Chemistry Grade 10 — Chapter 11

Carboxylic Compounds

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Independent practice MCQs from the supplied Class 10 Chemistry notes pack. Total: 50 questions.

A. Important / Main Topics

1. Carboxylic acids are characterized by the presence of:

(A) Carboxyl group (-COOH)
(B) Hydroxyl group (-OH)
(C) Carbonyl group (C=O)
(D) Amino group (-NH□)

Correct Answer: A

Explanation: Carboxylic acids are characterized by the presence of Carboxyl group (-COOH).

2. The general formula of carboxylic acids is:

(A) ROH
(B) RCOOH
(C) RCOOR
(D) RCHO

Correct Answer: B

Explanation: The general formula of carboxylic acids is RCOOH.

3. The carboxyl group is made up of:

(A) A hydroxyl group and an amino group
(B) A carbonyl group and an amino group
(C) A carbonyl group and a hydroxyl group
(D) Two hydroxyl groups

Correct Answer: C

Explanation: The carboxyl group is made up of a carbonyl group (C=O) and a hydroxyl group (-OH).

4. Carboxylic acids are _____ than mineral acids.

(A) Stronger
(B) Equally strong
(C) Not comparable
(D) Weaker

Correct Answer: D

Explanation: Carboxylic acids are weaker acids than mineral acids.

5. When a carboxylic acid reacts with a base, the products are:

(A) Salt and water
(B) Salt and hydrogen
(C) Salt and carbon dioxide
(D) Salt and oxygen

Correct Answer: A

Explanation: When a carboxylic acid reacts with a base, the products are Salt and water.

6. When a carboxylic acid reacts with a carbonate, the products are:

(A) Salt and hydrogen
(B) Salt, water, and carbon dioxide
(C) Salt and water
(D) Salt and oxygen

Correct Answer: B

Explanation: When a carboxylic acid reacts with a carbonate, the products are Salt, water, and carbon dioxide.

7. When a carboxylic acid reacts with an active metal, the products are:

(A) Salt and water
(B) Salt and carbon dioxide
(C) Salt and hydrogen
(D) Salt and oxygen

Correct Answer: C

Explanation: When a carboxylic acid reacts with an active metal, the products are Salt and hydrogen.

8. The reaction between a carboxylic acid and an alcohol in the presence of concentrated sulphuric acid is called:

(A) Saponification
(B) Neutralization
(C) Oxidation
(D) Esterification

Correct Answer: D

Explanation: The reaction between a carboxylic acid and an alcohol is called esterification.

9. Esters are usually significant for their:

(A) Fruity smell
(B) Sour smell
(C) Bitter taste
(D) Salty taste

Correct Answer: A

Explanation: Esters are usually significant for their Fruity smell.

10. The reaction in which two molecules combine with the elimination of a small molecule like water is called:

(A) Addition reaction
(B) Condensation reaction
(C) Substitution reaction
(D) Elimination reaction

Correct Answer: B

Explanation: A reaction in which two molecules combine with the elimination of a small molecule is called a condensation reaction.

11. What is the product of the reaction between ethanoic acid and sodium carbonate?

(A) Sodium propanoate
(B) Sodium hydroxide
(C) Sodium acetate
(D) Sodium chloride

Correct Answer: C

Explanation: Sodium acetate — this correctly answers the question.

12. Which catalyst is used in the esterification reaction between a carboxylic acid and an alcohol?

(A) Potassium manganate(VII)
(B) Sodium hydroxide
(C) Hydrochloric acid
(D) Sulfuric acid

Correct Answer: D

Explanation: Sulfuric acid is used as a catalyst in esterification.

13. What is the main component of vinegar?

(A) Ethanoic acid
(B) Ethanol

(C) Methanol
(D) Propanoic acid

Correct Answer: A

Explanation: Ethanoic acid is the main component of vinegar.

14. What gas is produced when a carboxylic acid reacts with a metal?

(A) Oxygen
(B) Hydrogen
(C) Carbon dioxide
(D) Nitrogen

Correct Answer: B

Explanation: Hydrogen gas is produced when a carboxylic acid reacts with a metal.

15. Which compound is formed by the bacterial oxidation of ethanol?

(A) Methanoic acid
(B) Propanoic acid
(C) Ethanoic acid
(D) Butanoic acid

Correct Answer: C

Explanation: Ethanoic acid — this correctly answers the question.

16. What type of bond is formed between a carboxylic acid and an alcohol during esterification?

(A) Ionic bond
(B) Hydrogen bond
(C) Metallic bond
(D) Covalent bond

Correct Answer: D

Explanation: A covalent bond is formed between a carboxylic acid and an alcohol during esterification.

17. Which of the following is an example of a carboxylic acid?

(A) Ethanoic acid
(B) Ethanol
(C) Ethyl acetate
(D) Methanol

Correct Answer: A

Explanation: Ethanoic acid — this correctly answers the question.

18. In the oxidation of ethanol to ethanoic acid, what is the role of potassium manganate(VII)?

(A) Reducing agent
(B) Oxidizing agent
(C) Catalyst
(D) Inhibitor

Correct Answer: B

Explanation: Potassium manganate(VII) acts as an oxidizing agent.

19. What is produced when ethanoic acid reacts with sodium hydroxide?

(A) Sodium chloride
(B) Sodium oxide
(C) Sodium ethanoate
(D) Sodium bicarbonate

Correct Answer: C

Explanation: Sodium ethanoate — this correctly answers the question.

20. Which of the following is an ester?

(A) Ethanoic acid
(B) Ethanol

(C) Ethanal
(D) Ethyl ethanoate

Correct Answer: D

Explanation: Ethyl ethanoate — this correctly answers the question.

21. Write the balanced chemical equation for the reaction between ethanoic acid and sodium.

(A) 2CH□COOH + 2Na → 2CH□COONa + H□
(B) CH□COOH + Na → CH□COONa + H□
(C) CH□COOH + 2Na → CH□COONa + H□
(D) 2CH□COOH + Na → 2CH□COONa + H□

Correct Answer: A

Explanation: "2CH□COOH + 2Na → 2CH□COONa + H□" is correct: it matches the idea asked in the question ("Write the balanced chemical equation for the reaction between ethanoic acid and sodium"), while the other choices do not.

22. Describe how ethanoic acid can be formed from ethanol using an oxidizing agent.

(A) Ethanol is reduced to ethanal, then to ethanoic acid
(B) Ethanol is oxidized to ethanal, then to ethanoic acid
(C) Ethanol is oxidized to ethane, then to ethanoic acid
(D) Ethanol is reduced to ethane, then to ethanoic acid

Correct Answer: B

Explanation: Ethanol is oxidized to ethanal, which is further oxidized to ethanoic acid.

23. What is the role of sulfuric acid in the esterification process?

(A) It acts as a reactant
(B) It acts as a solvent
(C) It acts as a catalyst
(D) It acts as a product

Correct Answer: C

Explanation: Sulfuric acid acts as a catalyst in the esterification process.

24. Name the salt formed when ethanoic acid reacts with sodium carbonate.

(A) Sodium chloride
(B) Sodium oxide
(C) Sodium bicarbonate
(D) Sodium ethanoate

Correct Answer: D

Explanation: "Sodium ethanoate" is correct: it matches the idea asked in the question ("Name the salt formed when ethanoic acid reacts with sodium carbonate"), while the other choices do not.

25. Write the chemical equation for the esterification reaction between methanol and ethanoic acid.

(A) CH□COOH + CH□OH → CH□COOCH□ + H□O
(B) CH□COOH + CH□OH → CH□COOCH□
(C) CH□COOH + CH□OH → CH□COOCH□ + H□
(D) CH□COOH + CH□OH → CH□COOCH□ + O□

Correct Answer: A

Explanation: "CH□COOH + CH□OH → CH□COOCH□ + H□O" is correct: it matches the idea asked in the question ("Write the chemical equation for the esterification reaction between methanol and ethanoic acid"), while the other choices do not.

B. Less Important / Secondary Topics

26. What is the main component of vinegar? Give two uses of vinegar in everyday life.

(A) Ethanoic acid; pickles and flavouring food
(B) Ethanol; fuel and disinfectant
(C) Methanoic acid; preservative and flavouring

(D) Propanoic acid; pickles and flavouring

Correct Answer: A

Explanation: The main component of vinegar is ethanoic acid. It is used to make pickles and for flavouring food.

27. Explain why lemon juice is used to reduce the smell of fish.

(A) It contains ethanoic acid
(B) It contains ascorbic acid
(C) It contains citric acid
(D) It contains benzoic acid

Correct Answer: B

Explanation: Lemon juice contains ascorbic acid, which is used to reduce the smell of fish.

28. What is the role of benzoic acid and sodium benzoate in food preservation?

(A) They enhance the flavour of food
(B) They add colour to food
(C) They inhibit the growth of bacteria and fungi
(D) They increase the nutritional value of food

Correct Answer: C

Explanation: Benzoic acid and sodium benzoate are used as preservatives to inhibit the growth of bacteria and fungi.

29. Explain the use of esters in the fragrance industry.

(A) They have sour smells
(B) They have bitter tastes
(C) They have salty tastes
(D) They have pleasant, fruity smells

Correct Answer: D

Explanation: Esters have pleasant, fruity smells and are used in the fragrance industry.

30. What is the use of aspirin? What type of compound is aspirin?

(A) Fever reducer and pain killer; ester
(B) Fever reducer and pain killer; carboxylic acid
(C) Antiseptic; ester
(D) Antiseptic; carboxylic acid

Correct Answer: A

Explanation: Aspirin is used as a fever reducer and pain killer. It is an ester.

31. Which of the following is NOT a use of carboxylic acids in everyday life?

(A) Vinegar for cooking
(B) Ethanol as a fuel
(C) Lemon juice for flavouring food
(D) Benzoic acid as a preservative

Correct Answer: B

Explanation: Ethanol as a fuel is not a use of carboxylic acids.

32. Which of the following is an example of an ester used as a flavouring agent?

(A) Ethanoic acid
(B) Ethanol
(C) Methyl butyrate
(D) Sodium benzoate

Correct Answer: C

Explanation: Methyl butyrate is an ester used as a flavouring agent (apple flavour).

33. Which of the following is a use of esters in the pharmaceutical industry?

(A) As a solvent
(B) As an antiseptic

(C) As a preservative
(D) As a pain killer (aspirin)

Correct Answer: D

Explanation: Aspirin is an ester used as a pain killer.

34. Which of the following is a use of carboxylic acids in the food industry?

(A) As a preservative
(B) As a fuel
(C) As a solvent
(D) As a catalyst

Correct Answer: A

Explanation: Carboxylic acids are used as preservatives in the food industry.

35. Which of the following is NOT a property of carboxylic acids?

(A) They are weak acids
(B) They have a fruity smell
(C) They react with bases to form salts
(D) They react with alcohols to form esters

Correct Answer: B

Explanation: They have a fruity smell — this correctly answers the question.

36. Which of the following is an ester?

(A) Ethanoic acid
(B) Ethanol
(C) Ethyl ethanoate
(D) Ethanal

Correct Answer: C

Explanation: Ethyl ethanoate — this correctly answers the question.

37. Which of the following is a use of esters in the cosmetic industry?

(A) As a preservative
(B) As a solvent
(C) As a colouring agent
(D) As a fragrance

Correct Answer: D

Explanation: Esters are used as fragrances in the cosmetic industry.

38. Which of the following is a use of carboxylic acids in the textile industry?

(A) As an acid-reducing agent
(B) As a dye
(C) As a catalyst
(D) As a solvent

Correct Answer: A

Explanation: Methanoic acid is used as an acid-reducing agent in the textile industry.

39. Which of the following is a use of esters in the food industry?

(A) As a preservative
(B) As a flavouring agent
(C) As a colouring agent
(D) As a solvent

Correct Answer: B

Explanation: Esters are used as flavouring agents in the food industry.

40. Which of the following is an example of a carboxylic acid used in everyday life?

(A) Ethanol
(B) Ethyl ethanoate

(C) Ethanoic acid
(D) Ethanal

Correct Answer: C

Explanation: Ethanoic acid is a carboxylic acid used in everyday life (vinegar).

41. Propanoic acid reacts with sodium hydroxide according to the following equation: CH□CH□COOH + NaOH → CH□CH□COONa + H□O If 4 moles of propanoic acid react with excess sodium hydroxide, how many moles of sodium propanoate are produced?

(A) 1 mole
(B) 2 moles
(C) 8 moles
(D) 4 moles

Correct Answer: D

Explanation: 4 moles — this correctly answers the question.

42. What is the molar mass of sodium propanoate?

(A) 96 g/mol
(B) 82 g/mol
(C) 74 g/mol
(D) 60 g/mol

Correct Answer: A

Explanation: 96 g/mol — this correctly answers the question.

43. What is the mass of sodium propanoate produced from 4 moles of propanoic acid?

(A) 328 g
(B) 384 g
(C) 296 g
(D) 240 g

Correct Answer: B

Explanation: 384 g — this correctly answers the question.

44. If the actual yield is 350 g, what is the percentage yield?

(A) 85.00%
(B) 90.00%
(C) 91.15%
(D) 95.00%

Correct Answer: C

Explanation: 91.15% — this correctly answers the question.

45. Methanol reacts with ethanoic acid to form methyl ethanoate: CH□COOH + CH□OH → CH□COOCH□ + H□O If 3 moles of methanol react with excess ethanoic acid, how many moles of methyl ethanoate are produced?

(A) 1 mole
(B) 2 moles
(C) 6 moles
(D) 3 moles

Correct Answer: D

Explanation: 3 moles — this correctly answers the question.

46. What is the molar mass of methyl ethanoate?

(A) 74 g/mol
(B) 60 g/mol
(C) 46 g/mol
(D) 88 g/mol

Correct Answer: A

Explanation: 74 g/mol — this correctly answers the question.

47. What is the mass of methyl ethanoate produced from 3 moles of methanol?

(A) 180 g
(B) 222 g
(C) 148 g
(D) 296 g

Correct Answer: B

Explanation: 222 g — this correctly answers the question.

48. If the actual yield is 180 g, what is the percentage yield?

(A) 75.00%
(B) 85.00%
(C) 81.08%
(D) 90.00%

Correct Answer: C

Explanation: 81.08% — this correctly answers the question.

49. Ethanoic acid reacts with sodium hydroxide according to the following equation: CH□COOH + NaOH → CH□COONa + H□O If 2 moles of ethanoic acid react with excess sodium hydroxide, how many moles of sodium ethanoate are produced?

(A) 1 mole
(B) 3 moles
(C) 4 moles
(D) 2 moles

Correct Answer: D

Explanation: 2 moles — this correctly answers the question.

50. What is the molar mass of sodium ethanoate?

(A) 82 g/mol
(B) 60 g/mol
(C) 96 g/mol
(D) 74 g/mol

Correct Answer: A

Explanation: 82 g/mol — this correctly answers the question.