545/1

S4 CHEMISTRY

Exam 3

PAPER 1

DURATION: 1 hour 30 minutes

Instructions to candidates

Attempt all question in all sections

SECTION A

1. When a steam of air is passed through sodium hydroxide solution and then over heat copper the residual gas is mainly

A. Ne B. CO_2 C. O_2 **D.** N_2

Sodium hydroxide absorbs CO_2 and copper remove oxygen

2. 45 kJ of energy is produced when 3g of butter is oxidized in the body. The energy produced in the body of a person who eats one kg of butter daily for 1 week is?

A.1050kJ B. 105kJ C. 15kJ D. 10.5kJ

3g produce 45kJ

(1000 x7)g produce

3. Which one of the following nitrates does NOT give off oxygen when heated?
   A. zinc nitrate
   B. sodium nitrate
   C. ammonium nitrate
   D. calcium nitrate

4. Which one of the following salts can be prepared by precipitation?
   A. calcium sulphate
   B. copper (II) chloride
   C. lead (II) nitrate
   D. Sodium chloride

5. Which one of the following reagents can be used to differentiate between lead (II) and aluminium ions in squesous solution?

A $NaOH_{(aq)}$ B. $KI_{(aq)}$ C. $NH_{3(aq)}$ D. $HNO_{3(aq)}$

6. Which one of the following hydroxides when strongly heated produces a yellow solid on cooling?

A. $Cu(OH)_2$ B. $Zn(OH)_2$ C. $Pb(OH)_2$ D. $Fe(OH)_2$

7. Which one of the following compounds does not give off carbon dioxide when strongly heated?

A. sodium carbonate
B. calcium carbonate
C. calcium hydrogen carbonate
D. sodium hydrogen carbonate

8. Which one of the following oxides can be reduced by carbon monoxide?

A. MgO B. CaO C. CuO D. K_2O

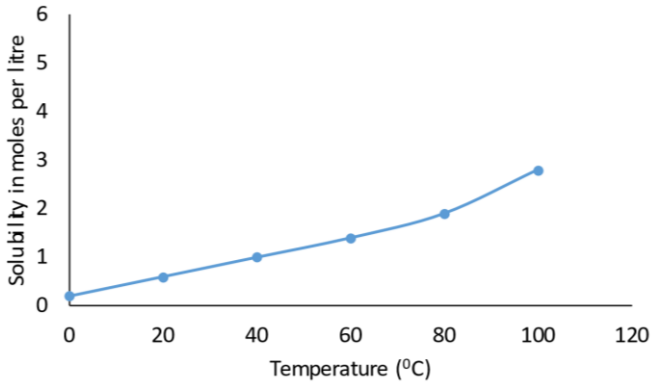
9. Propane burns in oxygen according to the following equation:

$$C_3H_8 + 5O_{2(g)} \longrightarrow 4H_2O_{(g)} + 3O_{2(g)}$$

The volume of oxygen required for complete combustion of 10dm2 of propane is

A. 75cm3 B. 50dm3 C. 25dm3 D. 15dm3

10. The solubility of hydrated copper (II) sulphate, $CuSO_4.5H_2O$ in moles per litre at various temperature is shown in the figure below



Determine the solubility of copper (II) sulphate at 80^0C in g/l is

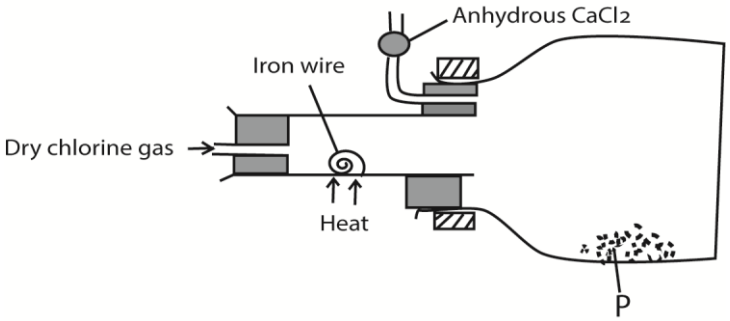
(Cu = 64, S = 32, O = 16, H = 1)

A. 50 B. 500 C. 75 D. 2000

11. Which one of the following is a basic oxide

A. SO_2 B. ZnO C. P_2O_5 D. CaO

12. The diagram in figure below shows the arrangement of the apparatus, which was set up to produce a chloride of iron.



The product P formed was

A. $FeCl_3$ B. $FeCl_2$ C. FeCl D. Fe_2Cl_3

13. $25.0cm^3$ of 0.1 M sodium carbonate was found to require $23.35cm^3$ of hydrochloric acid. The molarity of the acid is

A. $\frac{23.5x0.1}{25. x 2}$ B. $\frac{2x23.5x0.1}{25.0}$ C. $\frac{2 x 25.0}{23.5x0.1}$ D. $\frac{2x25.0 x 0.1}{23.5}$

14. Alkanes are hydrocarbons with the general formula

A. $CnH_{2n} + 2$ B. CnH_2n C. CH D. $C_2H_{2n} – 2$

15. Which one of the following oxides can be reduced by ammonia?

A. Zinc oxide
B. Copper (II) oxide
C. Magnesium oxide
D. Iron (II) Oxide

16. Ammonium chloride, HN_4Cl was dissolved in water. The resultant solution

A. had not effect on litmus paper
B. changed red litmus paper blue
C. changed blue litmus paper red
D. bleached litmus paper

17. Beginning with the least reactive, the order of reactivity of the following metals with dilute hydrochloric acid is

A. iron, aluminium lead, zinc
B. zinc, lead , aluminium, iron
C. lead, iron, zinc , aluminium
D. aluminium, zinc, iron, lead

18. Calcium reacts with water according to the following equation:

$Ca_{(s)} + 2H_2O_{(1)} \longrightarrow Ca(OH)_{2(aq)} + H_{2(g)}$

The volume of hydrogen formed when 0.3 mole of calcium reacts with water at 25°C is (1mole of a gas occupies 24dm^3 at 25°C)

A.0.72dm^3 B. 7.2dm^3 C. 72dm^3 D. 720dm^3

19. How many grams of sodium hydroxide are present in 250cm^3 of a 2 M solution? (Na=23, O=16 H=1)

A. 10g B. 20g C. 40g D. 80g

20. The atomic number of an element is
    A. the number of electrons and protons
    B. the number of protons and neutrons
    C. the number of neutrons
    D. the number of protons

21. 10amps of current was passed through silver nitrate solution for one minute. The mass of silver deposited at the cathode is (Ag =108, Faraday's constant =96,500 coulombs

A. $\frac{96.500x60 \times 10g}{108}$ B. $\frac{10x108}{96,500 \times 60g}$ C. $\frac{10 \times 60 \times 108\ g}{96,500}$ D. $\frac{10 \times 60}{96,500 \times 108g}$

22. Potassium hydrogen carbonate is decomposed by heat to potassium carbonate. The mass of potassium carbonate produced on heating 5 g of potassium hydrogen carbonate is (K=39, C, 12 H=1 O=16)

A. $\frac{138 \times 5}{200}$ B. $\frac{138 \times 5}{100}$ C. $\frac{200x5}{138}$ D. $\frac{100x5}{138}$

23. The number of moles of nitrogen molecules in 42 g of nitrogen is (N=14)

A.0.33 B. 0.67 C. 1.50 D. 3.00

24. The atomic numbers of elements X and Y are 7 and 9 respectively. The formula of the compound formed between X an Y is

A. XY_3 B. XY_2 C. X_3Y D. X_2Y

25. Isotopes are different atoms of the same element with the
    A. same number of protons, neurons and electrons
    B. same number of electrons and neutrons but different number of protons
    C. same number of protons and neutrons but different number of electrons
    D. same number of protons and electrons but different number of neutrons

26. Which one of the following substances does not conduct electricity?
    A. graphite
    B. diamond
    C. lead
    D. zinc

27. If a solution containing IM copper (II) sulphate is electrolysed, the substance formed at the cathode is

A. oxygen
B. hydrogen
C. copper
D. zinc

28. When a gas X with a pungent smell was passed over hot platinum foil a colourless gas Y was formed. Gas Y turned brown on mixing with air. Gas X is most likely to be
A. sulphur dioxide
B. ammonia
C. hydrogen sulphide
D. nitrogen monoxide

29. How many electrons are there in oxygen (O^{2-}) ion? (The atomic number of oxygen of oxygen is 8)
A. 6 B. 8 C. 10 D. 16

30. Which one of the following gases will not reduce copper (II) oxide to copper?
A. hydrogen B. Carbon monoxide C. Ammonia D. Carbon dioxide

31. An atom of an element X has 19 electrons. In the periodic table X belongs to
A. group I B. group II C. group III D. group IV

32. During quantitative determination of the ratio of oxygen to nitrogen in air by the action of air on hot copper, the gas collected in the evacuated flask is mainly
A. nitrogen B. oxygen C. Carbon dioxide D. water vapour

33. Compound R contains 15.8g of X and 84.2g of Y. The empirical formulas of R is

A. XY_3 B. X_2Y C. XY_2 D. X_3Y
(X=12; Y= 32)

Each of the questions 34 to 37 consists of an assertion (statement) on the lef
A. If both assertion and reason are true statement and the reason is the correct explanation of the assertion
B. If both assertion and reason are true But the reason is Not the correct explanation of the assertion
C. If the assertion is true and the reason false
D. If the assertion is a false statement and the reason is true statement

Instructions 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 statement

34.	Complete combustion of and fermentation of glucose are similar processes	BECAUSE	In both processions a gas that turns lime water milky is produced
35.	Sulphur dioxide is an acid anhydride	BECAUSE	It dissolves in water
36.	Carbon reacts with nitric acid	BECAUSE	Carbon is an oxidizing agent
37.	Elements of group I of the periodic table are very electromotive	BECAUSE	Their outermost shell electrons are not strongly attracted by the nucleus

38. Aqueous sodium hydroxide was added to a solution of salt X and a white precipitate insoluble in excess alkali was formed. X possibly contained
    A. lead ions
    B. zinc ions
    C. aluminum ions
    D. magnesium ions

39. Hydrogen chloride in aqueous solution
    A. reacts with zinc forming hydrogen and a salt
    B. reacts with a base to from a salt and water only
    C. Liberates carbon dioxide from carbonates
    D. bleaches most litmus paper

In each of the questions 40 to 45 one or more of the answers given may be correct. Read each question carefully and then indicate on your answer sheet according to the following
A. if 1,2,3 only correct B. if 1,3 only correct
C. if 2,4 only correct D. if 4 only correct
Instructions summarized

A	B	C	D
1,2,3 only correct	1,3 only correct	2,4 only correct	4 only correct

40. Which of the following substances are efflorescent
    1. $MgSO_4$ $7H_2O$
    2. $Na_2B_4O_7$ IOH_2O.
    3. Na_2CO_3 IOH_2O
    4. $CaCl_2$. 2H2O

41. Which of the following are mixtures?
    1. diamond
    2. brass
    3. aluminium
    4. steel

42. When copper (II) sulphate solution is electrolyzed using platinum electrodes
    1. copper is formed at the anode
    2. the colour of the solution remains unchanged
    3. oxygen is produced at the cathode
    4. the final solution is acidic

43. Which of the following conditions does not affect the rate the reaction between lumps of carbonate and dilute hydrochloric acid?

    1. Grinding the calcium carbonate
    2. adding iron powder to the mixture
    3. warming the reaction mixture
    4. exposing the reaction mixture to light

44. When magnesium is burnt in air
    1. there is an increase in mass
    2. bright light is observed
    3. magnesium nitride is formed
    4. there is a decrease in mass

45. Ionic compounds are generally
    1. conductors of electricity when in molten state only
    2. soluble in water
    3. soluble in all solvents
    4. have high melting points

46. . Which of the following compounds is/are used in the purification of water
    1. calcium hypo chloride
    2. calcium chloride
    3. chlorine gas
    4. carbon dioxide

47. Which of the following salts when in solution will form a white precipitate with dilute hydrochloric acid?

1. $Zn(NO_3)_2$ 2. $AgNO_3$ 3. $Ca(NO_3)_2$ 4. $Pb(NO_3)_2$

Each of the following questions 48 to 50 consists of an assertion (statement) on the left hand side and a reason on the right hand side.

    A. if both assertion and reason are true statements and the reason is the correct explanation for the assertion.
    B. If both assertion and reason are correct statements but the reason is not the correct explanation of the assertion.
    C. If the assertion is true but the reason is an incorrect statement.
    D. If the assertion is incorrect but the reason is a true statement.

48.	Carbon monoxide diffuses less more rapidly than Carbon dioxide.	Because	the molecular mass of carbon monoxide is than that of carbon dioxide.
49.	Rubber is more elastic than Polythene.	because	Rubber is a natural polymer.
50.	During an exothermic reaction the temperature falls	Because	Chemical bonds are made in such a reaction.

Answer Sheet

Tick or shade the correct alternative

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
A																									
B																									
C																									
D																									

	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	33	44	45	46	47	48	49	50
A																									
B																									
C																									
D																									

END