

2009-CE
CHEM
PAPER 2

BEACON COLLEGE

MOCK EXAMINATION

CHEMISTRY PAPER 2 (MULTIPLE-CHOICE)

1 hour

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1. 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.
2. All questions carry equal marks.
3. **ANSWER ALL QUESTIONS.** You should mark all your answers on the Answer Sheet.
4. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.
5. No marks will be deducted for wrong answer.

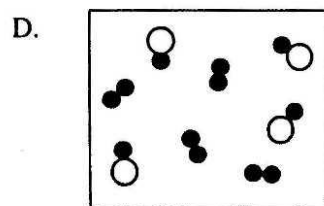
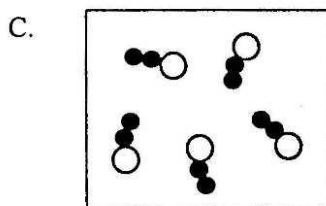
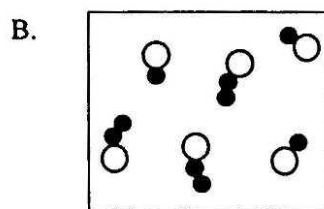
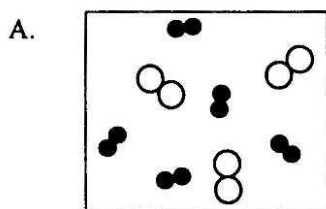
This paper consists of two sections. There are 30 questions in Section A and 20 questions in Section B.

Choose the best answer for each question.

Candidates may refer to the Periodic Table printed on page 20 when answering the questions.

Section A

1. Which of the following diagram can represent a mixture of element and compound?



2. Which of the following compounds give characteristic flame colors in flame test?

- (1) Potassium sulphate
- (2) Ammonium chloride
- (3) Calcium nitrate

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

3. Consider the information concerning particle X and particle Y listed below :

Particle	Number of protons	Number of electrons	Number of neutrons
X	16	17	20
Y	16	18	18

Which of the following statements is correct?

- A. X and Y are atoms of the same element.
 - B. X and Y are atoms of different elements.
 - C. X is a cation of Y.
 - D. Y is an anion of X.
4. Which of the following statements concerning oxygen gas is/are correct?

- (1) oxygen is combustible.
- (2) oxygen is used to fill weather balloons.
- (3) oxygen exists as diatomic molecules.

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

5. Consider the information listed below:

<u>Substance</u>	<u>Attraction between particles</u>
(1) methane	van der Waals' forces
(2) ammonia	covalent bond
(3) glucose	covalent bond

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

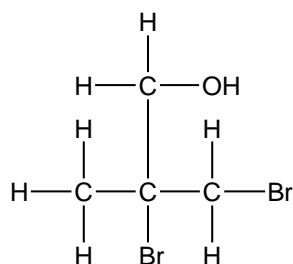
- A. (1) only
- B. (2) only
- C. (1) and (2) only
- D. (1) and (3) only

6. Which of the following atoms/ions have the same number of electron shells as an argon atom?

(1) potassium atom (2) calcium ion (3) chlorine atom

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

7. An organic compound has the following structure:



The systematic name of this compound is

- A. 1,2-dibromo-2-methylpropan-1-ol
 - B. 2,3-dibromo-2-methylpropan-1-ol
 - C. 2,3-dibromobutan-1-ol
 - D. 1,2-dibromobutan-1-ol
8. Which of the following change occurs in a catalytic converter installed in a motor car?
- A. nitrogen monoxide changes to nitrogen gas.
 - B. carbon monoxide changes to carbon particles .
 - C. unburnt hydrocarbons change to carbon monoxide.
 - D. sulphur dioxide changes to sulphur.

9. Which of the following process would NOT produce hydrogen gas?
- A. adding calcium to aqueous solution of ammonium chloride
 - B. adding sodium hydroxide to dilute hydrochloric acid.
 - C. adding iron to dilute hydrochloric acid
 - D. passing steam over red hot iron
10. Which of the following metal oxides can be reduced by heating with carbon?
- (1) sodium oxide
 - (2) tin(II) oxide
 - (3) iron(III) oxide
- A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (2) and (3) only
11. Which of the following combination(s) is/are correct?
- | <u>Alloy</u> | <u>Composition</u> |
|--------------------|------------------------|
| A. stainless steel | iron and chromium |
| B. brasses | copper and tin |
| C. bronze | copper and zinc |
| D. duralumin | aluminum and magnesium |

12. In which of the following equations does the underlined substance acts as an oxidizing agent?

- A. $\text{CuSO}_4 + \underline{\text{Zn}} \rightarrow \text{ZnSO}_4 + \text{Cu}$
- B. $\underline{\text{Pb(OH)}}_2 + 2\text{HNO}_3 \rightarrow \text{Pb(NO}_3)_2 + 2\text{H}_2\text{O}$
- C. $\underline{\text{PbO}}_2 + 4\text{HCl} \rightarrow \text{PbCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$
- D. $\underline{\text{MgCO}}_3 + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$

13. Which of the following substances would react with sodium oxide ?

- (1) ammonium bromide solution
- (2) hexane
- (3) methanoic acid

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

14. On strong heating, 10.0 g of the hydrated sodium sulphate produces 5.6 g of water. What is the mole ration between sodium ion and water in this compound?

(Relative atomic masses: H = 1.0, O = 16.0, S = 32.1, Na = 23.1)

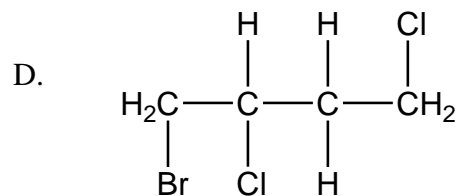
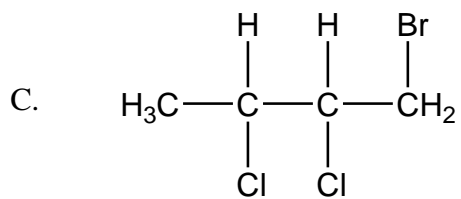
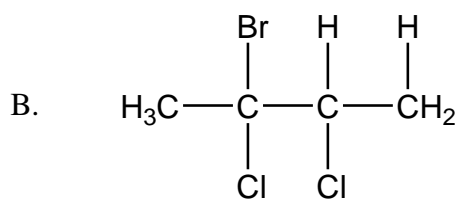
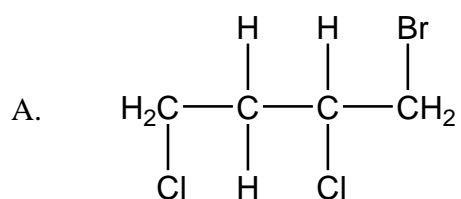
- A. 1 : 5
- B. 1 : 6
- C. 1 : 10
- D. 1 : 12

15. Which of the following substances is alkaline?
- A. toilet cleaner
 - B. sodium ethanoate solution
 - C. vinegar
 - D. ammonium permanganate solution
16. Which of the following statements concerning polyester is/are correct?
- (1) It softens upon heating.
 - (2) It is a cross-linked polymer.
 - (3) It is an addition polymer.
- A. (1) only
 - B. (2) only
 - C. (1) and (2) only
 - D. (1) and (3) only
17. Which of the following compounds would NOT react with ammonium chloride solution.
- A. silver nitrate solution
 - B. concentrated sodium hydroxide solution
 - C. dilute potassium hydroxide solution
 - D. lithium bromide solution
18. When potassium carbonate solution and magnesium chloride solution are mixed, precipitate is formed. Which of the following mixtures would produce the greatest amount of precipitate?
- A. 15 cm^3 of $1 \text{ M K}_2\text{CO}_3(\text{aq})$ + 8 cm^3 of $2 \text{ M MgCl}_2(\text{aq})$
 - B. 10 cm^3 of $1 \text{ M K}_2\text{CO}_3(\text{aq})$ + 10 cm^3 of $2 \text{ M MgCl}_2(\text{aq})$
 - C. 5 cm^3 of $2 \text{ M K}_2\text{CO}_3(\text{aq})$ + 15 cm^3 of $1 \text{ M MgCl}_2(\text{aq})$
 - D. 18 cm^3 of $1 \text{ M K}_2\text{CO}_3(\text{aq})$ + 5 cm^3 of $2 \text{ M MgCl}_2(\text{aq})$

19. Which of the following pairs of substances CANNOT be distinguished by using dilute hydrochloric acid?
- A. PbCO_3 and MgCO_3
 - B. Mg and Ag
 - C. MgCO_3 and CaO
 - D. K_2CO_3 and NaHCO_3
20. Which of the following pairs of solutions would form a precipitate when they are mixed?
- (1) $\text{NH}_3(\text{aq})$ and $\text{Pb}(\text{NO}_3)_2(\text{aq})$
 - (2) $\text{HCl}(\text{aq})$ and $\text{Pb}(\text{NO}_3)_2(\text{aq})$
 - (3) $\text{KI}(\text{aq})$ and $\text{AgNO}_3(\text{aq})$
- A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)
21. Which of the following statements concerning ethanol and methanol is INCORRECT?
- A. the boiling point of ethanol is higher than that of methanol.
 - B. both compounds can be represented by the same general formula.
 - C. both compounds are soluble in water.
 - D. each compound can be obtained by catalytic hydration from their corresponding alkenes.
22. Which of the following equations represents an addition reaction?
- A. $\text{C}_4\text{H}_6 + 2\text{H}_2 \rightarrow \text{C}_4\text{H}_{10}$
 - B. $\text{CH}_4 + \text{Cl}_2 \rightarrow \text{CH}_3\text{Cl} + \text{HCl}$
 - C. $\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$
 - D. $\text{C}_4\text{H}_9\text{OH} \rightarrow \text{C}_4\text{H}_8 + \text{H}_2\text{O}$

23. Which of the following reactions does NOT require the use of a catalyst?
- conversion of sulphur dioxide to sulfur trioxide in Contact process
 - cracking
 - oxidation of methanol to methanoic acid using acidified potassium permanganate.
 - fermentation of glucose to give ethanol

24. Which of the following compounds is formed from the reaction of 1-bromobut-2-ene with chlorine?



25. Consider the following information about four substances. W, X, Y and Z:

Substance	Melting Point/°C	Electrical conductivity at room temperature
W	-70	poor
X	100	very good
Y	250	poor
Z	1500	poor

Which of the above substances is a simple molecular substance and solid at room temperature?

- A. W
 - B. X
 - C. Y
 - D. Z
26. Which of the following substances is a thermoplastic as well as a addition polymer?
- A. nylon
 - B. perspex
 - C. polyester
 - D. urea-methanal

27. Which of the following statements concerning Group VII elements and their ions are correct?

- (1) Chlorine has the highest reducing power among chlorine, bromine and iodine.
- (2) Iodide ions have the highest oxidizing power among chloride, bromide and iodide ions.
- (3) Iodine is a solid at room temperature and pressure.

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

Directions : Each question below (Question 28 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.

<u>1st Statement</u>	<u>2nd Statement</u>
28. During electrolysis, oxidation takes place at the anode.	During electrolysis, anion release electrons and are discharged at the anode.
29. Acidified potassium permanganate can be used to distinguish between sodium sulphate solution and sodium sulphite solution.	Acidified potassium permanganate can be reduced by sodium sulphite to colorless manganese(II) ions, but not by sodium sulphate.
30. The basicity of propanoic acid is different from that of ethanoic acid.	The number of hydrogen atoms in a molecule of propanoic acid is equal to that in a molecule of ethanoic acid.

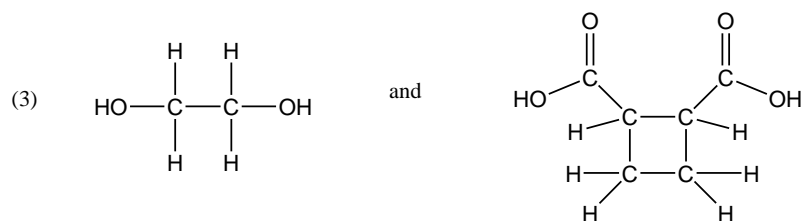
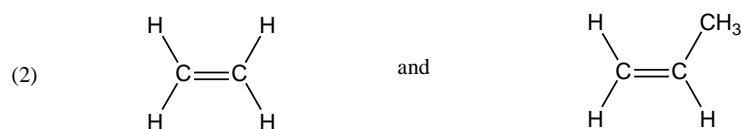
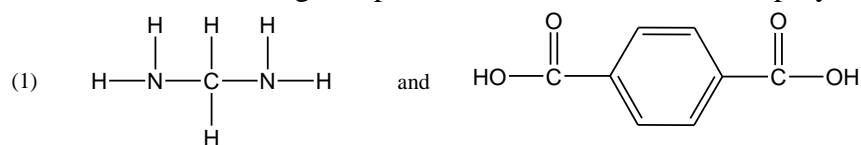
Section B

31. When sulphur dioxide is bubbled into potassium hydroxide solution, a colourless solution is formed. Which of the following statements concerning the solution are NOT correct?
- (1) the solution conducts electricity poorer than vinegar.
 - (2) the solution can change acidified potassium permanganate solution from purple to colorless.
 - (3) the solution can change potassium bromide solution from colourless to brown.
- A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)
32. A sample of zinc granules of mass 2.0 g was added to 100 cm³ of 0.125 M sulphuric acid. What is the theoretical volume of hydrogen produced at room temperature and pressure?
(Relative atomic mass : Zn = 65.4;
molar volume of gas at room temperature and pressure = 24 dm³)
- A. 0.30 dm³
B. 0.33 dm³
C. 0.60 dm³
D. 0.73 dm³

33. Which of the following is NOT the appropriate substance for preparing zinc sulphate by directly mixing with dilute sulphuric acid?

- A. zinc
- B. zinc chloride
- C. zinc carbonate
- D. zinc oxide

34. Which of the following compounds can form condensation polymer:



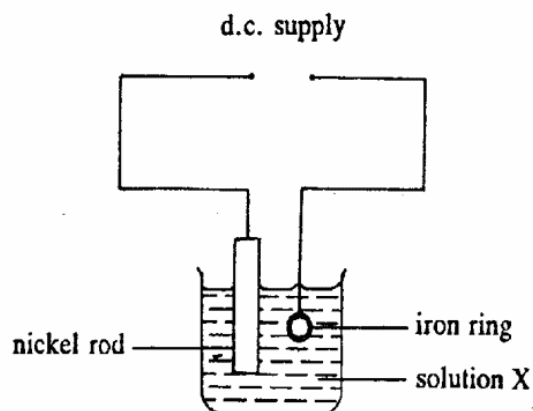
- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

35. Which of the following gases occupied the smallest volume at room temperature and pressure?

(Relative atomic masses: H = 1.0, C = 12.0, O = 16.0;
molar volume of gas at room temperature and pressure = 24.0 dm³)

- A. 1.0 g of methane
- B. 2.0 g of ethane
- C. 2.0 g of carbon dioxide
- D. 3.0 g of oxygen

36. A student tries to electroplate an iron ring with nickel using the set-up shown below.



Which of the following combinations is correct?

	<u>Solution X</u>	<u>Cathode</u>	<u>Anode</u>
A.	Copper (II) sulphate solution	Nichel rod	Iron ring
B.	Nickel (II) sulphate solution	Iron ring	Nichel rod
C.	Nichel(II) sulphate solution	Nichel rod	Iron ring
D.	Copper (II) sulphate solution	Iron ring	Nichel rod

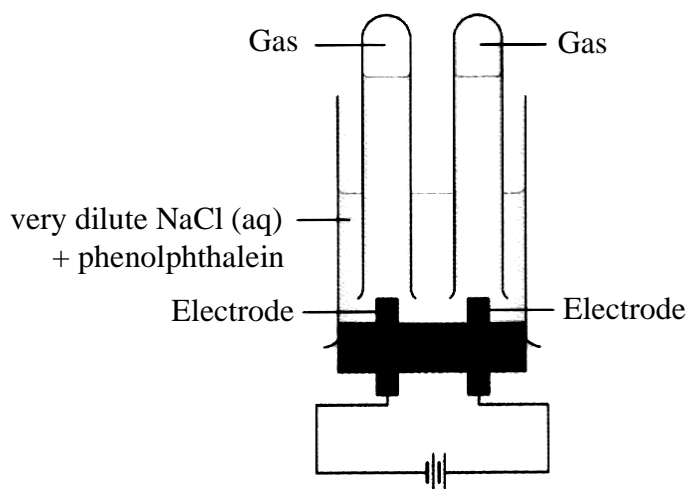
37. Consider the following chemical equation :



Which of the following combinations is correct?

	<u>w</u>	<u>x</u>	<u>y</u>	<u>z</u>
A.	2	6	1	3
B.	3	4	2	2
C.	5	4	4	2
D.	3	6	2	3

Directions: Q. 38 and Q. 39 refer to the following experiment.



38. Which of the following combinations is correct?

	<u>Gas evolved on cathode</u>	<u>Gas evolved on anode</u>
A.	chlorine	hydrogen
B.	hydrogen	chlorine
C.	hydrogen	oxygen
D.	oxygen	hydrogen

39. Which of the statements concerning the above experiment is/are correct?

- (1) Titanium electrodes should be used.
- (2) The concentration of $\text{Na}^+(\text{aq})$ ions around the anode decrease.
- (3) The solution changes from colorless to pink.

- (1) only
- (2) only
- (1) and (2) only
- (2) and (3) only

40. Which of the following statements concerning a zinc-carbon cell are correct?

- (1) ammonium chloride in the cell acts as an oxidizing reagent.
- (2) manganese(IV) oxide in the cell acts as a reducing agent.
- (3) The zinc case of the cell acts as a reducing reagent.

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

41. The number of atoms present in 15 cm^3 methanoic acid is

(Density of methanoic acid = 1.22 g cm^{-3})

Avogadro's number = 6.02×10^{23}

Relative atomic mass : C = 12.0, O = 16.0, H = 1.0)

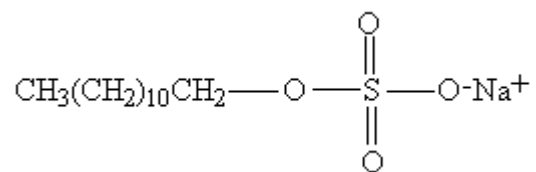
- A. 1.2×10^{23}
- B. 2.4×10^{23}
- C. 1.2×10^{24}
- D. 2.4×10^{24}

42. A student heated a mixture of fat and sodium hydroxide solution for some time. He then added the mixture to a beaker of saturated sodium chloride solution. A white solid was formed. Which of the following statements concerning this experiment is/are correct?

- (1) The reaction between fat and sodium hydroxide is saponification.
- (2) The white solid is an ester.
- (3) The white solid is fatty acids.

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

43. A detergent has the structure shown below:



- Which of the following statements concerning this detergent NOT correct?
- A. It is biodegradable.
B. It functions well in hard water.
C. It can be produced from saponification.
D. The portion, $\text{CH}_3(\text{CH}_2)_{10}\text{CH}_2-$, is hydrophobic.
44. In order to remove the oil in a sample containing hard water. Potassium carbonate solution is added to the sample before the addition of soapy detergent. It is because potassium carbonate can
- A. react with the oil.
B. increase the reactivity of the soapy detergent.
C. increase the solubility of oil in water.
D. soften the hard water.
45. Which of the following statements concerning sulphur dioxide are correct?
- (1) It can be prepared by the reaction between nitric acid and potassium sulphite.
(2) It should be collected by upward delivery.
(3) It can be absorbed by milk of magnesia.
- A. (3) only
B. (1) and (2) only
C. (1) and (3) only
D. (2) and (3) only

46. When 10 g of PURE rubidium carbonate (Rb_2CO_3) reacted with excess nitric acid, 1.04 dm^3 of carbon dioxide was obtained at room temperature and pressure. However, in a similar experiment using 10 g of IMPURE rubidium carbonate, 0.98 dm^3 of carbon dioxide was obtained. Assuming that the impurity is a metallic carbonate, what would this impurity be?

(Molar mass: $\text{Rb}_2\text{CO}_3 = 231 \text{ g}$; $\text{Li}_2\text{CO}_3 = 73.8 \text{ g}$; $\text{Na}_2\text{CO}_3 = 106 \text{ g}$;
 $\text{K}_2\text{CO}_3 = 138.2 \text{ g}$; $\text{Cs}_2\text{CO}_3 = 325.8 \text{ g}$)

- A. Li_2CO_3
B. Na_2CO_3
C. K_2CO_3
D. Cs_2CO_3
47. Compound X dissolves in water to give a colored solution. When chlorine gas is bubbled into the solution, the color of the solution does not change significantly. X is probably
- A. copper(II) fluoride
B. iron(II) bromide
C. cobalt (II) bromide.
D. potassium iodide

Directions : Each question below(Question 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.

1st Statement

2nd Statement

- | | |
|--|--|
| 48. Aqueous ammonia can be used as glass cleaner. | Aqueous ammonia can hydrolyze grease to form soap. |
| 49. Electrical wire is made of iron but not of copper. | Iron has a higher corrosion resistance than copper. |
| 50. The volume of hydrogen liberated at room temperature and pressure by the reaction between 10 cm ³ of 10 M sulphuric acid and excess zinc granules is greater than that between 10 cm ³ of 10 M hydrochloric acid and excess zinc granules. | Both sulphuric acid and hydrochloric acid are strong acid. |

END OF PAPER

