CANDIDATE – PLEASE NOTE!

PRINT your name on the line below and return this booklet with your answer sheet. Failure to do so may result in disqualification.

FORM TP 02025059

TEST CODE **01212010**

MAY/JUNE 2025

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

CHEMISTRY

Paper 01 – General Proficiency

1 hour 15 minutes

02 JUNE 2025 (p.m.)

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This test consists of 60 items. You will have 1 hour and 15 minutes to answer them.
2. In addition to this test booklet, you should have an answer sheet.
3. Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.
4. On your answer sheet, find the number which corresponds to your item and shade the space having the same letter as the answer you have chosen. Look at the sample item below.

Sample Item

The SI unit of length is the

(A) metre
(B) second
(C) newton
(D) kilogram

Sample Answer

● Ⓑ Ⓒ Ⓓ

The best answer to this item is "metre", so (A) has been shaded.

5. If you want to change your answer, erase it completely before you fill in your new choice.
6. When you are told to begin, turn the page and work as quickly and as carefully as you can. If you cannot answer an item, go on to the next one. You may return to that item later.
7. You may do any rough work in this booklet.
8. Figures are not necessarily drawn to scale.
9. You may use a silent, non-programmable calculator to answer items.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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1. Which of the following properties refer to an electron?

	Relative Charge	Approximate Mass
(A)	–1	0
(B)	0	1
(C)	0	2
(D)	+1	1

2. Which of the following processes does NOT provide evidence in support of the particulate nature of matter?

(A) Osmosis
(B) Diffusion
(C) Filtration
(D) Brownian motion

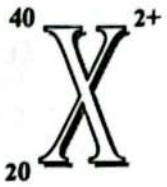
3. From which of the following substances can a solid be obtained by the process of sedimentation?

(A) Gels
(B) Foams
(C) Emulsions
(D) Suspensions

4. Which of the following substances consists of the cation of a base and an anion of an acid?

(A) Salt
(B) Alkali
(C) Neutral oxide
(D) Acid anhydride

Item 5 refers to the following diagram in which X represents the symbol of a positive ion.



5. Which of the following pairs represents the number of neutrons and electrons in X?

	Number of Neutrons	Number of Electrons
(A)	20	20
(B)	20	18
(C)	60	18
(D)	60	20

6. What mass of neon atoms contains the same number of moles as 140 g of calcium atoms? [RAM: Ne = 20; Ca = 40]

(A) 0.70 g
(B) 7.00 g
(C) 70.00 g
(D) 700.00 g

7. Which of the following salts is an acid salt?

(A) $NaHSO_4$
(B) Na_2SO_4
(C) Na_3PO_4
(D) Na_2CO_3

8. A 'weak acid' is BEST described as one that yields a

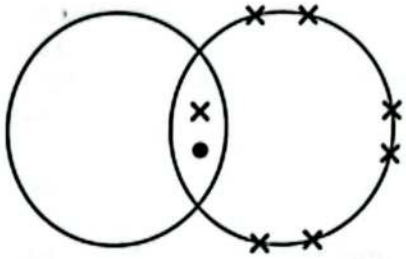
(A) low reading on the pH meter
(B) low concentration of acid in aqueous solution
(C) high concentration of hydrogen ions in solution
(D) low concentration of hydrogen ions in aqueous solution

9. Which of the following substances do NOT produce water when reacted with acid?

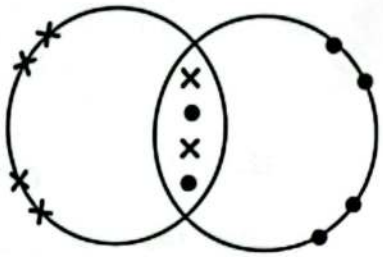
(A) Carbonates
(B) Metal oxides
(C) Active metals
(D) Metal hydroxides

10. Which of the following diagrams illustrates bonding in chlorine?

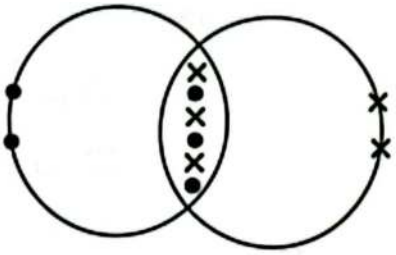
(A)



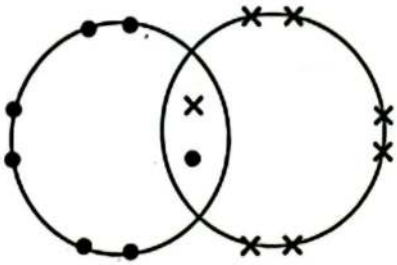
(B)



(C)



(D)



Item 11 refers to the information in the following table.

Element	Atomic Number
I	3
II	6
III	17
IV	18

11. Which TWO elements above, when combined with each other, form an ionic compound?

(A) I and II
(B) I and III
(C) II and IV
(D) III and IV

12. The ionic equation for the reaction between an acid and a carbonate is represented by

(A) $2H^+(aq) + CO_3^{2-}(aq) \rightarrow HCO_3^-(aq)$

(B) $H^+(aq) + CO_3^{2-}(aq) \rightarrow H_2CO_3(aq)$

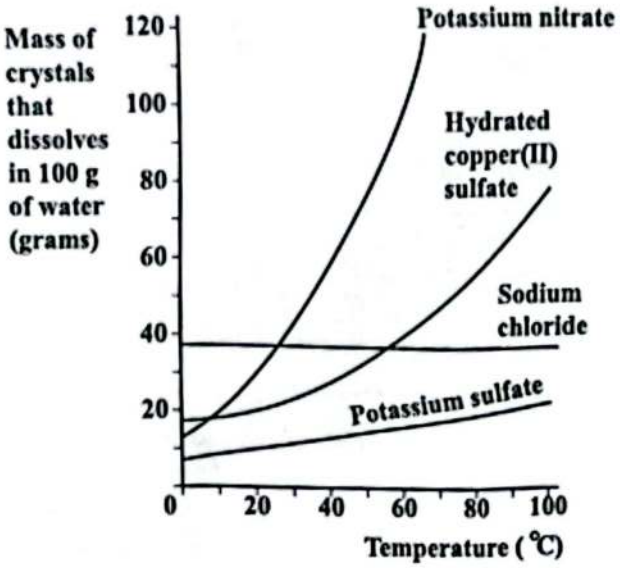
(C) $2H^+(aq) + CO_3^{2-}(aq) \rightarrow CO_2(g) + H_2O(l)$

(D) $H^+(aq) + CO_3^{2-}(aq) \rightarrow CO_2(g) + H_2O(l)$

13. An atom has 20 electrons. When it ionizes, it has the same electronic configuration as

(A) neon
(B) argon
(C) sodium
(D) calcium

Item 14 refers to the solubility curves in the following diagram.



14. The salt whose solubility changes to the GREATEST extent in the temperature range 0 °C to 60 °C is

(A) sodium chloride
(B) potassium nitrate
(C) potassium sulfate
(D) hydrated copper(II) sulfate

15. The mass number of an element is defined as

(A) the number of neutrons
(B) the number of electrons
(C) the number of neutrons and protons
(D) the number of electrons and neutrons

16. Which of the following acids is formed during intense exercise?

(A) Lactic
(B) Ascorbic
(C) Ethanoic
(D) Methanoic

Item 17 refers to the following table.

Element	Number of Protons	Number of Electrons	Number of Neutrons
W	9	9	9
X	17	17	17
Y	9	9	10
Z	17	18	17

17. All of the elements shown above belong to which group of the periodic table?

(A) Group IV
(B) Group V
(C) Group VI
(D) Group VII

18. Crystals of sodium chloride are BEST described as

(A) ionic
(B) metallic
(C) molecular
(D) macromolecular

19. Where does oxidation take place during electrolysis?

(A) Conductor
(B) Electrolyte
(C) Cathode
(D) Anode

20. Which of the following is the correct formula for ammonium carbonate?

(A) NH_4CO_3

(B) $NH_4(CO_3)_2$

(C) $(NH_4)_2CO_3$

(D) $(NH_4)_2(CO_3)_2$

21. Which of the following mixtures can be referred to as a standard solution?

(A) Iodine in 50 cm^3 of ethanol
(B) 30 g of sodium chloride in water
(C) Sodium chloride in 50 cm^3 of water
(D) 30 g of iodine in 50 cm^3 of ethanol

22. Which of the following elements exhi allotropy?

(A) Silicon
(B) Carbon
(C) Uranium
(D) Aluminium

23. The relative atomic mass of carbon is 1 and that of oxygen is 16. Therefore, 88 of carbon dioxide consists of

(A) 3.1 moles of carbon dioxide
(B) 12 moles of carbon and 32 mole of oxygen
(C) 1 mole of carbon atoms an 2 moles of oxygen atoms
(D) 2 moles of carbon atoms an 4 moles of oxygen atoms

24. A mixture of copper(II) oxide an copper(II) sulfate is BEST separated by

(A) distilling the mixture
(B) heating the mixture and condensin
(C) shaking with excess water and the filtering
(D) shaking with excess water followe by fractional distillation

25. When 100 cm^3 of 2 mol dm^{-3} hydrochloric acid (in excess) is added to 5.0 g of granulated zinc, hydrogen gas is evolved at a certain rate. If 5.0 g of powdered zinc were used instead, the rate of production of hydrogen gas would

(A) increase because of the greater concentration of powdered zinc
(B) increase because of the increased surface area of powdered zinc
(C) decrease because of the decreased surface area of powdered zinc
(D) decrease because of the lower solubility of powdered zinc

26. The Faraday constant has a value of

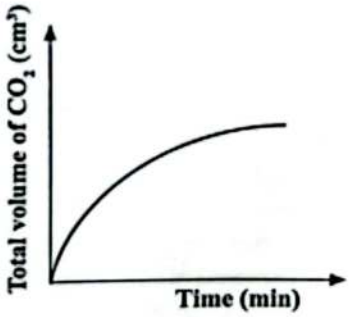
(A) 96 500 C mol^{-1}
(B) 9 500 C mol^{-1}
(C) 950 C mol^{-1}
(D) 95 C mol^{-1}

27. Which of the following occurs during the breaking of a chemical bond?

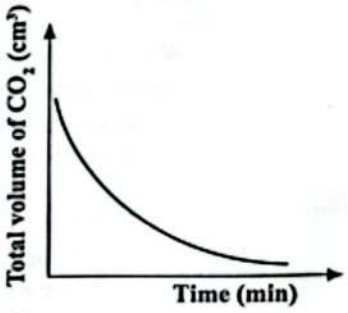
(A) There is an exothermic reaction.
(B) There is no energy change.
(C) Energy is required.
(D) Energy is released.

28. Some calcium carbonate was reacted with excess dilute hydrochloric acid. The volume of carbon dioxide evolved was recorded and plotted against time. Which of the following graphs represents this reaction?

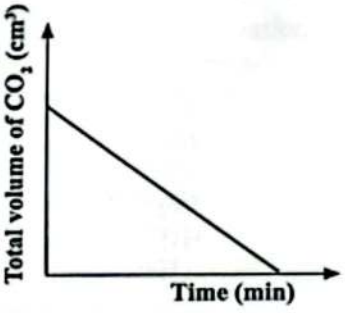
(A)



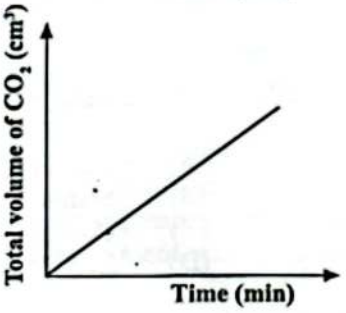
(B)



(C)



(D)



Item 29 refers to the following sequence of reactions involving iron compounds, where I, II, III and IV represent progressive stages in the sequence.

$$FeCO_3 \xrightarrow{I} FeO \xrightarrow{II} Fe_2O_3 \xrightarrow{III} Fe_2(SO_4)_3 \xrightarrow{IV} Fe(OH)_3$$

29. In which stage is the oxidation state of iron increased?

(A) I
(B) II
(C) III
(D) IV

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30. Which of the following metals has become an environmental hazard because of the indiscriminate disposal of thermometers by labs and hospitals?

(A) Lead
(B) Copper
(C) Mercury
(D) Aluminium

31. Which of the following metals will react MOST vigorously with dilute acid?

(A) Zinc
(B) Iron
(C) Lead
(D) Copper

32. Which metal is MOST easily ionized?

(A) Aluminium
(B) Sodium
(C) Copper
(D) Iron

33. Stainless steel is used to make utensils and surgical instruments. Which of the following is the major metal found in steel?

(A) Iron
(B) Sodium
(C) Copper
(D) Aluminium

34. Which of the following is the reason for adding cryolite to pure alumina during the extraction of aluminium by electrolysis?

(A) It lowers the melting point.
(B) It reduces the resistance.
(C) It reduces the current.
(D) It prevents damage.

35. When copper(II) carbonate is heated alone in a dry test tube, a gas is evolved and a black residue is formed. This gas is expected to

(A) turn red litmus blue
(B) relight a glowing splint
(C) decolourize acidified aqueous potassium manganate(VII)
(D) form a white precipitate with aqueous calcium hydroxide

36. A suitable drying agent for the laboratory preparation of ammonia gas is

(A) calcium oxide
(B) calcium chloride
(C) concentrated sulfuric acid
(D) anhydrous copper sulfate

37. Which of the following compounds may be used to counteract the effects of acid rain on the soil?

(A) CaO
(B) H_2S
(C) SO_2
(D) CO

38. An element that is a non-metal

(A) is a solid at room temperature
(B) can act as a reducing agent
(C) forms an acidic oxide
(D) conducts electricity

39. Which of the following aqueous solutions will produce a blue precipitate with aqueous sodium hydroxide?

(A) Aluminium nitrate
(B) Copper(II) nitrate
(C) Iron(III) nitrate
(D) Iron(II) nitrate

40. Which of the following is NOT a method used to treat water for domestic purposes?

(A) Chlorinating
(B) Filtering
(C) Stirring
(D) Boiling

Item 41 refers to the following table showing various tests and observations for gases.

	Test	Observation
(A)	Damp blue litmus paper	Damp blue litmus paper turns red.
(B)	Glowing splint	Splint relights.
(C)	Damp red litmus paper	Damp red litmus paper turns blue.
(D)	Lit splint	Splint extinguishes with a pop.

41. Which test can be used to identify an acidic gas?

42. Which of the following observations is expected when aqueous silver nitrate is added to aqueous potassium chloride?

(A) A pungent gas is evolved.
(B) A blue precipitate appears.
(C) A white precipitate appears.
(D) A brown precipitate appears.

43. Why is aluminium more resistant to corrosion than iron?

(A) Aluminium oxide formed is more reactive than iron oxide formed.
(B) Aluminium has reacted completely but iron has not reacted completely.
(C) Aluminium oxide does not react with aluminium but iron oxide reacts with iron.
(D) Aluminium oxide protects the aluminium but iron oxide does not protect the iron.

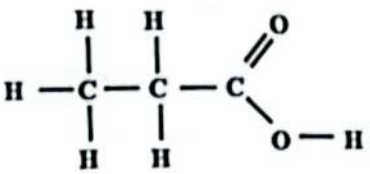
44. Which of the following properties of water explains why ice floats on the surface of a lake?

(A) Density
(B) Surface tension
(C) Universal solvent
(D) Heat of vaporization

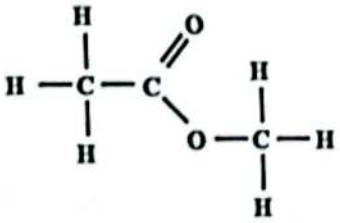
45. Which of the following hydrocarbons is the MAJOR constituent of natural gas?

(A) Butane
(B) Ethane
(C) Propane
(D) Methane

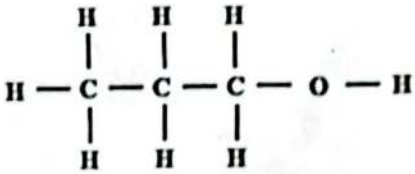
Item 46 refers to the fully displayed structural formulae of compounds Q, R and S shown below.



Q



R



S

46. Which of the following correctly identifies the homologous series to which each compound belongs?

	Q	R	S
(A)	Ester	Acid	Alcohol
(B)	Acid	Alcohol	Ester
(C)	Acid	Ester	Alcohol
(D)	Alcohol	Ester	Acid

47. Which of the following substances is used as a monomer in addition polymerization?

(A) C_3H_7OH

(B) C_3H_6

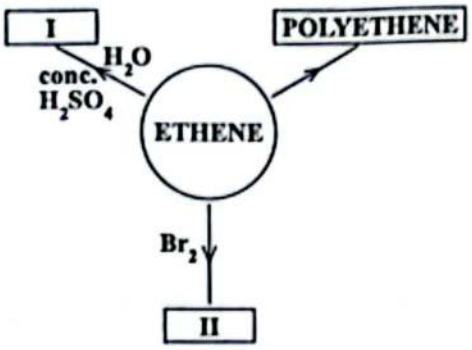
(C) C_3H_8

(D) $CH_3COOC_2H_5$

48. When large alkane molecules are cracked, the products are a mixture of

(A) small alkane molecules only
(B) small alkene molecules only
(C) large and small alkane molecules
(D) small alkane and alkene molecules

Item 49 refers to the following chart showing the conversion of ethene to different products.



49. The product, polyethene, is a

(A) gas
(B) solid
(C) liquid
(D) solution

50. Which of the following features is NOT true of all homologous series of compounds?

The members of the series have

(A) the same functional group
(B) the same general formula
(C) similar chemical properties
(D) the same empirical formula

51. Which of the following is the residue in the fractional distillation of petroleum?

(A) Propene
(B) Bitumen
(C) Methane
(D) Paraffin

52. Which of the following terms describes starch?

(A) Giant ionic structure
(B) Giant covalent structure
(C) Simple molecular crystal
(D) Macromolecular structure

53. Which of the following statements is/are true of alkenes?

I. They react with $KMnO_4/H^+$.
II. They undergo addition reactions.
III. They undergo substitution reactions.

(A) I only
(B) I and II only
(C) I and III only
(D) I, II and III

54. The compound $CH_3CH_2CH_2CH_2OH$ is called

(A) 1-propanol
(B) 4-propanol
(C) 1-butanol
(D) 4-butanol

55. A hydrocarbon is described as being unsaturated. This means that the

(A) molecule has insufficient hydrogen atoms
(B) molecule contains at least one double bond
(C) carbon atoms in the molecule are very reactive
(D) carbon atoms in the molecule are linked by single bonds

56. Which of the following compounds can be dehydrated?

(A) Natural gas
(B) Propene
(C) Vinegar
(D) Ethanol

57. Which of the following statements are true of alkanes and alkenes?

I. Both alkanes and alkenes burn in air to produce carbon dioxide and water.
II. Alkanes undergo substitution reactions whilst alkenes undergo addition reactions.
III. Alkanes are saturated hydrocarbons whilst alkenes are unsaturated hydrocarbons.

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

58. During the manufacture of ethanol by fermentation, the gas which is evolved

(A) turns lime water cloudy
(B) burns with a blue flame
(C) relights a glowing splint
(D) turns potassium dichromate green

Item 59 refers to the following equation.

Organic acid + Alcohol $\rightleftharpoons$ Ester + Water

59. The reverse reaction is known as

(A) synthesis
(B) hydrolysis
(C) esterification
(D) polymerization

60. Which of the following are reactions of ethanoic acid?

I. It forms a salt with aqueous sodium hydroxide.
II. It liberates carbon dioxide from a carbonate.
III. It liberates hydrogen on contact with a strongly electropositive metal.

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II and III

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.