Name	Index No
School	Sign

233/1

TRIAL 1

Kenya Certificate of Secondary Education **CHEMISTRY** PAPER 1 (THEORY) 2 HOURS

INSTRUCTIONS TO THE CANDIDATE

- ✓ Answer all questions in the spaces provided.
 ✓ Additional papers must not be inserted
 ✓ All working must be clearly shown where necessary.

For examiners use only

Questions	Maximum score	Candidates score
1 - 31	80	

1. (a)	An element A has atomic number 20 while element B has atomic number 8. Write the electronic configuration for each element. (2 m	narks)
 (b)	What type of hand would be formed when A and B and a	
(0)	What type of bond would be formed when A and B react. (1mag)	,
Fe ₍ Fe ₍	The equations below represents changes in the physical states for iron metal. (s) \rightarrow Fe _(l) ; H = +15.4kj mol ⁻¹ (n) \rightarrow Fe _(g) ; H = +354 kJMol ⁻¹ (leulate the amount of heat required to change 11.2g of iron solid to gaseous iron. (Fe = 56)	••••••
		arks)
••••		
	the unormation octow is on rour elements represented by letters P. O. R and S. Shidy it and	lanswer
the Q r		es P from
the Q r	questions that follow. eacts with dilute acids but not with cold water. R does not react with dilute acids. S displac oxide and P reacts with cold water. Arrange the elements in order of decreasing reactivity. (2 m	ees P from arks)
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6. The column below was used to soften hard water. Hard water in Resin Soft water out (a) Explain how the hard water was softened as it passed through the column. (1mark) (b) If the material in the column is not able to soften hard water, how could it be activated? (c) Give one advantage of using soft water. (1mark) 7. Determine the empirical formula of a compound made up of carbon and hydrogen given that the percentage of carbon in the compound is 79.9%. (C = 12.0, H = 1.0) 8. Write an equation for the reaction that occurs when butane is reacted with hydrogen gas in the presence of nickel catalyst. (1mark) 9. 22.2 cm3 of sodium hydroxide solution, containing 4.0g per litre of sodium hydroxide were required for complete neutralization of 0.1g of a dibasic acid. Calculate the relative formula mass of the dibasic acid. (Na = 23.0, O =16.0, H = 1.0).

10. Nitrogen and oxygen react according to the equation: $N_{2(g)} + O_{2(g)} = 2NO_{(g)}$; $\Delta H = +1$ If the reaction was allowed to reach equilibrium, explain the effect on the yield of $NO_{(g)}$ temperature was increased.	80kJ. if the (2 marks)
11. A student set up the apparatus to prepare and collect a sample of ammonia gas as sho diagram below. Study the set up and answer the questions that follow. Sodium hydroxide soln Ammonium chloride	
Identify two mistakes in the set up represented by the diagram.	(2 marks)

12. When excess ammonia solution is added to a solution of copper (II) ions a deep blue write the formula of the complex ion formed.	(1mark)
	•••••••
13. In terms of structure and bonding explain graphite conducts electricity while diamond	(2 marks)
14. When excess chlorine gas is bubbled through dilute sodium hydroxide solution, the resolution acts as a bleaching agent.(a) Write an equation for the reaction between chlorine gas and sodium hydroxide solution.	
(b) Explain how the solution acts as a bleaching agent.	(2 marks)

15. The graph below shows the solubility of potassium dichromate in water at different temperatures. Solubility Temperature / °C In an experiment 20g of a saturated solution of potassium dichromate (VI) was cooled from 60°C to 20°C. Calculate the mass of salt crystallized. 16. Give two reasons why during the manufacture of sulphuric (VI) acid, sulphur (VI) oxide gas is dissolved in concentrated sulphuric (VI acid, instead of dissolving it in water directly. 17. Write an equation for the process that takes place at the anode during the electrolysis of aqueous sodium sulphate solution using platinum electrodes. (1 mark) 18. The diagram shows the apparatus used for oxidizing ammonia in the laboratory. (a) State the observations made.

(1mark)

	3 ,
(b) Explain the observations.	(2 marks)
19. A solid P when heated gives a black powder Q and a colourless gas that fo lime water. When dilute sulphuric acid was added to powder Q, a pale blue so (a) Give the chemical formula of:	rms a white precipitate in lution was formed.
(i) Solid P.	(1mark)
(ii) Powder Q	(1mark)
A) Circ de color of a U.D.	
(b) Give the colour of solid P.	(1mark)
20 (a). Write an equation to represent the polymerization of 1-chloropropane. Cl H Cl H C = C H CH ₃	(2 marks)
(b) Name the polymer formed in (a) above.	(1mark)
21. State two observations that would be noted when solid lead (II) nitrate is h	eated strongly. (2 marks)
22. Study the information below and answer the questions that follow. A mixture contains 3 solids: alum, camphor and sugar. Alum is soluble in water but insoluble in both alcohol and ether. Camphor is so but insoluble in water while sugar is soluble in both water and alcohol but inso Explain how you would obtain a pure sample of sugar from the mixture.	oluble in alcohol and ether luble in ether. (3 marks)

23. Write two equations to show that all	uminum hydroxide is amphoteric.	(2 marks)
24. Starting with aqueous magnesium s oxide.	ulphate explain how you would obtain	a sample of magnesium (3 marks)
	•	
06 77 0.11 1 1 1 1 1 1 1 1 1 1 1 1		
25. The following electrolysis circuit is	set up, using mert electrodes P, Q, R	and S.
را	Q R S	
molten lead(II)		concentrated drochloric acid
(a) At which of the electrode(s) is a Gro	-	(1mark)
(a) At which of the electrode(s) is a Gre		
(a) At which of the electrode(s) is a Ord	· · · · · · · · · · · · · · · · · · ·	(,
(b) Write the ionic equation for the reac		(1 mark)
(b) Write the ionic equation for the reac		(1mark)
(b) Write the ionic equation for the reac	etion at electrode R.	(1 mark)
(b) Write the ionic equation for the reaction (c) A sample of silver contains impuriti	es of gold. During purification by electroice of anode and cathode for this pro-	(1 mark)
(b) Write the ionic equation for the reaction (c) A sample of silver contains impuriti is used as an electrode. Give the best chande.	es of gold. During purification by electroice of anode and cathode for this pro-	(1 mark)
(c) A sample of silver contains impuriti is used as an electrode. Give the best ch. Anode.	estion at electrode R. es of gold. During purification by electroice of anode and cathode for this pro	(1 mark)
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(c) A sample of silver contains impuriti is used as an electrode. Give the best ch. Anode.	es of gold. During purification by electroice of anode and cathode for this production energies of elements A and B. Ionization energies (kJMol-1)	(1 mark)
(c) A sample of silver contains impuriti is used as an electrode. Give the best che Anode	es of gold. During purification by electroice of anode and cathode for this produce at the cathode and cathode for this produce. Ization energies of elements A and B. Ionization energies (kJMol-1) 494	(1 mark)
(c) A sample of silver contains impuriti is used as an electrode. Give the best che Anode	es of gold. During purification by electroice of anode and cathode for this production energies of elements A and B. Ionization energies (kJMol-1)	(1 mark)
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(b) Compare the first and second ionization energies of element A. Explain.	(2 marks)
	•••••
27. Explain why very high temperatures are required for nitrogen to react with oxygen.	(1mark)
28. Hydrogen combines with oxygen to form water. How many moles of hydrogen atoms water contain? (H = 1.0; O = 16.0).	does 3.6g of (2 marks)
29 (a) What is meant by the following terms: (i) Valency	(1mark)
(ii) Electron affinity.	(1mark)
	• • • • • • • • • • • • • • • • • • • •
(b) (i) Why is air considered a mixture and not a compound?	(1mark)
(ii) Give one similarity between rusting and combustion.	(1mark)
30 (a) State the purpose of a pH scale.	(1mark)
b) Hydrochloric acid is a strong acid. Explain?	

(c) State two disadvantages of washing clothes in hard water using soapy detergents.	(2 marks)
31 (a) Name the type of reaction that occurs when a solution of lead (II) nitrate is added to sodium sulphate in a test tube.	(1mark)
(b) Write a balanced equation for the reaction that occurs when crystals of sodium nitrate test tube.	are heated in a (1mark)
(c) Give the meaning of "an acid salt".	(1mark)

This is the last printed page