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Chemistry Grade 12 — Chapter 10

Hydroxy Compounds

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Independent practice MCQs from the supplied Class 12 Chemistry notes pack. Total: 50 questions.

A. Important / Main Topics

1. Which of the following is a hydroxy compound?

(A) All of the above
(B) Ethanol
(C) Phenol
(D) Naphthol

Correct Answer: A

Explanation: All of the given compounds contain a hydroxyl group (-OH) and are hydroxy compounds.

2. What is the product of the reaction between an acyl chloride and an alcohol?

(A) Ether
(B) Ester
(C) Ketone
(D) Aldehyde

Correct Answer: B

Explanation: Ester — this correctly answers the question.

3. What is the by-product of the reaction between an acyl chloride and an alcohol?

(A) Water
(B) Carbon dioxide
(C) Hydrogen chloride
(D) Hydrogen gas

Correct Answer: C

Explanation: The by-product is hydrogen chloride (HCl).

4. What is the intermediate in the preparation of phenol from aniline?

(A) Chlorobenzene
(B) Benzoic acid
(C) Phenoxide ion
(D) Benzene diazonium chloride

Correct Answer: D

Explanation: The intermediate is benzene diazonium chloride.

5. At what temperature is the diazotization reaction carried out?

(A) 0–5°C
(B) 25°C
(C) 100°C
(D) 150°C

Correct Answer: A

Explanation: The diazotization reaction is carried out at 0–5°C.

6. What is the product of the reaction of phenol with sodium hydroxide?

(A) Sodium phenoxide + hydrogen
(B) Sodium phenoxide + water
(C) Phenoxide + carbon dioxide
(D) Benzene + sodium hydroxide

Correct Answer: B

Explanation: Phenol reacts with NaOH to form sodium phenoxide and water.

7. Which of the following is the strongest acid?

(A) Water
(B) Ethanol
(C) Phenol
(D) Methanol

Correct Answer: C

Explanation: Phenol — this correctly answers the question.

8. What is the main factor that stabilizes the phenoxide ion?

(A) Inductive effect
(B) Hydrogen bonding
(C) Solvation
(D) Resonance

Correct Answer: D

Explanation: Resonance — this correctly answers the question.

9. What is the reaction of phenol with bromine water?

(A) Formation of a white precipitate of 2,4,6-tribromophenol
(B) Formation of a yellow precipitate of picric acid
(C) Formation of a gas
(D) No reaction

Correct Answer: A

Explanation: Phenol reacts with bromine water to form a white precipitate of 2,4,6-tribromophenol.

10. What is the product of the reaction of naphthols with diazonium salts?

(A) Naphthoxide salts
(B) Azo dyes
(C) Nitronaphthols
(D) Bromonaphthols

Correct Answer: B

Explanation: Azo dyes — this correctly answers the question.

11. Which of the following is a phenol?

(A) Benzene
(B) Toluene
(C) Phenol
(D) Aniline

Correct Answer: C

Explanation: Phenol is a hydroxy compound with an -OH group attached to a benzene ring.

12. The general formula of a phenol is:

(A) R-OH
(B) R-COOH
(C) R-CHO
(D) Ar-OH

Correct Answer: D

Explanation: The general formula of a phenol is Ar-OH.

13. What is the formula of naphthol?

(A) mathrmC□□H□OH
(B) C□H□OH
(C) mathrmC□□H□
(D) C□H□

Correct Answer: A

Explanation: MathrmC□□H□OH — this correctly answers the question.

14. Which of the following is a property of naphthols?

(A) They are basic.
(B) They are acidic.
(C) They are neutral.
(D) They are amphoteric.

Correct Answer: B

Explanation: They are acidic. — this correctly answers the question.

15. What is the product of the reaction of naphthols with sodium hydroxide?

(A) Naphthalene
(B) Naphthol
(C) Sodium naphthoxide
(D) Hydrogen gas

Correct Answer: C

Explanation: Sodium naphthoxide — this correctly answers the question.

16. What is the product of the reaction between ethanoyl chloride and ethanol?

(A) Methyl ethanoate
(B) Ethanoic acid
(C) Ethanamide
(D) Ethyl ethanoate

Correct Answer: D

Explanation: Ethyl ethanoate — this correctly answers the question.

17. What is the product of the reaction between ethanoyl chloride and phenol?

(A) Phenyl ethanoate
(B) Ethyl ethanoate
(C) Ethanoic acid
(D) Ethanamide

Correct Answer: A

Explanation: Phenyl ethanoate — this correctly answers the question.

18. What is the product of the reaction between ethanoyl chloride and water?

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

Correct Answer: B

Explanation: Ethanoic acid — this correctly answers the question.

19. What is the product of the reaction between ethanoyl chloride and ammonia?

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

Correct Answer: C

Explanation: Ethanamide — this correctly answers the question.

20. What is the product of the reaction between ethanoyl chloride and methylamine?

(A) Ethanamide
(B) Ethanoic acid
(C) Ethyl ethanoate
(D) N-methylmethanamide

Correct Answer: D

Explanation: N-methylmethanamide — this correctly answers the question.

21. What is the product of the reaction of phenol with dilute nitric acid?

(A) o-Nitrophenol and p-nitrophenol
(B) Picric acid
(C) Nitrobenzene
(D) Benzoic acid

Correct Answer: A

Explanation: O-Nitrophenol and p-nitrophenol — this correctly answers the question.

22. What is the product of the reaction of phenol with concentrated nitric acid?

(A) o-Nitrophenol and p-nitrophenol
(B) Picric acid
(C) Nitrobenzene
(D) Benzoic acid

Correct Answer: B

Explanation: Picric acid — this correctly answers the question.

23. What is the product of the reaction of phenol with sodium metal?

(A) Sodium phenoxide + water
(B) Phenoxide + carbon dioxide
(C) Sodium phenoxide + hydrogen
(D) Benzene + sodium

Correct Answer: C

Explanation: Phenol reacts with sodium metal to form sodium phenoxide and hydrogen gas.

24. Which of the following is the correct order of acid strength?

(A) Alcohols > Phenols > Carboxylic acids
(B) Phenols > Carboxylic acids > Alcohols
(C) Carboxylic acids > Alcohols > Phenols
(D) Carboxylic acids > Phenols > Alcohols

Correct Answer: D

Explanation: The correct order is Carboxylic acids > Phenols > Alcohols.

25. What is the product of the reduction of a carboxylic acid with LiAlH□?

(A) Primary alcohol
(B) Secondary alcohol
(C) Tertiary alcohol
(D) Aldehyde

Correct Answer: A

Explanation: Primary alcohol — this correctly answers the question.

B. Less Important / Secondary Topics

26. What is decarboxylation?

(A) Loss of CO□
(B) Loss of H□O
(C) Loss of H□
(D) Loss of O□

Correct Answer: A

Explanation: Loss of CO□ — this correctly answers the question.

27. Which of the following is a good leaving group in nucleophilic acyl substitution?

(A) OH□
(B) Cl□
(C) NH□□

(D) CH□□

Correct Answer: B

Explanation: Cl□ — this correctly answers the question.

28. Which of the following is a poor leaving group?

(A) Cl□
(B) Br□
(C) OH□
(D) I□

Correct Answer: C

Explanation: OH□ — this correctly answers the question.

29. What is the role of the carbonyl carbon in the reactions of carboxylic acids?

(A) It acts as a nucleophile.
(B) It acts as a base.
(C) It acts as a catalyst.
(D) It acts as an electrophile.

Correct Answer: D

Explanation: The carbonyl carbon is electrophilic.

30. What is the product of the reaction of a carboxylic acid with PCl□?

(A) Acyl chloride
(B) Ester
(C) Amide
(D) Alcohol

Correct Answer: A

Explanation: Acyl chloride — this correctly answers the question.

31. At which position does 1-naphthol undergo electrophilic substitution?

(A) 1 and 2
(B) 2 and 4
(C) 1 and 3
(D) 3 and 4

Correct Answer: B

Explanation: 2 and 4 — this correctly answers the question.

32. At which position does 2-naphthol undergo electrophilic substitution?

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

Correct Answer: C

Explanation: 1 — this correctly answers the question.

33. What is the product of the reaction of 1-naphthol with bromine water?

(A) 1-bromo-2-naphthol
(B) 3-bromo-1-naphthol
(C) 4-bromo-1-naphthol
(D) 2-bromo-1-naphthol and 4-bromo-1-naphthol

Correct Answer: D

Explanation: The products are 2-bromo-1-naphthol and 4-bromo-1-naphthol.

34. What is the product of the reaction of 2-naphthol with bromine water?

(A) 1-bromo-2-naphthol
(B) 2-bromo-1-naphthol and 4-bromo-1-naphthol
(C) 3-bromo-2-naphthol

(D) 4-bromo-2-naphthol

Correct Answer: A

Explanation: 1-bromo-2-naphthol — this correctly answers the question.

35. What is the colour of the azo dye precipitate formed from naphthols?

(A) White
(B) Orange-red
(C) Yellow
(D) Green

Correct Answer: B

Explanation: The azo dye precipitate is orange-red.

36. Why is phenol more acidic than water?

(A) Because it has a higher molecular weight.
(B) Because it has a lower boiling point.
(C) Because the phenoxide ion is resonance-stabilized.
(D) Because it is a solid at room temperature.

Correct Answer: C

Explanation: The phenoxide ion is resonance-stabilized.

37. Why is ethanol a weaker acid than water?

(A) Because it has a higher molecular weight.
(B) Because it has a lower boiling point.
(C) Because it is a liquid at room temperature.
(D) Because the ethyl group is electron-donating.

Correct Answer: D

Explanation: Because the ethyl group is electron-donating. — this correctly answers the question.

38. What is the conjugate base of phenol?

(A) Phenoxide ion
(B) Hydroxide ion
(C) Ethoxide ion
(D) Benzene

Correct Answer: A

Explanation: The conjugate base of phenol is the phenoxide ion.

39. What is the conjugate base of water?

(A) Phenoxide ion
(B) Hydroxide ion
(C) Ethoxide ion
(D) Hydronium ion

Correct Answer: B

Explanation: The conjugate base of water is the hydroxide ion.

40. What is the conjugate base of ethanol?

(A) Phenoxide ion
(B) Hydroxide ion
(C) Ethoxide ion
(D) Hydronium ion

Correct Answer: C

Explanation: The conjugate base of ethanol is the ethoxide ion.

41. Why is phenol a stronger acid than water?

(A) Because of the electron-donating effect of the ethyl group.
(B) Because of the difference in molecular weight.
(C) Because of the difference in boiling points.

(D) Because of resonance stabilization of the phenoxide ion.

Correct Answer: D

Explanation: Because of resonance stabilization of the phenoxide ion. — this correctly answers the question.

42. Why is ethanol a weaker acid than water?

(A) Because of the electron-donating effect of the ethyl group.
(B) Because of resonance stabilization of the ethoxide ion.
(C) Because of the difference in molecular weight.
(D) Because of the difference in boiling points.

Correct Answer: A

Explanation: Because of the electron-donating effect of the ethyl group. — this correctly answers the question.

43. Which of the following is the correct order of pK_a values?

(A) Phenol > Water > Ethanol
(B) Phenol < Water < Ethanol
(C) Water < Phenol < Ethanol
(D) Ethanol < Water < Phenol

Correct Answer: B

Explanation: The pK_a order is Phenol (10) < Water (15.7) < Ethanol (16). A lower pK_a means a stronger acid.

44. What is the main reason for the difference in acidity between phenol and water?

(A) The electron-donating effect of the ethyl group.
(B) The difference in molecular weight.
(C) Resonance stabilization of the phenoxide ion.
(D) The difference in boiling points.

Correct Answer: C

Explanation: Resonance stabilization of the phenoxide ion is the main reason.

45. What is the main reason for the difference in acidity between water and ethanol?

(A) Resonance stabilization of the ethoxide ion.
(B) The difference in molecular weight.
(C) The difference in boiling points.
(D) The electron-donating effect of the ethyl group.

Correct Answer: D

Explanation: The electron-donating effect of the ethyl group. — this correctly answers the question.

46. Which of the following is the correct order of pK_a values?

(A) Phenol < Water < Ethanol
(B) Phenol > Water > Ethanol
(C) Water < Phenol < Ethanol
(D) Ethanol < Water < Phenol

Correct Answer: A

Explanation: The pK_a order is Phenol (10) < Water (15.7) < Ethanol (16).

47. What is the main reason for the difference in acidity between phenol and water?

(A) The electron-donating effect of the ethyl group.
(B) Resonance stabilization of the phenoxide ion.
(C) The difference in molecular weight.
(D) The difference in boiling points.

Correct Answer: B

Explanation: Resonance stabilization of the phenoxide ion is the main reason.

48. What is the main reason for the difference in acidity between water and ethanol?

(A) Resonance stabilization of the ethoxide ion.
(B) The difference in molecular weight.
(C) The electron-donating effect of the ethyl group.

(D) The difference in boiling points.

Correct Answer: C

Explanation: The electron-donating effect of the ethyl group. — this correctly answers the question.

49. What is the colour of the azo dye precipitate formed from naphthols?

(A) White
(B) Yellow
(C) Green
(D) Orange-red

Correct Answer: D

Explanation: The azo dye precipitate is orange-red.

50. Which of the following is a correct statement about naphthols?

(A) They behave like simple phenols.
(B) They are not acidic.
(C) They do not react with bromine water.
(D) They cannot form azo dyes.

Correct Answer: A

Explanation: They behave like simple phenols. — this correctly answers the question.