CHEMISTRY DEPARTMENT 2023
S.6 BRAINSTORMING TEST
TOPIC; TRANSITION ELEMENTS
SUB-TOPIC; CHEMISTRY OF CHROMIUM

NAME……**INDEX number**…….

Signature …… **STREAM** …….
Instructions; Attempt **all** questions in this paper.

1. (a) Write
(i) The electronic configuration of chromium atom (atomic number =24) (01 mark)

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(ii) The all the possible oxidation states of chromium. (01 mk)

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b) (i) State the most common oxidation states of chromium

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(ii)Which one is the stable state of chromium? (01 mark)

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c) (i)Write the formulae of the oxide of chromium in each of the above oxidation states. (1½ marks)

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(ii) State three reasons why chromium is a transition element. (03marks)

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(c) Explain why chromium

(i) is a transition element. (01 mark)

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(ii) has variable oxidation states. (01 mark)

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(iii) forms complexes (01 mark)

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d) State two ways in which the chemistry of chromium resembles that of aluminium. (02 marks)

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2. (a) Write an equation for the reaction of chromium with

(i) Air (1½ marks)

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(ii) Water (1½ marks)

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(iii) dilute acids (03 marks)

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(iv) Concentrated acids. (03 marks)

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(b) A solution of chromium(III) sulphate turns a blue litmus paper to red. Explain this observation (03 marks)

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3. (a) Write an equation for reaction between hot concentrated sodium hydroxide solution and

(i) Chromium metal

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(ii) chromium(iii) oxide

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(b) (i) A piece of chromium metal was dropped in a hot solution of hydrochloric acid. State what was observed and write the equation for the reaction

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(ii) Chlorine was bubbled through the resultant mixture in a) above. State what was observed and write the equation for the reaction

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(iii) Excess sodium hydroxide solution was added to the product in b) above. State what was observed and write the equation for the reaction

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(iv) Hydrogen peroxide was added to above mixture and the mixture boiled. State what was observed and write the equation for the reaction

Observation

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Equation (1½ marks)

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(c) State what is observed and wrote equation for the reaction when the following are added to a solution of chromium(III) nitrate

(i) Sodium hydrogen carbonate solution

Observation

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Equation (1½ marks)

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(ii) Sodium carbonate solution

Observation

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Equation (1½ marks)

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(iii) Sodium sulphite solution

Observation

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Equation (1½ marks)

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(iv) Ammonium sulphide

Observation

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Equation (1½ marks)

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(v) Magnesium powder

Observation

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Equation (1½ marks)

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(vi) Aqueous ammonia solution dropwise until in excess.

Observation

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Equation (1½ marks)

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(vii) Sodium hydroxide solution dropwise until in excess

Observation

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Equation (1½ marks)

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4. (a) Write equation for the decomposition of solid Ammonium dichromate. (1½ marks)

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b) Sodium hydroxide solution was added to Potassium dichromate(vi) solution in test tube. State what was observed and write an equation for the reaction

Observation

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Equation (1½ marks)

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c) To the resultant solution above, dilute sulphuric acid was added. State what was observed and write an equation for the reaction

Observation

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Equation (1½ marks)

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END.