

3051/1

BGCSE

School Number	Candidate Number
Surname and Initials	

CHEMISTRY

PAPER 1 3051/1

Tuesday **19 MAY 2015** 12:00 noon–1:15 P.M.

Additional materials:
None

**MINISTRY OF EDUCATION
NATIONAL EXAMINATIONS**
BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS AND INFORMATION TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided above.

Answer **ALL** the questions on this paper.

For each question in this paper, **four** suggested answers A, B, C and D are given.

Circle the letter of the response which you consider to be correct.

Attempt **ALL** the questions. Marks will **NOT** be deducted for wrong answers. Your total score on this test will be the number of correct answers given.

Relative atomic masses are given in the Periodic Table of elements provided on page 2.

The volume of one mole of gas at room temperature and pressure (r.t.p.) is $24\,000\text{ cm}^3$ and at standard temperature and pressure (s.t.p.) is $22\,400\text{ cm}^3$.



For Examiner's Use	
TOTAL MARKS	

This question paper consists of 12 printed pages and 4 blank pages.

1. Which two factors determine the state of any matter?
 - A catalyst and temperature
 - B pressure and volume
 - C surface area and temperature
 - D temperature and pressure

2. Which metal oxide is amphoteric?
 - A aluminium oxide
 - B calcium oxide
 - C iron(III) oxide
 - D sodium oxide

3. Which physical method of separation is most suitable to separate a mixture of oil and water?
 - A crystallization
 - B chromatography
 - C decantation
 - D distillation

4. Which state of matter has no definite shape but a definite volume?
 - A compounds
 - B gas
 - C liquid
 - D solid

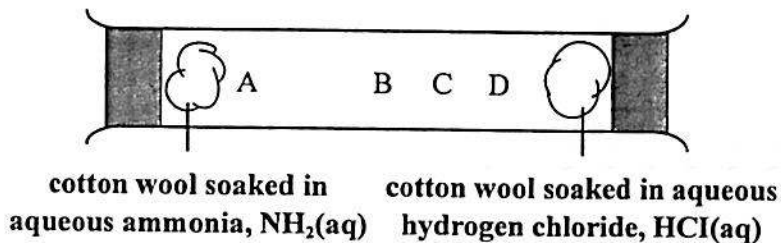
5. Which of the following is **not** an example of matter?
 - A air
 - B bacteria
 - C man
 - D sound

6. Which SI scale would be used to measure the temperature of a gas?
 - A Celsius
 - B Fahrenheit
 - C Kelvin
 - D Pascal

7. Which best describes the diffusion of ammonia gas?

- A high concentration \longrightarrow low concentration
- B high concentration \longrightarrow even equilibrium
- C low concentration \longrightarrow high concentration
- D low concentration \longrightarrow even equilibrium

8. In the experiment shown below, in which position will a white ring form?



9. Which Law is represented by the given equation $V = kT$ where k is a constant?

- A Boyle's Law
- B Charles' Law
- C Law of Constant Proportions
- D The Combined Gas Law

10. What is another phrase to describe Avogadro's Law for gases at rtp?

- A a pressure-volume relationship
- B a temperature-pressure relationship
- C a temperature-volume relationship
- D a volume-mole relationship

11. Which set of coefficients balances this equation?



	NaOH	H_2SO_4	Na_2SO_4	H_2O
A	1	2	1	2
B	2	1	1	2
C	2	0	0	2
D	2	2	2	2

12. Use the equation, $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \longrightarrow 2\text{HCl}(\text{g})$ to calculate the amount of hydrogen chloride gas produced from 4.0 L of chlorine gas reacting with excess hydrogen gas at r.t.p.
- A 1.0 L
 - B 2.0 L
 - C 8.0 L
 - D 48.0 L
13. An inflated balloon has a volume of 3.0 L at a temperature of 25°C. The temperature is raised and the volume doubles to 6.0 L. What is the final temperature on the Kelvin thermometer?
- A 50 K
 - B 150 K
 - C 323 K
 - D 596 K
14. How many particles are there in one mole of sodium atoms at rtp?
- A 23 particles
 - B 22 400 particles
 - C 24 000 particles
 - D 6.02×10^{23} particles
15. Which compound is a saturated hydrocarbon?
- A C_2H_4
 - B C_2H_6
 - C C_3H_6
 - D C_4H_4

Use the reactions to answer questions 16 to 18. The choices may be used once, more than once or not at all.

- A $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \longrightarrow \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$
- B $\text{C}_2\text{H}_6 + \text{Br}_2 \longrightarrow \text{C}_2\text{H}_5\text{Br} + \text{HBr}$
- C $\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \longrightarrow \text{CH}_3\text{COOH} + \text{H}_2\text{O}$
- D $\text{C}_2\text{H}_4 + \text{H}_2\text{O} \longrightarrow \text{C}_2\text{H}_5\text{OH}$

Which reaction is

- 16. a substitution reaction; A B C D
- 17. an oxidation reaction; A B C D
- 18. an esterification reaction? A B C D
- 19. The Table shows the physical properties of a gas.

physical property	observation
colour	greenish-yellow
density	denser than air
solubility	soluble in water

Identify the name of the gas?

- A carbon dioxide
 - B chlorine
 - C nitrogen monoxide
 - D hydrogen
20. Which colour results when chlorine gas is bubbled into a pale green iron(II) chloride solution?
- A orange
 - B green
 - C yellow
 - D white

25. The equation shows a reaction to convert copper(II) oxide into copper metal.



What is the function of the carbon in this reaction?

- A a redox agent
- B a reducing agent
- C an organic agent
- D an oxidizing agent

Four harmful chemicals are listed. Use A, B, C or D to answer questions 26 to 28. The choices can be used once, more than once or not at all.

- A asbestos
- B carbon monoxide
- C pesticide
- D untreated sewage

Which of the harmful chemicals can cause the following problems after prolonged exposure?

- 26. damage to the lungs, lung cancer and eventual death; A B C D
- 27. the spread of diseases like typhoid and diarrhoea; A B C D
- 28. birth defects and fetal death? A B C D

29. Which carbonates thermally decompose to form carbon dioxide and an oxide only?

- I ammonium carbonate
- II calcium carbonate
- III copper carbonate
- IV potassium carbonate

- A I and II only
- B I, II and III
- C II and III only
- D I, II, III and IV

42. A molecule of ammonia can be made into ammonium ion by adding which of the following particles?

- A an electron
- B a hydroxide group
- C a neutron
- D a proton

43. Which bonding is most significant in explaining the high boiling point of diamonds?

- A covalent bonding
- B hydrogen bonding
- C ionic bonding
- D metallic bonding

Use the gases A, B, C and D to answer questions 44, 45, 46 and 47. The choice may be used once, more than once or not at all.

- A $\text{H}_2(\text{g})$
- B $\text{NH}_3(\text{g})$
- C $\text{CO}_2(\text{g})$
- D $\text{O}_2(\text{g})$

Which gas

- | | | | | | |
|-----|---|---|---|---|---|
| 44. | is produced by the reaction of zinc with steam; | A | B | C | D |
| 45. | is readily soluble in water and produces a slightly basic solution; | A | B | C | D |
| 46. | will form a salt when dissolved in aqueous sodium hydroxide; | A | B | C | D |
| 47. | has an M_r equal to that of propane? | A | B | C | D |

48. A farmer in Abaco is given a fertilizer marked 7-10-8. Which number refers to the percentage of nitrogen by mass?
- A 7
 - B 8
 - C 10
 - D 25
49. Which substance is a pollutant produced by the combustion of fossil fuels?
- A methane
 - B oxygen
 - C ozone
 - D sulphur dioxide
50. Which compound causes the blue-green colour produced during an exploding fireworks display?
- A calcium chloride
 - B copper chloride
 - C potassium chloride
 - D sodium chloride

30. What is the valency of an atom with an electronic configuration of 2, 8, 7?
- A +2
 - B +1
 - C -1
 - D -7
31. In which group of the Periodic Table would an element with an electronic configuration of 2,8,8,1 be found?
- A I
 - B II
 - C VII
 - D VIII
32. Which element has the largest number of neutrons?
- A argon/Ar
 - B calcium/Ca
 - C potassium/K
 - D sulfur/S
33. How many protons are present in the nucleus of a uranium-238 (U-238 atom)?
- A 330
 - B 238
 - C 146
 - D 92
34. Which section of the Periodic Table contains cations with multiple valencies?
- A alkali metals
 - B non-metals
 - C noble gases
 - D transition metals
35. How many periods of elements are found in the Periodic Table on page 2?
- A 6
 - B 7
 - C 9
 - D 18

36. Which compound contains an oxygen atom with an oxidation number of -1 ?
- A H_2O
 - B H_2O_2
 - C H_2SO_3
 - D H_2SO_4
37. What is the oxidation number assigned to each nitrogen atom in the N_2 molecule?
- A 0
 - B $+2$
 - C -2
 - D -3
38. Which family or Group in the Periodic Table contains the most reactive metal?
- A alkaline earth metals
 - B alkali metals
 - C Group III
 - D transition metals
39. Which of the following happens during reduction?
- A the loss of electrons
 - B the loss of oxygen
 - C the formation of a binary compound
 - D the formation of an ion with a larger valency
40. Which metal is not reactive enough to displace hydrogen atoms from hydrochloric acid?
- A aluminium
 - B copper
 - C iron
 - D magnesium
41. Which statement is **true** about an acid?
- A All acids have a pH greater than 7.
 - B A decomposition reaction occurs when an acid is added to an alkali.
 - C An example of an acid is NaOH .
 - D All acids are electrolyte

42. Which statement can be applied to sulfuric acid (H_2SO_4)?
- A It is a dibasic acid.
 - B It is a carboxylic acid.
 - C It has a basicity of one.
 - D It is a weak acid.
43. Given a 1 mol dm^{-3} solution of each substance, which solution would produce the largest concentration of hydrogen ions?
- A acetic acid
 - B hydrochloric acid
 - C potassium hydrogen carbonate
 - D sodium ethanoate
44. Name the salt formed when a solution of H_2SO_4 is titrated with aqueous $\text{Ca}(\text{OH})_2$.
- A calcium sulfate
 - B calcium hydroxide
 - C calcium oxide
 - D calcium sulfide
45. Which ion would produce a blue-green flame in a fireworks display?
- A Ba^{2+}
 - B Cu^{2+}
 - C Fe^{2+}
 - D K^+
46. During the electrolysis of molten CaBr_2 , which substance would be produced at the anode?
- A Ca
 - B Br_2
 - C H_2
 - D O_2

47. Which change in quantity can increase the rate of a chemical reaction?
- A decreasing the concentration of the reactants
 - B decreasing the reaction temperature
 - C increasing the surface area of the reactants
 - D removing the catalyst
48. Which substance does an antacid tablet contain?
- A aluminium chloride
 - B aluminium hydroxide
 - C sodium chloride
 - D sodium phosphate
49. Which substance is needed by plants which have poor root growth?
- A nitrates
 - B phosphates
 - C potassium
 - D water
50. Which substance is responsible for acid rain?
- A carbon dioxide
 - B CFCs
 - C methane
 - D sulfur dioxide