

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X

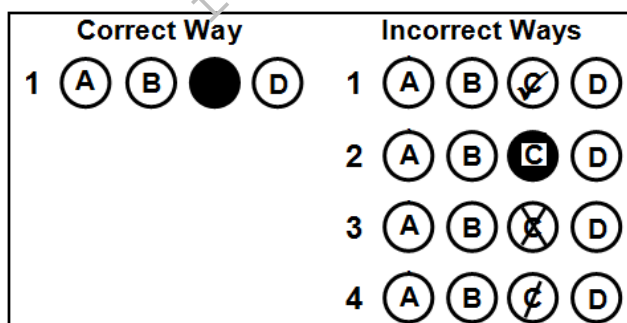
ANNUAL EXAMINATIONS (THEORY) 2025

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.



Candidate's Signature

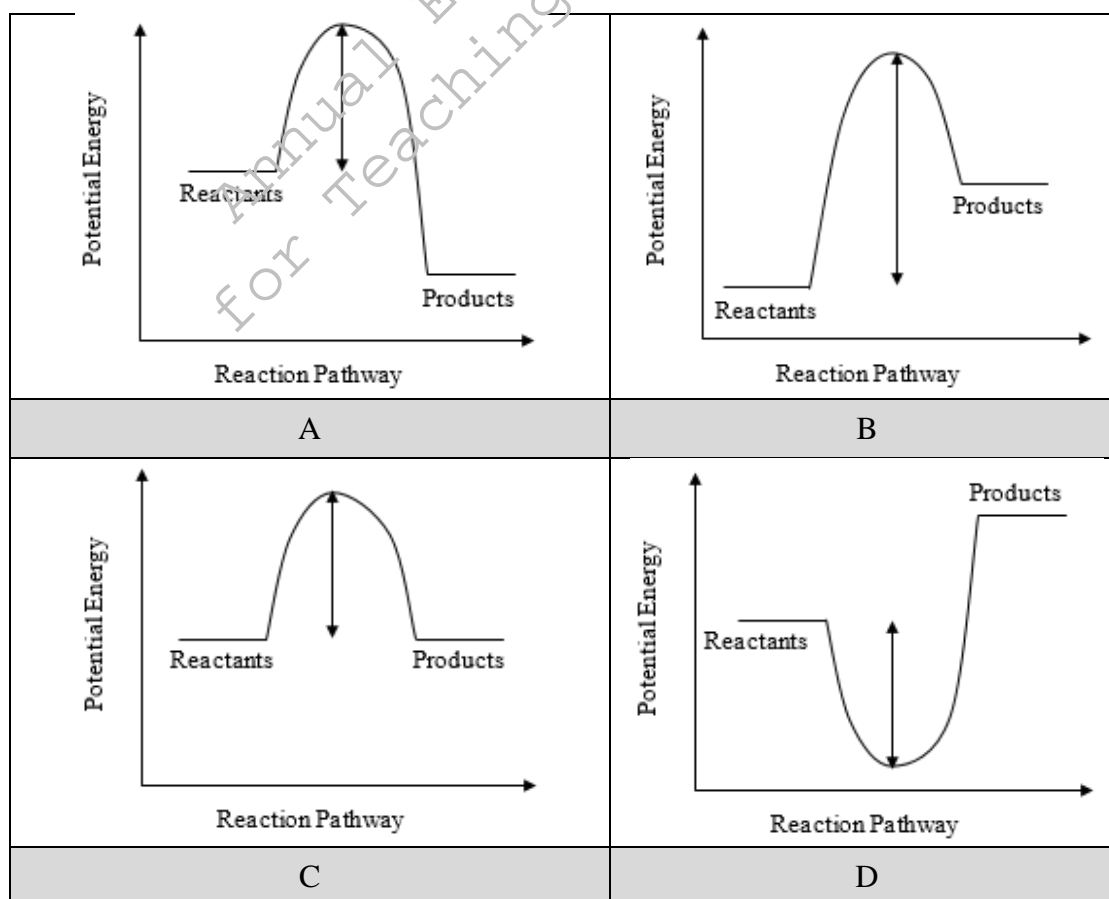
5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. You may use a simple calculator if you wish.

- An addition of a catalyst in a chemical reaction helps to increase the
 - yield of a chemical reaction.
 - speed of a chemical reaction.
 - activation energy of a chemical reaction.
 - product formation in the presence of impurities.
- Nitrogen dioxide (NO_2), a reddish-brown gas, is a major pollutant released from car exhausts which causes acid rain. When two molecules of NO_2 join together, they form one molecule of the colourless dinitrogen tetroxide gas. The equilibrium constant K_c expression for this reversible reaction is

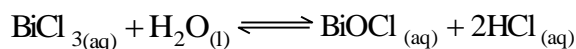
$$K_c = \frac{[\text{N}_2\text{O}_4]}{[\text{NO}_2]^2}$$

What will be the unit of equilibrium constant for this reaction?

- $\frac{\text{mol}}{\text{dm}^3}$
 - $\frac{\text{dm}^3}{\text{mol}}$
 - $\frac{\text{mol}^{-2}}{\text{dm}^6}$
 - $\frac{\text{dm}^{-3}}{\text{mol}}$
- The energy profile diagram that represents the burning of wood in air is



4. Which of the following two concentrations when changed will cause the equilibrium to shift to the left?



- A. Decrease $[\text{H}_2\text{O}]$, increase $[\text{BiOCl}]$
 B. Increase $[\text{H}_2\text{O}]$, increase $[\text{HCl}]$
 C. Decrease $[\text{BiCl}_3]$, decrease $[\text{BiOCl}]$
 D. Increase $[\text{BiCl}_3]$, decrease $[\text{HCl}]$
5. What is the effect of a rise in temperature on an exothermic reversible reaction at equilibrium?
- A. It will equalise the amount of reactant and product.
 B. It will shift the equilibrium in the reverse direction.
 C. It will shift the equilibrium in the forward direction.
 D. It will stop the reaction from proceeding in both directions
6. The substance that acts as a Brønsted-Lowry acid when it reacts with water is
- A. CH_4
 B. NH_3
 C. H_2S
 D. CO_3^{2-}
7. The figure below shows the colours of two indicators: methyl orange and litmus solution at different pH values.

Methyl Orange	Red	Yellow
Litmus	Red	Blue
pH	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14	

Methyl orange and litmus solution both produce the same result of red colour when introduced in a solution of

- A. sugar and water.
 B. sodium and water.
 C. sulphur dioxide and water.
 D. sodium chloride and water.
8. $2\text{HNO}_{3(\text{aq})} + \text{Na}_2\text{CO}_{3(\text{aq})} \rightarrow ?$

The products of the given reaction are

- A. $2\text{NaNO}_{3(\text{aq})} + \text{H}_2\text{O}_{(\text{l})} + \text{CO}_{(\text{g})}$
 B. $2\text{NaNO}_{2(\text{aq})} + \text{H}_2\text{O}_{(\text{l})} + \text{CO}_{2(\text{g})}$
 C. $2\text{NaNO}_{3(\text{aq})} + \text{H}_2\text{O}_{(\text{l})} + \text{CO}_{2(\text{g})}$
 D. $2\text{NO}_{2(\text{g})} + \text{Na}_2\text{O}_{2(\text{aq})} + \text{H}_2\text{CO}_{3(\text{aq})}$

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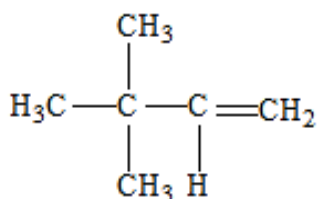
9. In an incomplete neutralisation reaction of $\text{Zn}(\text{OH})_2$ by HCl , which type of salt will be obtained?

- A. Basic salt
- B. Mixed salt
- C. Acidic salt
- D. Neutral salt

10. The benefit of using milk of magnesia, $\text{Mg}(\text{OH})_2$, for humans is that it

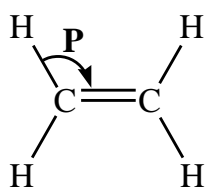
- A. cures jaundice.
- B. treats tooth decay.
- C. reduces stomach acidity.
- D. relieves the pain of insect bites.

11. The name of the given compound as recommended by the International Union of Pure and Applied Chemistry (IUPAC) is



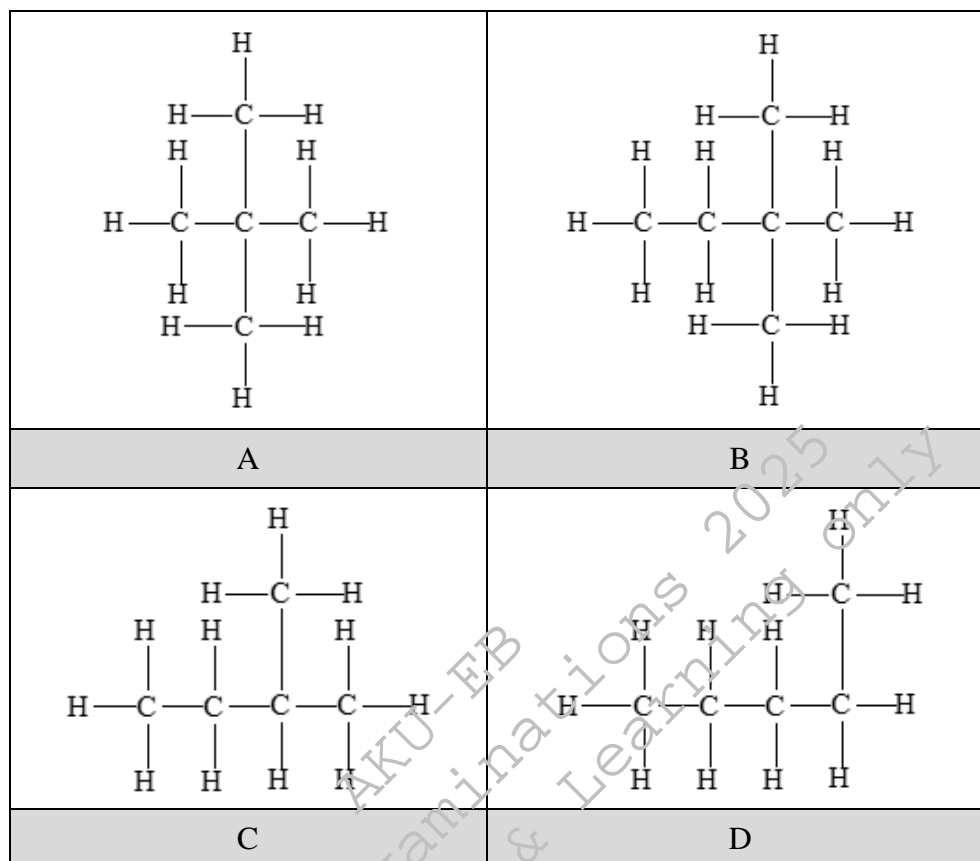
- A. 2,2-dimethyl-3-butene.
- B. 3,3-dimethyl-1-butene.
- C. 1,1,1-trimethyl-2-propene.
- D. 3,3,3-trimethyl-1-propene.

12. The angle **P** in the given structure is



- A. 60°
- B. 95°
- C. 120°
- D. 165°

13. The structural formula of isopentane is



14. Which of the following processes is used for the conversion of vegetable oil into banaspati ghee?

- A. Halogenation
- B. Hydrogenation
- C. Dehalogenation
- D. Dehydrogenation

15. A gaseous mixture of hydrocarbons that mainly consists of methane and is used for cooking at home is known as

- A. natural gas.
- B. artificial gas.
- C. liquefied gas.
- D. compressed gas.

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16. Organic compounds have **X** bonding; therefore, they exhibit **Y** electrical conductivity both in fused state and in solution form.

Which of the following CORRECTLY identifies **X** and **Y**?

	X	Y
A	Ionic	Poor
B	Metallic	Good
C	Covalent	Poor
D	Ionic	Good

17. A petrol tanker has the following hazard warning symbol on it.



The symbol indicates that the tanker contains a compound that is

- A. corrosive.
 B. explosive.
 C. flammable.
 D. radioactive.
18. The following tests are carried out on an aqueous solution of compound **X**. The given observation table depicts the tests and their results.

Test	Result
Dip blue and red litmus paper	Blue litmus paper turns red while red litmus paper remains unchanged.
Add bromine water	The white precipitate is formed.
Add a neutral solution of ferric chloride slowly and dropwise	The violet-purple colouration is observed.

The observation table indicates that the compound **X** is a/ an

- A. ketone.
 B. phenol.
 C. aldehyde.
 D. carboxylic acid.

19. The number of carbon atoms an alkane must possess to exhibit three possible chain isomers is
- two.
 - three.
 - four.
 - five.
20. The carboxyl functional group is present in

$\begin{array}{c} \text{O} \\ \\ \text{H}_3\text{C}-\text{CH}_2-\text{C}-\text{CH}_3 \end{array}$	$\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\text{OH}$
A	B
$\text{H}_3\text{C}-\text{CH}_2-\text{O}-\text{CH}_3$	$\begin{array}{c} \text{O} \\ \\ \text{H}_3\text{C}-\text{CH}_2-\text{C}-\text{OH} \end{array}$
C	D

21. Consider the given characteristics of a carbohydrate.
- A white, crystalline solid
 - Composed of two monomers
 - Commonly known as table sugar
- Based on these characteristics, the carbohydrate is identified as
- sucrose.
 - glucose.
 - maltose.
 - fructose.
22. Which of the following statements is FALSE about deoxyribonucleic acid (DNA)?
- Damage to DNA causes typhoid.
 - It is a long double-stranded molecule.
 - Synthesis of RNA is controlled by DNA.
 - It stores all genetic information of the cell.
23. The linear sequencing of amino acids in a polypeptide chain results in the
- denaturation of protein.
 - loss of biological activity of a protein.
 - formation of primary structure of a protein.
 - formation of secondary structure of a protein.

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24. Protease enzymes are added to detergents which are BEST suited to remove the stains of
- A. milk and egg.
 - B. oil and grease.
 - C. fruits and vegetables.
 - D. ketchup and ice cream.
25. An example of an essential micro-mineral for humans is
- A. calcium.
 - B. fluoride.
 - C. phosphorus.
 - D. magnesium.
26. Sabeen has a viral disease acquired by drinking contaminated water. Her symptoms include fatigue, depression, dark yellow urine and yellowness of skin and eyes.

Based on the given symptoms, Sabeen is suffering from

- A. cholera.
 - B. typhoid.
 - C. hepatitis.
 - D. diarrhoea.
27. Zafar wants to prepare permanent hard water in the laboratory.

Which salt should he add to water to cause permanent hardness?

- A. Calcium sulphate
 - B. Calcium carbonate
 - C. Calcium hydroxide
 - D. Calcium bicarbonate
28. The property of water that allows it to form spherical-shaped drops is
- A. adhesion.
 - B. cohesion.
 - C. expansion.
 - D. contraction.

29. Which of the following differences is TRUE about soft and hard water?

	Hard Water	Soft Water
A	It makes good lather with soap.	It makes poor lather with soap.
B	It is rich in sodium ions.	It is rich in calcium ions.
C	It uses less soap for laundry.	It uses more soap for laundry.
D	It leaves a messy scum.	It leaves no scum.

30. In Clark's method, hardness is removed from water by converting bicarbonates into carbonates with the addition of
- quicklime.
 - slaked lime.
 - caustic soda.
 - washing soda.
31. Under normal conditions, the concentration of ozone remains constant in the stratosphere by the
- formation of molecular oxygen
 - combination of oxygen molecules with free oxygen atoms
 - decomposition of ozone by free oxygen atoms
- I only.
 - II only.
 - I and III.
 - II and III.

32. The INCORRECT pairing of an air pollutant with its effect is

	Air Pollutant	Effect
A	carbon monoxide	intensifies emphysema
B	sulphur dioxide	causes bronchitis
C	nitrogen dioxide	intensifies asthma
D	ozone	causes congestion

33. The envelope of gases surrounding the Earth and other planets is known as
- biosphere.
 - lithosphere.
 - atmosphere.
 - hydrosphere.
34. Incomplete combustion of fossil fuel MAJORLY produces
- carbon dioxide + water
 - carbon monoxide + water
 - carbon dioxide + carbon + water
 - bicarbonate + carbon monoxide + water
35. The gas that is NOT responsible for global warming is
- CH₄
 - CO₂
 - CCl₄
 - C₂H₂

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36. All of the following metals can be extracted from its ore and purified using electrolysis EXCEPT
- A. iron.
 - B. gold.
 - C. copper.
 - D. aluminium.
37. What happens to the largest hydrocarbon molecules during fractional distillation of crude oil (petroleum) in a fractionating column?
- A. They condense at the top of the column.
 - B. They remain solid at the top of the column.
 - C. They condense at the bottom of the column.
 - D. They remain solid at the bottom of the column.
38. During the extraction of copper, one of the reactions that takes place in Bessemer converter is given below.
- cuprous oxide + cuprous sulphide \rightarrow copper + **X**
- The gas **X** produced in the given reaction is
- A. oxygen.
 - B. hydrogen.
 - C. sulphur dioxide.
 - D. hydrogen sulphide.
39. The Solvay process is used in the manufacturing of
- A. sodium nitrate.
 - B. sodium chloride.
 - C. sodium carbonate.
 - D. sodium hydroxide.
40. On the industrial scale, ammonia is synthesised by
- A. Haber process.
 - B. Solvay process.
 - C. Contact process.
 - D. Ostwald process.

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