.
2. When told to open this book, you should check that all the questions are there. Look for the words '**END OF PAPER**' after the last question.
3. All questions carry equal marks.
4. **ANSWER ALL QUESTIONS.** You should mark all your answers on the Answer Sheet.
5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.
6. No marks will be deducted for wrong answers.

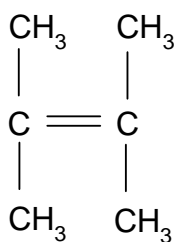
This paper consists of two sections. There are 30 questions in Section A and 20 questions in Section B.

Choose the best answer for each question.

Candidates may refer to the Periodic Table printed on page 1 when answering the questions.

Section A

1. What is the systematic name of the following hydrocarbon?



- A. 1,1,2-methylpropene
B. 2,3,3-trimethylpropene
C. 2,3-methylbut-2-ene
D. 2,3-dimethylbut-2-ene
2. Consider the following cracking process:
 $\text{C}_{10}\text{H}_{22} \rightarrow \text{P} + \text{R}$
Which of the following statements about the process is correct if P is a saturated hydrocarbon containing 5 carbon atoms?
- A. P is the liquid
B. P and R are in same homologous series
C. R is a saturated hydrocarbon
D. The process is an exothermic

3. Arrange the order of the procedures of separation of oxygen and argon from air.
- (1) Liquefaction of air
 - (2) Fractional distillation of air
 - (3) Purification of air
- A. (1) → (3) → (2)
B. (3) → (1) → (2)
C. (3) → (2) → (1)
D. (2) → (1) → (3)
4. Which of the following substances CANNOT react with acidified potassium dichromate solution?
- A. butan-1-ol
 - B. iron(II) nitrate solution
 - C. potassium sulphite solution
 - D. propene
5. Which of the following gases CANNOT be collected by upward displacement of air? A.
- ammonia
- B. sulphur dioxide
 - C. propane
 - D. but-1-ene
6. Which of the following pairs of atomic numbers corresponds to elements with similar chemical properties?
- A. 3, 10
 - B. 5, 16
 - C. 10, 19
 - D. 12, 20
7. In the periodic table, the most reactive metals are in
- A. the upper left corner.
 - B. the upper right corner.
 - C. the lower left corner.
 - D. the lower right corner.

8. Using 1 mole of reactant, which of the following chemical changes involves the lowest number of electrons?
- $\text{H}_2\text{O}_2(\text{aq}) \rightarrow \text{H}_2\text{O}(\ell)$
 - $\text{O}_2(\text{g}) \rightarrow \text{OH}^-(\text{aq})$
 - $\text{MnO}_4^-(\text{aq}) \rightarrow \text{Mn}^{2+}(\text{aq})$
 - $\text{MnO}_4^-(\text{aq}) \rightarrow \text{MnO}_2(\text{s})$
9. Dry sodium chloride solid is a non-conductor of electricity because
- it is a non-electrolyte.
 - it exists as molecules.
 - its ions are not mobile.
 - metallic bonding is not present.
10. The chemical nature of rust is
- FeO
 - $\text{FeO} \cdot n\text{H}_2\text{O}$
 - Fe_2O_3
 - $\text{Fe}_2\text{O}_3 \cdot n\text{H}_2\text{O}$
11. Which of the following statements is correct?
- All non-metals either gas or liquid at room temperature and pressure
 - Metal ions are held together by delocalized electrons in the metal
 - All metals have higher densities than water
 - Metals conduct electricity because they have mobile ions
12. Which of the following is the constituent of liquefied petroleum gas?
- butane
 - hydrogen
 - methane
 - carbon monoxide
13. Consider the information given in the table below:

Particle	Number of protons	Number of electrons	Number of neutrons
A	x	x	x + 1

B	x	x - 1	x + 1
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Which of the following statements is correct?

- A. A and B are isotopes of the same element
- B. A and B are atoms of different elements
- C. A is an anion of B
- D. B is a cation of A

14. Which of the following is NOT a neutralization reaction?

- A. $\text{CuO(s)} + 2\text{HCl(aq)} \rightarrow \text{CuCl}_2\text{(aq)} + \text{H}_2\text{O}(\ell)$
- B. $2\text{NH}_3\text{(aq)} + \text{H}_2\text{SO}_4\text{(aq)} \rightarrow (\text{NH}_4)_2\text{SO}_4\text{(aq)}$
- C. $\text{HCO}_3^-\text{(aq)} + \text{H}^+\text{(aq)} \rightarrow \text{CO}_2\text{(g)} + \text{H}_2\text{O}(\ell)$
- D. $\text{O}^{2-}\text{(aq)} + 2\text{H}^+\text{(aq)} \rightarrow \text{H}_2\text{O}(\ell)$

15. Which of the following statements concerning household bleach is INCORRECT?

- A. The active ingredient of household bleach is sodium hypochlorite
- B. Household bleach can be used as a germicide
- C. Household bleach is produced by dissolving chlorine in water
- D. The raw material for manufacturing household bleach is sodium chloride

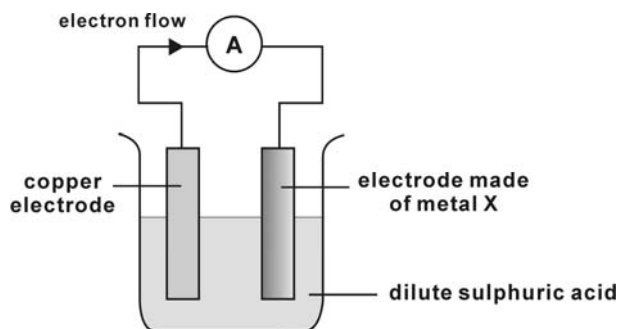
16. Which of the following solutions does NOT react with sodium sulphite solution?

- A. potassium bromide solution
- B. acidified potassium permanganate solution
- C. dilute sulphuric acid
- D. iron(III) nitrate solution

17. A white solid dissolves in water to give an alkaline solution. The solution reacts with dilute ethanoic acid to give a gas. The solid is probably

- A. calcium oxide.
- B. zinc carbonate.
- C. ammonium hydroxide.
- D. sodium carbonate.

18.



With reference to the above diagram, which of the following statements is correct?

- A. The electrode made of metal X is the anode.
- B. Copper is at a higher position in the electrochemical series than metal X.
- C. The mass of the copper electrode increases.
- D. The mass of the electrode made of metal X decreases.

19. Which of the following is the best method used to separate a mixture of naphtha and fuel oil?

- A. evaporation
- B. crystallization
- C. fractional distillation
- D. paper chromatography

20. Which of the following gases does NOT change the colour of moist pH paper?

- A. nitrogen dioxide
- B. chlorine
- C. sulphur dioxide
- D. carbon monoxide

21. Which of the following is a non-renewable energy source?

- A. nuclear energy
- B. geothermal energy
- C. power from biomass
- D. hydroelectric energy

22. The following experimental results were obtained when 1 M HCl was allowed to react 1 M NaOH:

Expt. No.	Volume of acid	Volume alkali	Rise in temperature
1	50 cm ³ of 1 M HCl	50 cm ³ of 1 M NaOH	T ₁ °C
2	200 cm ³ of 1 M HCl	200 cm ³ of 1 M NaOH	T ₂ °C

Which of the following is correct?

- A. T₁ = T₂
- B. T₁ = 2T₂
- C. 2T₁ = T₂
- D. 4T₁ = T₂

23. Which of the following combinations concerning the hardness of different forms of calcium carbonate is correct?

	<u>Softest</u>	<u>Hardest</u>
A.	Marble	Limestone
B.	Limestone	Marble
C.	Chalk	Marble
D.	Limestone	Chalk

24. If 1 g of oxygen gas contains Y molecules, how many molecules in 1 g of helium gas contains?
(Relative atomic masses: He = 4.0; O = 16.0)

- A. Y
- B. 4Y
- C. 8Y
- D. 16Y

25. Which of the following compounds may have a molecular formula of $C_4H_8O_2$?

- (1) alkanoic acid
 - (2) alkanol
 - (3) ester
- A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (2) and (3) only

26. Which of the following pairs of substances, when mixed, would produce a precipitate?

- (1) sodium carbonate solution and lead(II) nitrate solution
 - (2) potassium chloride solution and calcium hydroxide solution
 - (3) copper(II) oxide and sodium hydroxide solution
- A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (2) and (3) only

27. Consider the following information:

	Substance	Attractions between particles in substance
(1)	mercury	metallic bond
(2)	neon	van der Waals' force
(3)	silicon dioxide	ionic bond

Which of the following combination(s) is/are correct?

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

28. Which of the following is/are NOT the advantage of using perspex to replace glass?

- (1) Perspex is lighter
 - (2) Perspex has better light transmission property
 - (3) Perspex cannot be easily scratched
- A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (2) and (3) only

Directions: Each question below (Question Nos. 29 to 30) consists of two separate statements. Decide whether each of the two statements is true or false; if both are true, then decide whether or not the second statement is a correct explanation of the first statement. Then select one option from A to D according to the following table:

- A. Both statements are true and the 2nd statement is a correct explanation of the 1st statement.
- B. Both statements are true but the 2nd statement is NOT a correct explanation of the 1st statement.
- C. The 1st statement is false but the 2nd statement is true.
- D. Both statements are false.

1 st statement

2 nd statement

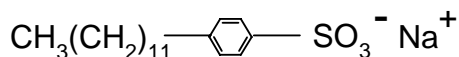
- | | | |
|-----|---|--|
| 29. | Urea-methanal is suitable for making milk bottles. | Urea-methanal does not melt on heating. |
| 30. | The melting point of hydrogen chloride is lower than that of lead(II) chloride. | Hydrogen chloride is a covalent compound whereas lead(II) chloride is an ionic compound. |

Section B

31. In the electrolysis of a copper(II) sulphate solution, carbon is used as the anode and copper as the cathode. Which of the following statements concerning this electrolysis is correct?

- A. The concentration of $\text{Cu}^{2+}(\text{aq})$ ions in the solution remains unchanged
- B. The concentration of $\text{H}^{+}(\text{aq})$ ions around the cathode increases
- C. $\text{O}_2(\text{g})$ is liberated at the anode
- D. $\text{H}_2(\text{g})$ is liberated at the cathode

32. A detergent has the structure shown below:



Which of the following statements concerning this detergent is INCORRECT?

- A. It is biodegradable
- B. It can be manufactured from vegetable oils
- C. It functions well in acidic solution
- D. The portion, $\text{CH}_3(\text{CH}_2)_{11}-\text{C}_6\text{H}_4-$, is hydrophobic

33. Which of the following solution is a weak electrolyte?

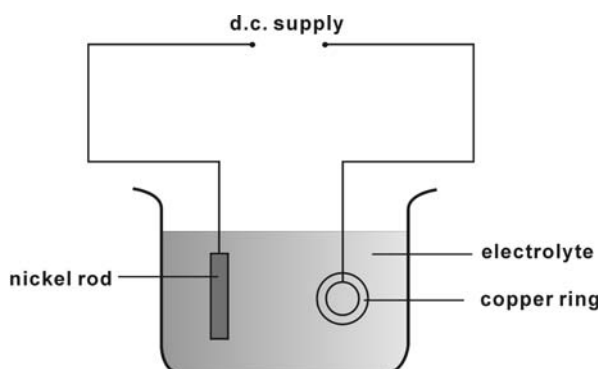
- A. 0.5 M glucose solution
- B. 1 M methanoic acid
- C. 1 M calcium nitrate solution
- D. 1.5 M sodium chloride solution

34. Which of the following acid solutions, when added to 1 g zinc granules, would have the fastest initial rate of reaction?

- A. 20 cm^3 of 1 M HCl
- B. 20 cm^3 of 2 M H_2SO_4
- C. 40 cm^3 of 1 M H_2SO_4
- D. 40 cm^3 of 3 M CH_3COOH

35. In a solution containing sodium chloride and sodium carbonate, the concentration of sodium ions and chloride ions are 0.5 M and 0.2 M respectively. What is the concentration of carbonate ions?
- A. 0.10 M
 - B. 0.15 M
 - C. 0.20 M
 - D. 0.30 M
36. Which of the following substances CANNOT remove grease on a window?
- A. Dilute ammonia solution
 - B. Dilute soapless detergent solution
 - C. Dilute sodium hydroxide solution
 - D. Dilute hydrochloric acid
37. Which of the following is NOT the appropriate substance for preparing magnesium chloride by directly mixing with dilute hydrochloric acid?
- A. magnesium
 - B. magnesium carbonate
 - C. magnesium sulphate
 - D. magnesium oxide
38. Ethane and ethene can be distinguished by burning them separately in air because
- A. ethene gives more carbon soot on burning.
 - B. ethane is flammable while ethene is not.
 - C. ethane burns with a more luminous flame.
 - D. when equal moles of ethane and ethene are burnt completely in air, ethene will give more carbon dioxide.

39. A student tries to plate a copper ring with nickel using the set-up below:



Which of the following combinations is correct?

	<u>Positive electrode</u>	<u>Negative electrode</u>	<u>Electrolyte</u>
A.	copper ring	nickel rod	$\text{Ni}^{2+}(\text{aq})$
B.	nickel rod	copper ring	$\text{Ni}^{2+}(\text{aq})$
C.	copper ring	nickel rod	$\text{Cu}^{2+}(\text{aq})$
D.	nickel rod	copper ring	$\text{Cu}^{2+}(\text{aq})$

40. Which of the following contains the smallest number of atoms at room temperature and pressure?
(Relative atomic masses: H = 1.0, C = 12.0, N = 14.0, O = 16.0, S = 32.0;

Molar volume of gas at room temperature and pressure = 24 dm^3)

- A. 1.5 mol of ammonia gas
- B. 1 mol of sulphur dioxide
- C. 30 g of nitrogen monoxide
- D. 12 dm^3 of ethene

41. The formula of a solid tribasic acid is H_3X . 47.1 g of the acid is dissolved in some distilled water and the solution is then diluted to 1000 cm^3 with distilled water.

25 cm^3 of the diluted solution requires 20 cm^3 of 1.80 M sodium hydroxide solution for complete neutralization. What is the relative molecular mass of H_3X ?

- A. 10.9
- B. 32.7
- C. 52.3
- D. 98.1

42. Which of the following gases can be dried by concentrated sulphuric acid?

- (1) nitrogen
 - (2) hydrogen
 - (3) hydrogen chloride
- A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

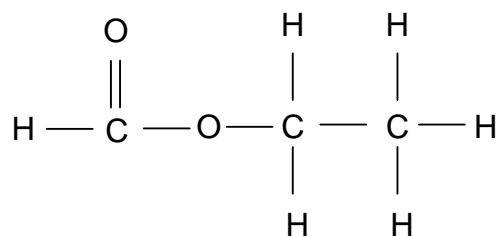
43. Which of the following substances can be used to distinguish between dilute nitric acid and dilute sulphuric acid?

- (1) hydrated copper(II) sulphate crystals
 - (2) copper turnings
 - (3) sodium hydrogencarbonate powder
- A. (1) only
B. (2) only
C. (1) and (3) only
D. (2) and (3) only

44. Which of the following measures can reduce the emission of pollutants from burning of PVC in an incinerator?

- (1) pass flue gas through scrubbers
 - (2) washing the flue gas with alkali
 - (3) install electrostatic precipitators
- A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

45. Consider the compound represented by the structure below:



Which of the following statements concerning the compound is/are correct?

- (1) It can turn wet red litmus paper blue
 - (2) It can be used as a solvent
 - (3) It can soluble in water
- A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (2) and (3) only

46. Which of the following reagents is/are commonly stored in brown bottles?

- (1) chlorine water
 - (2) silver nitrate solution
 - (3) concentrated hydrochloric acid
- A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)

Directions: Each question below (Question Nos. 48 to 50) consists of two separate statements. Decide whether each of the two statements is true or false; if both are true, then decide whether or not the second statement is a correct explanation of the first statement. Then select one option from A to D according to the following table:

- A. Both statements are true and the 2nd statement is a correct explanation of the 1st statement.
- B. Both statements are true but the 2nd statement is NOT a correct explanation of the 1st statement.
- C. The 1st statement is false but the 2nd statement is true.
- D. Both statements are false.

	1 st statement	2 nd statement	
48.	In pyrolysis of plastics, hydrocarbon can be obtained.	In pyrolysis of plastics, a lot of energy is required.	END OF PAPER
49.	Vinegar can be produced by refluxing butan-1-ol with acidified potassium dichromate solution.	Vinegar is an alkanoic acid.	
50.	The zinc case of a zinc-carbon cell becomes thinner when it has been used for a long time.	The zinc loses electrons to form zinc ions.	

PERIODIC TABLE 週期表

GROUP 族

																		atomic number 原子序																		
																		relative atomic mass 相對原子質量																		
																		1																		
																		H 1.0																		
																		2																		
																		He 4.0																		
																		3																		
																		Li 6.9																		
																		4																		
																		Be 9.0																		
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																		At (210)																		
																		86																		
																		Rn (222)																		

* 58	Ce 140.1	59	Pr 140.9	60	Nd 144.2	61	Pm (145)	62	Sm 150.4	63	Eu 152.0	64	Gd 157.3	65	Tb 158.9	66	Dy 162.5	67	Ho 164.9	68	Er 167.3	69	Tm 168.9	70	Yb 173.0	71	Lu 175.0
** 90	Th (232.0)	91	Pa (231)	92	U (238.0)	93	Np (237)	94	Pu (244)	95	Am (243)	96	Cm (247)	97	Bk (247)	98	Cf (251)	99	Es (252)	100	Fm (257)	101	Md (258)	102	No (259)	103	Lr (260)