

END OF YEAR EXAMINATIONS 2018

S.3 CHEMISTRY

Paper 1

TIME: 1 HOUR 30 MINS

INSTRUCTIONS

Answer all questions writing a correct letter in the table below

QN		QN		QN		QN		QN	
1		11		21		31		41	
2		12		22		32		42	
3		13		23		33		43	
4		14		24		34		44	
5		15		25		35		45	
6		16		26		36		46	
7		17		27		37		47	
8		18		28		38		48	
9		19		29		39		49	
10		20		30		40		50	

1. Ammonia reacts with copper(II)oxide to form copper according to the following equation

$3\text{CuO}_{(s)} + 2\text{NH}_{(g)} \rightarrow 3\text{Cu}_{(s)} + \text{N}_{2(g)} + 3\text{H}_{2(l)}$. The mass of copper formed when 12g of ammonia is reacted with copper(II) is (Cu=64,N=14,O=16,H=1)

A. $\left(\frac{12 \times 64}{17 \times 3}\right) g$ B. $\left(\frac{12 \times 64}{2 \times 17}\right) g$ C. $\left(\frac{12 \times 2 \times 64}{3 \times 17}\right) g$ D. $\left(\frac{12 \times 3 \times 64}{2 \times 17}\right) g$

2. The electronic configuration of an atom of an element G is 2:8:2. Which one of the following elements will show properties similar to G?

A. ${}_{14}^{28}Q$ B. ${}_{13}^{27}R$ C. ${}_{13}^{39}W$ D. ${}_{20}^{40}T$

3. chlorine reacts with iron to form iron(III) chloride according to the following equation

Which one of the following would be the volume of chlorine that would react with 5.6g of iron to produce iron(III) chloride at s.t.p? ($F_e=56$: 1 mole of a gas occupies 22.4 litres at s.t.p)

4. Which of the following is/are produced when small amounts of carbon dioxide is bubbled into sodium hydroxide solution
- A. Sodium hydrogen carbonate and water
B. Sodium carbonate and water
C. Sodium hydrogen carbonate only
D. Sodium carbonate only
5. The electronic configuration of elements X and Y are 2:8:3 and 2:6 respectively. Which one of the following is the formula of the compound formed between X and Y?
- A. XY_3 B. X_2Y_3 C. X_2Y D. X_3Y_2
6. Which one of the following substances is not decomposed when strongly heated?
- A. K_2CO_3 B. $NaNO_2$ C. $FeSO_4$ D. $NaHCO_3$
7. When a piece of hot copper was lowered into a bell jar of air . the volume of air in the jar decreased. Which one of the following gases causes the decrease in the volume?
- A. Water vapour B. carbon dioxide C. oxygen D. nitrogen

8. The atomic numbers of elements T,U,V and Z are 11,16,17 and 20 respectively. Which one of the elements forms an ion with a charge of negative two?
- A. T B. Z C. V D. U
9. Which of the following sets of compounds belongs to the same homologous series?
- A. C_2H_4 , C_3H_6 and C_4H_8
B. C_2H_6 , C_2H_2 and C_3H_8
C. C_2H_2 , C_3H_6 and C_4H_{10}
D. C_2H_6 , C_5H_{10} and C_3H_8
10. Which one of the following properties is true about carbon and sulphur?
- A. Form covalent compounds only
B. Form acidic oxide only
C. Conduct electricity
D. Have allotropes
11. The full symbol of an atom element z is $^{39}_{19}Z$. which one of the following is the number of neutrons in the nucleus of Z?
- A. 19 B. 20 C. 39 D. 58
12. Which one of the following carbonates when heated decomposes without leaving a solid residue?
- A. Ammonium carbonate
B. Copper(II) carbonate
C. Magnesium carbonate
D. Lead(II) carbonate
13. The atomic numbers of elements W,X,Y and Z are 9,11,12 and 14 respectively. Which one of the following pairs of elements can combine to form a covalent compound?
- A. W and Y B. X and Y C. Y and Z D. Z and W

14. Which one of the following allotropes of sulphur is stable above 96°C

- A. Monoclinic sulphur
- B. Rhombic sulphur
- C. Plastic sulphur
- D. Amorphous sulphur

15. Which one of the following substance is formed when sodium is burnt in limited amount of air?

- A. Sodium oxide B. sodium peroxide C. sodium carbonate
- D. sodium nitride

16. A mixture of sodium carbonate and sodium hydrogen carbonate can best be separated by fractional crystallization because the two salts have different

- A. Densities B. solubilities C. melting points D. boiling points

17. Brass is an alloy of

- A. Lead and tin B. iron and carbon C. Copper and zinc
- D. Magnesium and aluminium

18. Solutions Q,R,T and X have PH values 14,10,7 and 2 respectively. Which one of the solutions would react with copper(II) oxide to produce a salt and water only?

- A. Q B. T C. X D. R

19. The mass number of an atom is 11. If it's electronic configuration is 2:3, what is the number of neutrons in the atom?

- A. 5 B. 6 C. 8 D. 11

20. An atom of element Y has two energy levels. If Y forms an ion with the formula Y^{2-} , what is the atomic number of Y?

- A. 2 B. 4 C. 6 D. 8

21. Lead (II) nitrate decomposes on heating according to the following equation

The volume of nitrogen dioxide produced at s.t.p when 2.2g of lead(II) nitrate is heated is

(N=14, O=16, Pb=207: 1 mole of a gas occupies 22.4 dm³ at s.t.p)

A. $\left(\frac{2.2 \times 22.4}{331}\right) dm$ B. $\left(\frac{2.2 \times 4 \times 22.4}{331}\right) dm$ C. $\frac{2.2 \times 22.4}{331 \times 2}$ D. $\frac{2.2 \times 22.4}{2 \times 331 \times 4}$

22. Which one of the following is the mass of carbon dioxide that would occupy 5.6 dm³ at s.t.p? (C=12, O=16: 1 mole of gas occupies 22.4 dm³ at s.t.p)

A. 15.00g B. 11.00g C. 7.5g D. 2.85g

23. Which one of the following mixtures when heated forms a residue which is yellow when hot? The mixture of zinc and the oxide of

A. Lead B. aluminium C. magnesium D. calcium

24. Iron reacts with oxygen to form iron(II) oxide according to the following equation



A. $\left(\frac{0.5 \times 32 \times 2}{56}\right) g$ B. $\left(\frac{0.5 \times 32}{56}\right) g$ C. $\left(\frac{0.5 \times 16}{56}\right) g$ D. $\left(\frac{0.5 \times 16}{56 \times 2}\right) g$

Which one of the following is the mass of oxygen that will react with 0.5g of iron (O=16, Fe=56)

25. The table below shows number of neutrons in atoms W, X, Y and Z and their atomic masses. Which of the atoms are isotopes?

Atom	Atomic mass	Number of neutrons
W	39	20

X	40	20
Y	40	22
Z	41	22

- A. W and X B. X and Y C. Y and Z D. W and Z

26. The mass of 2×10^{23} atoms of aluminium is
(The atomic mass of aluminium = 27, Avogadro's Number = 6×10^{23} particles)

- A. $(2 \times 10^{23} \times 27)g$ B. $(\frac{27 \times 6.0 \times 10^{23}}{2 \times 10^{23}})g$ C. $(\frac{2 \times 10^{23} \times 27}{6 \times 10^{23}})g$
D. $(2 \times 10^{23} \times 6 \times 10^{23} \times 27)g$

27. which one of the following nitrates when strongly heated will decompose to form a metal

- A. $\text{Cu}(\text{NO}_3)_2$ B. $\text{Pb}(\text{NO}_3)_2$ C. AgNO_3 D. NaNO_3

28. which of the following hydrocarbons is unsaturated?

- A. C_2H_{10} B. C_3H_8 C. C_2H_6 D. C_2H_4

29. which of the following sulphates is prepared by precipitation method?

- A. Iron(II) sulphate B. copper(II) sulphate
C. Barium sulphate D. zinc sulphate

30. which one of the following elements will burn in oxygen to form acidic oxides?

- A. Ca B. Zn C. K D. S

Each of the question 31-40 consist of an assertion(statement) on the left hand side and a reason on the right hand side.

Select

- A. If both assertion and reason are true statements and the reason is a correct explanation of the assertion
B. If both the assertion and reason are true but the reason is not a correct explanation of the assertion

- C. If the assertion is true but the reason is not correct statement
- D. If the assertion is not correct but the reason is a correct statement

Instruction summarized	
Assertion	Reason
A True	True (Reason is a correct explanation)
B True	True (Reason is not a correct explanation)
C True	Incorrect
D Incorrect	True

31. water can be separated from its mixture with cooking oil by using a separating funnel **Because** water and cooking oil have different boiling points

32. The components of plant pigment can be separated by filtration **Because** the components of plant pigments move at different rates during chromatography

33. water and alcohol can be separated by fractional distillation **Because** they form an immiscible mixture

34. The PH of carbon dioxide is less than seven **Because** carbon dioxide is an acid

35. substances react faster at higher temperatures **Because** increase in temperature causes the reacting particles to be far

36. A mixture of ammonium chloride and sodium chloride can be separated by sublimation **Because** they both have common anions

37. copper(II) hydroxide dissolves in excess aqueous ammonia **Because** copper(II) hydroxide is amphoteric

38. The components of ink can be separated by chromatography **Because** they have different colours

39. Both graphite and diamond do not conduct electricity **Because** they are allotropes of carbon

40. A mixture of water and petrol can be separated by separating funnel **Because** water and petrol are immiscible liquids

In each of the questions 41-50, one or more of the answers given may be correct. Read each question carefully and then indicate the correct answer according to the following

- A. If 1,2,3 only are correct
- B. If 1 and 3 only are correct
- C. If 2 and 4 only are correct
- D. If 4 only is correct

41. which one of the following is /are true about all halogens. They are

- 1. diatomic elements
- 2. reducing agents
- 3. coloured elements
- 4. gases at room temperature

42. which one of the following hydroxides will form a dark brown solid when heated strongly

1. Zn(OH)
2. Cu(OH)_2
3. Mg(OH)_2
4. Pb(OH)_2

43. which one of the following salts when dissolved in water cause(s) hardness in water

1. ammonium nitrate
2. calcium sulphate
3. potassium chloride
4. magnesium hydrogen carbonate

44. which of the following nitrates will form nitrogen dioxide when strongly heated?

1. calcium nitrate
2. sodium nitrate
3. copper(II) nitrate
4. ammonium nitrate

45. which of the following has/have a giant molecular structure?

1. sulphur
2. graphite

3. phosphorus

4. diamond

46. which of the following methods can be used to separate a soluble solid from its solution?

1. distillation

2. evaporation

3. crystallization

4. chromatography

47. which of the following statement(s) is/are true about elements in group(II) in the periodic table

1. They have similar chemical properties

2. They have same number of electron shells

3. Their ions carry same number of charge

4. Their reactivity increases as you go up the group

48. which of the following is/are property/properties of alkalis?

1. turn red litmus solution blue

2. contains hydroxide ions

3. are soluble in water

4. turn blue litmus red

49. on going down a group in the periodic table

1. atomic number increases
2. number of shells increases
3. ionic radius increases
4. non-metallic character increases

50. which of the following substance undergoes a physical change when heated strongly?

1. copper(II) nitrate
2. ammonium chloride
3. potassium chlorate
4. zinc oxide

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HAPPY X-MASS AND NEW YEAR