

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X

ANNUAL EXAMINATIONS (THEORY) 2024

Chemistry Paper I

Time: 1 hour 10 minutes Marks: 40

INSTRUCTIONS

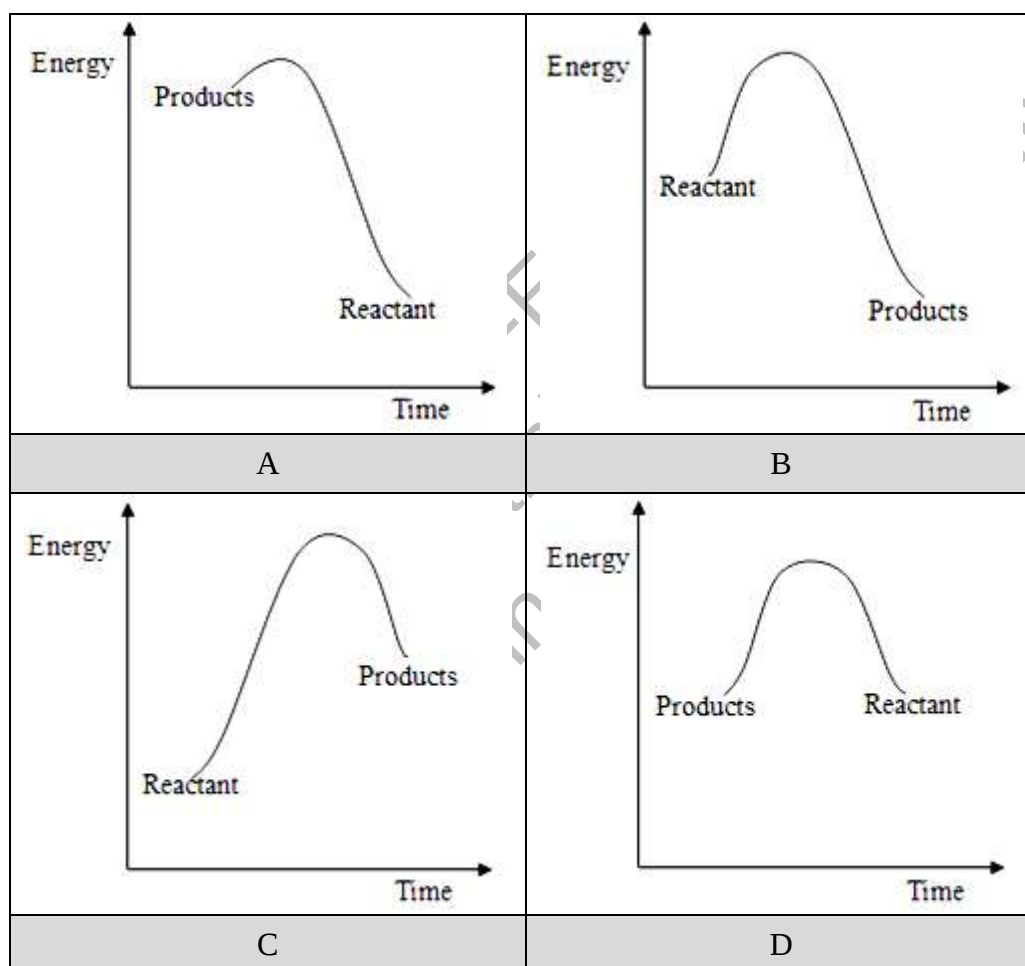
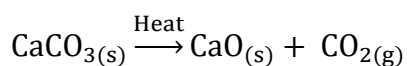
1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 40 only.
4. In each question there are four choices A, B, C, D. Choose ONE. On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

Correct Way		Incorrect Ways	
1		1	
		2	
		3	
		4	

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. Iron is used as a catalyst in the manufacturing of ammonia by Haber process to
 - A. prevent the decomposition of ammonia.
 - B. speed up the rate of formation of ammonia.
 - C. remove impurities from the reaction mixture.
 - D. reduce the temperature of the reaction mixture.
2. The energy profile diagram that represents the given reaction is

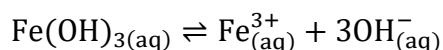


3. While making an aqueous solution of an acid, it is advised not to add water into the acid.

This is because adding water to acid produces

- A. toxic gases.
- B. precipitates.
- C. high heat energy.
- D. concentrated solution.

4. Consider the given ionisation reaction.



The equilibrium expression for the given ionisation reaction is

	Equilibrium Expression
A	$K_c = \frac{[\text{Fe}(\text{OH})_3]}{[\text{Fe}^{3+}][3\text{OH}^{-}]}$
B	$K_c = \frac{[\text{Fe}^{3+}][3\text{OH}^{-}]}{[\text{Fe}(\text{OH})_3]}$
C	$K_c = \frac{[\text{Fe}(\text{OH})_3]}{[\text{Fe}^{3+}][\text{OH}^{-}]^3}$
D	$K_c = \frac{[\text{Fe}^{3+}][\text{OH}^{-}]^3}{[\text{Fe}(\text{OH})_3]}$

5. An endothermic reaction will occur when

- A. ethanol is burnt in air.
- B. carbon is oxidised to carbon dioxide.
- C. water is added to anhydrous copper(II) sulphate.
- D. carbon dioxide and water react to form glucose and oxygen.

6. The by-product(s) of the given reaction is/ are



- A. $\text{H}_{2(\text{g})}$
- B. $\text{H}_2\text{O}_{(\text{l})}$
- C. $\text{H}_2\text{O}_{(\text{l})} + \text{O}_{2(\text{g})}$
- D. $\text{H}_2\text{O}_{(\text{l})} + \text{Cl}_{2(\text{g})}$

7. Water is an example of Lewis base because it tends to

- A. accept a proton.
- B. donate a proton.
- C. accept an electron pair.
- D. donate an electron pair.

8. Consider the given characteristics.

- I. Deprotonates other compounds
- II. Donates proton to other compounds
- III. Deprotonates water if used in aqueous medium

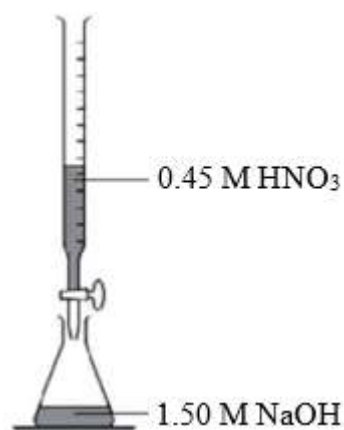
The characteristic(s) exhibited by a strong base is/ are

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

9. The pH value that is CORRECTLY matched to the substances in the given table is

	pH Value	Substance
A	5.0	blood
B	9.0	distilled water
C	2.0	gastric juice
D	10.0	saliva

10. Consider a conical flask containing 25 cm³ of NaOH solution with phenolphthalein as an indicator.



How much volume of HNO₃ will be required to neutralise the solution in conical flask?

- A. 0.027 cm³
- B. 7.50 cm³
- C. 37.95 cm³
- D. 83.33 cm³

11. Carbon dioxide and water are the products of a combustion reaction in which 1 volume of gas X reacts with exactly 3 volumes of oxygen gas at standard temperature and pressure.

The gas X can be identified as

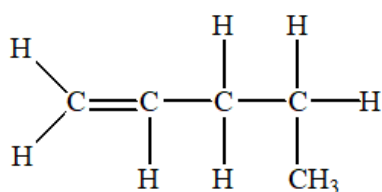
- A. ethane.
B. ethene.
C. ethyne.
D. methane.
12. The structural formula of 3-pentene-1-yne is

$\text{H}_2\text{C}=\text{CH}-\text{CH}=\text{CH}-\text{CH}_3$	$\text{H}_2\text{C}=\text{CH}-\text{C}\equiv\text{C}-\text{CH}_3$
A	B
$\text{HC}\equiv\text{C}-\text{C}\equiv\text{C}-\text{CH}_3$	$\text{HC}\equiv\text{C}-\text{CH}=\text{CH}-\text{CH}_3$
C	D

13. When a purple solution of the oxidising agent KMnO_4 is added to compound Y, compound Y is oxidised to a diol and KMnO_4 is converted to brown MnO_2 .

Based on this reaction, the compound Y must be

- A. C_6H_{14}
B. C_8H_{16}
C. C_9H_{20}
D. $\text{C}_{12}\text{H}_{26}$
14. Consider the given structure.



The name given by the International Union of Pure and Applied Chemistry (IUPAC) for this structure is

- A. 1-methyl-3-butene.
B. 4-methyl-1-butene.
C. Pent-1-ene.
D. Pent-4-ene.

15. Consider the following fossil fuels.

- I. Petroleum
- II. Coal
- III. Natural gas

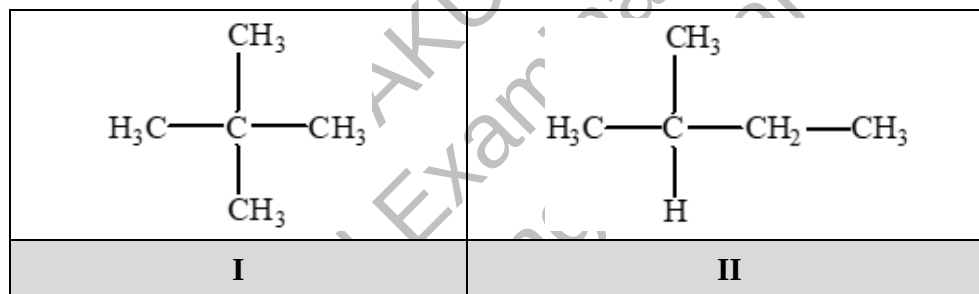
Among these fossil fuels, COMMONLY used feedstock in chemical industries is/ are

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

16. The molecular formula of an alkene having eight carbon atoms is

- A. C_8H_{14}
- B. C_8H_{16}
- C. C_8H_{17}
- D. C_8H_{18}

17. Given are two structures.



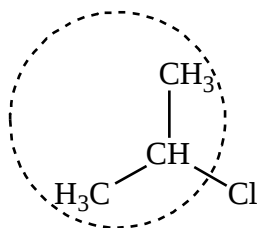
The CORRECT description about the given structures is that they have the same

- A. physical properties but different chemical properties.
- B. atomic arrangement but different physical properties.
- C. chemical properties but different molecular formulae.
- D. molecular formulae but different atomic arrangement.

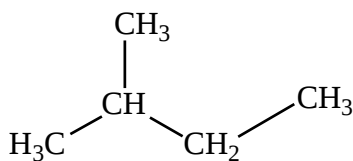
18. Which of the following has the ketone functional group?

- A. $\text{CH}_3\text{COCH}_2\text{CH}_3$
- B. $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$
- C. $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$
- D. $\text{CH}_3\text{CH}_2\text{COOCH}_2\text{CH}_3$

19. The encircled alkyl radical in the given structure is



- A. ethyl.
B. butyl.
C. methyl.
D. isopropyl.
20. The number of possible alkyl radicals of the given alkane are



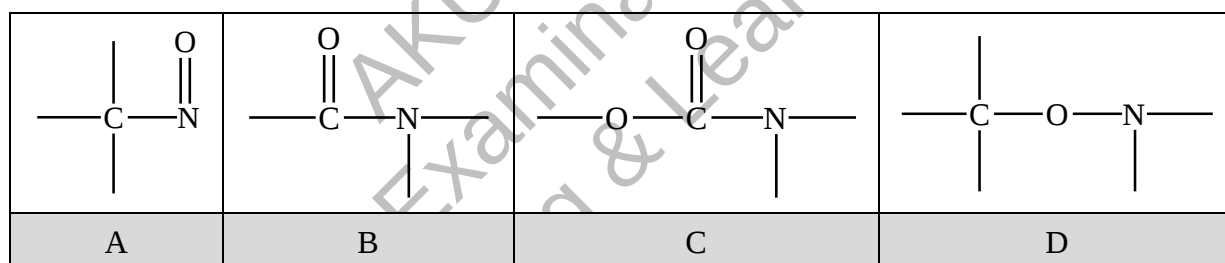
- A. 2
B. 3
C. 4
D. 5
21. Monosaccharides differ from disaccharides on the basis of their
- A. colour.
B. hydrolysis.
C. physical state.
D. solubility in water.
22. 5% dextrose solution, given intravenously to a patient, provides all of the following EXCEPT that it
- A. replaces lost fluid.
B. strengthens bones.
C. increases blood sugar.
D. fulfils nutritional needs.

23. A macronutrient **X** is required for the following functions in the human body.

- Growth and development
- Formation of new cells and tissues
- Transport of oxygen through the blood

Based on the given functions, **X** is identified as

- A. fats.
 B. proteins.
 C. vitamins.
 D. carbohydrates.
24. A vitamin that is synthesised in the human skin by exposure to sunlight is
- A. vitamin A.
 B. vitamin D.
 C. vitamin E.
 D. vitamin K.
25. The structure that represents a peptide linkage in a dipeptide molecule is



26. The process that returns water into the atmosphere is
- A. distillation.
 B. precipitation.
 C. transpiration.
 D. condensation.
27. When clean air is bubbled through pure water, its pH
- A. remains the same.
 B. rises from 7.0 to 8.4.
 C. rises from 7.0 to 10.4.
 D. lowers from 7.0 to 5.6.
28. Heavy metals, toxic sludge and different solvents are dumped into ocean every year.

The MAIN reason of these aquatic contamination is

- A. eutrophication.
 B. industrialisation.
 C. human settlements.
 D. agricultural expansion.

29. In water, the presence of compound that decreases the cleansing action of soap is
- deuterium oxide.
 - sodium sulphate.
 - calcium chloride.
 - potassium carbonate.
30. Bacterial contamination, in long-term water supply, can cause the epidemic of
- typhoid.
 - malaria.
 - dengue.
 - polio.
31. The set of conditions that causes global warming and increased amount of ultraviolet radiations to reach the Earth surface is

	Concentration of Ozone in Stratosphere	Concentration of Carbon dioxide in Troposphere
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

32. The BEST way to control air pollution is to decrease the use of
- fossil fuels.
 - catalytic converters.
 - electric-powered cars.
 - flue gas desulphurisation.
33. The term, 'greenhouse effect' is defined as the ability of
- atmosphere to retain water vapours.
 - clouds to scatter electromagnetic rays.
 - bacteria to oxidise ammonia aerobically.
 - certain gases to trap heat within the atmosphere.
34. The pH of acid rain lies between
- 6.5 – 7.0
 - 6.0 – 6.5
 - 5.5 – 6.0
 - 4.0 – 5.5

35. The layers of Earth in which temperature decreases with the increase in altitude are
- I. troposphere
 - II. stratosphere
 - III. mesosphere
 - IV. thermosphere
- A. I and II.
 - B. I and III.
 - C. II and IV.
 - D. III and IV.
36. The fractional distillation of crude oil does NOT yield
- A. wax.
 - B. grease.
 - C. charcoal.
 - D. kerosene.
37. Brine, limestone and ammonia gas are used in the making of
- A. urea.
 - B. steel.
 - C. brass.
 - D. soda ash.
38. During the extraction of iron in a blast furnace, iron oxide converts into iron by the action of
- A. carbon.
 - B. oxygen.
 - C. carbon monoxide.
 - D. calcium carbonate.
39. The conversion of SO_2 into SO_3 in contact process is carried out in the presence of
- A. iron.
 - B. nickel.
 - C. platinum.
 - D. vanadium pentoxide.
40. A forensic department is hiring candidates to investigate the evidences collected at a crime scene that occurred in an oil industry.
- To apply for the job, candidates should have the qualification of
- A. organic chemistry.
 - B. analytical chemistry.
 - C. industrial chemistry.
 - D. environmental chemistry.

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