

FUKIEN SECONDARY SCHOOL
S3 First Term Examination (2020-2021)
Chemistry
(45 minutes)

Date: 15th January 2021

Name: _____

Time: 8:30a.m. - 9:15a.m.

Class: _____ No.: _____

Instructions to students:

1. Write your name, class and class number on both the question paper and the answer sheets.
2. Answer ALL questions.
3. Write down all the answers on the answer sheets.
4. Hand in the question paper and the answer sheets at the end of the examination.
5. The total mark of the paper is 70.

I. Multiple Choice Questions (20 marks)

1. The chemical symbol of bromine is
 - A B.
 - B Br.
 - C Bo.
 - D Bm.
2. Which of the following substances is NOT an element?
 - A Carbon
 - B Glucose
 - C Oxygen
 - D Sodium
3. Which of the following statements about copper is correct?
 - A It is a poor conductor of heat.
 - B It has a shiny appearance.
 - C It is brittle.
 - D It has a low boiling point.
4. The atomic number and mass number of an atom of an element is 9 and 19 respectively. The atom contains
 - A 9 electrons and 10 neutrons.
 - B 9 neutrons and 10 electrons.
 - C 9 protons and 10 electrons.
 - D 9 protons and 19 neutrons.

5. Which of the following statements about subatomic particles are correct?
- (1) Atoms of all elements must contain protons and electrons.
 - (2) Atoms of the same element must contain the same number of protons.
 - (3) Protons and neutrons have almost the same mass.
- A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)
6. Which of the following statements about an atom are correct?
- (1) Most of the mass of an atom is in its nucleus.
 - (2) Electron is the lightest subatomic particle in an atom.
 - (3) Electrons occupy most of the space of an atom.
- A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)
7. Which of the following statements about potassium are correct?
- (1) Its atomic number is 19.
 - (2) Its atom contains 20 electrons.
 - (3) It is a soft metal.
- A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)
8. Element X occurs in nature as two isotopes, ${}^6\text{X}$ and ${}^7\text{X}$. If the relative atomic mass of X is 6.93, what is the relative abundance of the ${}^7\text{X}$ isotope?
- A 25%
B 69%
C 75%
D 93%
9. A sample of element X consists of 93.2% of ${}^{39}\text{X}$ and 6.8% of ${}^{41}\text{X}$. The relative atomic mass of X is
- A 39.1.
B 39.3.
C 39.7.
D 40.1.

10. Oxygen has three isotopes. Their mass numbers are 16, 17 and 18 respectively. Which of the following statements about the three isotopes is / are correct?
- (1) The isotope O-16 contains 16 electrons.
 - (2) The isotope O-17 contains 9 neutrons
 - (3) The isotope O-18 contains 10 protons.
- A (1) only
B (2) only
C (1) and (3) only
D (2) and (3) only
11. An atom of an element has an electronic arrangement of 2,8,18,5. The atomic number of the element is
- A 5.
B 10.
C 28.
D 33.
12. To which period of the periodic table does the atom $^{31}_{15}\text{P}$ belong?
- A 1
B 2
C 3
D 4
13. Which of the following statements about alkali metals is correct?
- A They react with water to give an alkaline solution.
B They are hard.
C They have high melting points.
D They become dull when exposed to air.
14. The elements in the periodic table are arranged according to
- A atomic numbers.
B atomic masses.
C neutron number.
D mass numbers.
15. Which of the following lists of elements belongs to the same group of the periodic table?
- A Hydrogen, sodium, lithium
B Chlorine, bromine, iodine
C Helium, beryllium, argon
D Boron, silicon, oxygen

16. Which of the following statements about the periodic table are correct?
- (1) Across a period, from left to right, the number of outermost shell electrons in atoms of elements increases.
 - (2) Atoms of different elements in the same group have different number of occupied electron shells.
 - (3) Elements in the same period have similar chemical properties.
- A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)
17. Which of the following statements about halogens is correct?
- A All of them have the same colour.
B They have the same number of occupied electron shells in their atoms.
C Their reactivity decreases down the group.
D Bromine is the only liquid element at room temperature and pressure.
18. The atomic number of element X is 35. Which of the following elements has chemical properties similar to those of element X?
- A Oxygen
B Calcium
C Fluorine
D Nitrogen
19. Which of the following pairs of species have the same number of outermost shell electrons?
- (1) Chlorine atom and sulphide ion
 - (2) Calcium atom and magnesium atom
 - (3) Nitride ion and argon atom
- A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)
20. Which of the following ions carries a charge of -1 ?
- A Ammonium ion
B Sulphide ion
C Carbonate ion
D Hydrogencarbonate ion

II. Structured Questions (50 marks)

1. Complete the following table. (10 marks)

	Electronic arrangement of atom of element	Group to which the element belongs	Period to which the element belongs	Name of element
(a)	2, 3	(i)	(ii)	(iii)
(b)	2, 8, 6	(i)	(ii)	(iii)
(c)	(i)	IV	2	(ii)
(d)	(i)	I	4	(ii)

2. Zinc has four isotopes.



- (a) Isotopes of zinc have differences and similarities. In terms of protons, neutrons and electrons,
- (i) how is ${}_{30}^{64}\text{Zn}$ different from ${}_{30}^{66}\text{Zn}$? (1 mark)
- (ii) how is ${}_{30}^{64}\text{Zn}$ similar to ${}_{30}^{66}\text{Zn}$? (1 mark)
- (b) The table below shows the relative abundance of the isotopes.

	${}_{30}^{64}\text{Zn}$	${}_{30}^{66}\text{Zn}$	${}_{30}^{67}\text{Zn}$	${}_{30}^{68}\text{Zn}$
relative abundance	49.0%	28.0%	4.4%	18.6%

Calculate the relative atomic mass of zinc. (3 marks)

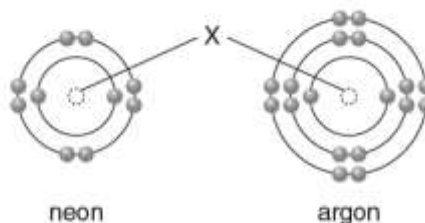
3. (a) Complete the following table. (10 marks)

	Name of particle	Chemical formula	Atom, simple ion or polyatomic ion?
(a)	Nitrate ion	(i)	(ii)
(b)	(i)	Na^+	(ii)
(c)	Iron(II) ion	(i)	(ii)
(d)	(i)	S	(ii)
(e)	(i)	Cu^{2+}	(ii)

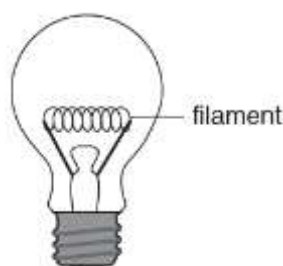
- (b) Draw an electron diagram for each of the following particles.

- (i) F (2 marks)
- (ii) O^{2-} (2 marks)
- (iii) Ca^{2+} (2 marks)

4. The atomic structures of neon and argon are shown below.



- (a) State the name of the central parts of the atoms, labelled X. (1 mark)
- (b) How many protons are there in an atom of argon? (1 mark)
- (c) The full atomic symbol for a particular isotope of neon is $^{20}_{10}\text{Ne}$. Write a similar full atomic symbol for the isotope of argon which has 20 neutrons. (1 mark)
- (d) Suggest ONE use of neon. (1 mark)
- (e) The simplified diagram below shows a tungsten light bulb. The bulb is filled with argon gas.



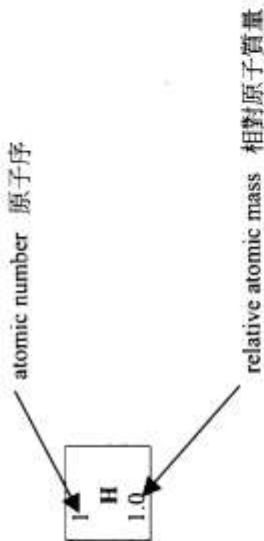
Explain in terms of electronic structure why argon gas is suitable for filling up tungsten light bulbs. (2 marks)

- (f) Give the chemical formulae of TWO oppositely charged ions which have the same electronic arrangement as an argon atom. (2 marks)
5. The elements in Group II of the Periodic Table show many similarities and trends in their properties.
- (a) Explain why magnesium and calcium are in the same group of the Periodic Table. Give the electronic arrangements of their atoms in your explanation. (2 marks)
- (b) Magnesium, calcium, strontium and barium all react with cold water.
- (i) Give TWO observations when some calcium is added to cold water. (2 marks)
- (ii) Write a word equation for the reaction involved. (1 mark)
6. A teacher dropped a small piece of potassium into water in a glass trough.
- (a) State TWO observations you expect. (2 marks)
- (b) The teacher used a safety screen. Give ONE other safety precaution the teacher should take. (1 mark)
- (c) A few drops of universal indicator solution were put in the glass trough after the reaction. The universal indicator solution turned blue. Why did the universal indicator solution turn blue? (2 marks)
- (d) Both potassium and rubidium react with water to give similar products. Suggest ONE of the products. (1 mark)

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PERIODIC TABLE 週期表

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		** 90		91	92	93	94	95	96	97	98	99	100	101	102	103
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Chemistry
(45 minutes)

Name: _____

Class: _____ No.: _____

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