

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X

ANNUAL EXAMINATIONS (THEORY) 2023

Chemistry Paper I

Time: 1 hour 10 minutes Marks: 40

INSTRUCTIONS

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 40 only.
4. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.

| Correct Way | Incorrect Ways |
|---------------------------|---------------------------|
| 1 (A) (B) (●) (D) | 1 (A) (B) (✗) (D) |
| | 2 (A) (B) (●) (D) |
| | 3 (A) (B) (✗) (D) |
| | 4 (A) (B) (✗) (D) |

Candidate's Signature

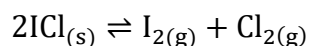
5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. You may use a simple calculator if you wish.

1. In the progression of any reversible chemical reaction, the point at which no net change occurs in the total concentration of reactants and products is known as
- chemical kinetics.
 - chemical equation.
 - chemical energetics.
 - chemical equilibrium.

2. Which of the following exemplifies an exothermic process?

- Cracking of oil fractions
- Melting of bituminous coal
- Burning of petrol in a car engine
- Fractional distillation of petroleum

3. Given is the heterogeneous equilibrium reaction.



If all the reactants and products are used in molar concentrations, then what will be the unit for equilibrium constant?

- $\text{mol} \cdot \text{dm}^{-3}$
 - $\text{mol}^2 \cdot \text{dm}^{-6}$
 - $\text{mol}^{-2} \cdot \text{dm}^6$
 - No unit
4. The addition of a catalyst to a reversible reaction at equilibrium will alter the reaction's
- position.
 - heat energy.
 - activation energy.
 - equilibrium constant.
5. According to the given chemical equation, the formation of nitrogen dioxide gas can be increased when



| | Temperature | Pressure |
|---|-------------|----------|
| A | high | low |
| B | low | high |
| C | high | high |
| D | low | low |

6. In a science laboratory, Asghar takes aqueous ammonia in two different test tubes. In test tube **I**, he dips a moist red litmus paper while in test tube **II**, he adds aqueous sulphuric acid.

Which of the following options identifies the CORRECT result in each test tube?

| | Test Tube I | Test Tube II |
|---|-------------------------|---|
| A | No change | $(\text{NH}_4)_2\text{SO}_4 + \text{H}_2\text{O}$ |
| B | No change | $(\text{NH}_4)_2\text{SO}_4$ |
| C | Litmus paper turns blue | $(\text{NH}_4)_2\text{SO}_4$ |
| D | Litmus paper turns blue | $(\text{NH}_4)_2\text{SO}_4 + \text{H}_2\text{O}$ |

7. The given table shows the pH value of different body fluids.

Which of these is the MOST acidic?

| | Body Fluid | pH Value |
|---|------------------|-----------|
| A | Nasal mucus | 5.5 – 6.5 |
| B | Pancreatic juice | 7.5 – 8.0 |
| C | Urine | 5.0 – 6.0 |
| D | Tears | 6.5 – 7.6 |

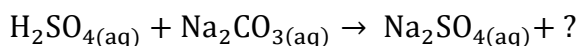
8. Which of the following salts exemplifies an acidic salt?

- A. NaCl
- B. NH_4Cl
- C. BaCl_2
- D. CaCl_2

9. The pH of a 0.5 M solution of $\text{Ba}(\text{OH})_2$ is

- A. 0.3
- B. 1.0
- C. 13.6
- D. 14.0

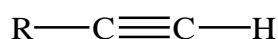
10. The by-products of the given reaction will be



- A. $\text{H}_2(\text{g}) + \text{CO}(\text{g})$
- B. $\text{H}_2(\text{g}) + \text{CO}_2(\text{g})$
- C. $\text{H}_2\text{O}(\text{l}) + \text{CO}(\text{g})$
- D. $\text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$

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11. Ethylene is used as a feedstock in the making of
- rubber toys.
 - glass bottles.
 - ceramic tiles.
 - plastic boxes.
12. Using the rules of International Union of Pure and Applied Chemistry (IUPAC) nomenclature, the FIRST step to name an alkane is to
- find and name the longest continuous carbon chain.
 - identify and name groups attached to the carbon chain.
 - number the chain consecutively, starting at the end nearest a substituent group.
 - designate the location of each substituent group by an appropriate number and name.
13. Alkanes are saturated hydrocarbons because they
- give addition reactions.
 - tend to form oily products.
 - are straight chain hydrocarbons.
 - contain single carbon-carbon bond.
14. Consider the following terminal alkyne.



If the given alkyne undergoes oxidation in the presence of strong alkaline KMnO_4 , then the end products of this reaction will be

| | End Products |
|---|---|
| A | $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C} \\ \diagup \quad \diagdown \\ \quad \quad \text{OH} \end{array} + \begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C} \\ \diagup \quad \diagdown \\ \quad \quad \text{OH} \end{array}$ |
| B | $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C} \\ \diagup \quad \diagdown \\ \quad \quad \text{OH} \end{array} + \text{CO}_2$ |
| C | $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C} \\ \diagup \quad \diagdown \\ \quad \quad \text{O}^- \end{array} \text{K}^+ + \text{MnO}_2 + \text{MnO}_4^{-2}$ |
| D | $\begin{array}{c} \text{OH} \quad \text{OH} \\ \quad \\ \text{R}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array} + \text{MnO}_2 + \text{MnO}_4^{-2}$ |

15. Which of the following reactants on heating with zinc dust produces ethyne?

| | |
|--|--|
| $\begin{array}{c} \text{Cl} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{Cl} \end{array}$ | $\begin{array}{c} \text{H} \quad \text{Cl} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{Cl} \end{array}$ |
| A | B |
| $\begin{array}{c} \text{Cl} \quad \text{Cl} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{Cl} \quad \text{Cl} \end{array}$ | $\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{Cl} \end{array}$ |
| C | D |

16. The variety of organic compounds is MAINLY due to

- I. catenation
- II. isomerism
- III. polymerisation

- A. I only.
- B. I and II.
- C. III only.
- D. II and III.

17. Which of the following is NOT an organic compound?

- A. Urea
- B. Diamond
- C. Table sugar
- D. Deoxyribonucleic acid

18. Consider the given structures of alkane.

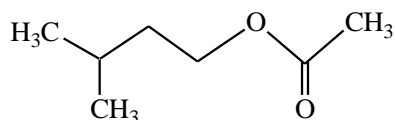
| | | |
|---|--|---|
| $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$ | $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$ | $\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$ |
| I | II | III |

The structure(s) that can form more than two alkyl radicals is/ are

- A. I only.
- B. I and II.
- C. III only.
- D. II and III.

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19. Consider the given structure of a compound that gives banana its characteristic smell.



Based on its functional group, the compound belongs to a class that is

- A. ester.
 - B. ketone.
 - C. aldehyde.
 - D. carboxylic acid.
20. The molecular formula of pent-1-ene is
- A. C₅H₁₂
 - B. C₅H₁₀
 - C. C₅H₈
 - D. C₅H₆
21. Given are some essential minerals.

- I. Iron
- II. Zinc
- III. Sulphur
- IV. Phosphorus

The minerals that are required in larger amounts by a human body are

- A. I and II.
 - B. I and IV.
 - C. II and III.
 - D. III and IV.
22. Upon hydrolysis, a disaccharide molecule breaks into two units of glucose.

This disaccharide is identified as

- A. lactose.
 - B. sucrose.
 - C. maltose.
 - D. fructose.
23. The structure of nucleoside in the ribonucleic acid (RNA) has a
- A. phosphate group.
 - B. thymine molecule.
 - C. hexose sugar moiety.
 - D. uracil nitrogenous base.

24. The vitamin that is easily absorbed by the body in the presence of fats is
- vitamin A.
 - vitamin B3.
 - vitamin B12.
 - vitamin C.
25. Oils can be converted into fats by the process of
- oxidation.
 - hydration.
 - halogenation.
 - hydrogenation.
26. The MOST effective method to remove permanent hardness from water is
- boiling.
 - distillation.
 - Clark's method.
 - ion exchange resin method.
27. How many hydrogen bonds are present in a molecule of water?
- One
 - Two
 - Three
 - Four
28. Which of the following water borne diseases damages bones and teeth?
- Cholera
 - Typhoid
 - Fluorosis
 - Hepatitis
29. Calcium ions present in a sample of permanent hard water can be removed by reacting the sample with
- calcium zeolite.
 - sodium carbonate.
 - calcium carbonate.
 - magnesium zeolite.
30. A raw water treatment process is unable to remove
- microorganisms.
 - foul smelling gases.
 - low density particles.
 - calcium and magnesium ions.

31. The incomplete combustion of petrol in car engines produces

- A. carbon dioxide.
- B. nitrogen dioxide.
- C. carbon monoxide.
- D. nitrogen monoxide.

32. The emission of greenhouse gases is increased by

- A. acid rain.
- B. deforestation.
- C. eutrophication.
- D. global warming.

33. Based on the critical pH level of water, the organism that can survive in acid rain is

| | Critical pH Level of Water | Aquatic organism |
|---|----------------------------|------------------|
| A | 6 | Clams |
| B | 5.5 | Crayfish |
| C | 5 | Trout |
| D | 4 | Frog |

34. Consider the following features of a layer in Earth's atmosphere.

- Coldest temperature reaches up to -90°C
- Air crafts cannot reach to its height
- Glowing meteoroids are formed here
- Satellite is unable to measure its traits

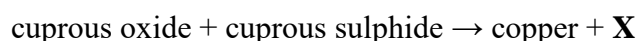
Based on the given features, the layer of atmosphere identified is

- A. exosphere.
- B. ionosphere.
- C. mesosphere.
- D. thermosphere.

35. Which of the following environmental spheres is considered to be the sum of all the ecosystems?

- A. Biosphere
- B. Lithosphere
- C. Atmosphere
- D. Hydrosphere

36. During the extraction of copper, one of the reactions that takes place in Bessemer converter is given below.



The gas **X** produced in the given reaction is

- A. oxygen.
 - B. hydrogen.
 - C. sulphur dioxide.
 - D. hydrogen sulphide.
37. During the manufacturing of nitric acid by Ostwald process, the oxidation of nitric oxide results in the formation of
- A. NO
 - B. NO₂
 - C. N₂O
 - D. N₂O₃
38. The chemicals that provide nourishment to plants for a healthy growth are known as
- A. fertilisers.
 - B. herbicides.
 - C. neutralisers.
 - D. insecticides.
39. In Solvay's process, ammonium bicarbonate reacts with sodium chloride to form
- A. sodium bicarbonate, ammonia and chlorine.
 - B. sodium bicarbonate and ammonium chloride.
 - C. sodium carbonate, ammonia and hydrogen chloride.
 - D. sodium carbonate, carbon dioxide and ammonium chloride.
40. During the extraction of iron in a blast furnace, the haematite ore is
- A. reduced.
 - B. oxidised.
 - C. hydrated.
 - D. neutralised.

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