Name:
Score: 0 / 20 points (0%)

Chapter 12 Review Quiz

Multiple Choice
Identify the choice that best completes the statement or answers the question.

___ 1. Esters are formed from the reaction between:
a. an amine and a carboxylic acid.
b. an alkene and an alcohol.
c. an alcohol and a carboxylic acid.
d. an alcohol and an aldehyde.

ANSWER: C
Esters form through addition of an alcohol and a carboxylic acid.
POINTS: 0 / 1
FEEDBACK:
REF: 343

___ 2. Butanoic acid is added to ethanol to form the ester:
a. ethanol butanoic acid.
b. butyl ethanoate.
c. ethyl butanoate.
d. ethanol butanoate.

ANSWER: C
Esters are named from the alcohol (alkyl) and carboxylic acid (alkanoate) it is formed from.
POINTS: 0 / 1
FEEDBACK:
REF: 343

___ 3. Which of the following lists contains only isomers of ethyl butanoate?
a. butyl ethanoate, hexanoic acid, propyl propanoate
b. hexanoic acid, propyl propanoate, methyl hexanoate
c. propyl propanoate, hexyl methanoate, hexanoic acid
d. pentanoic acid, butyl ethanoate, propyl propanoate

ANSWER: A
Isomers have the same molecular formula and different structural formula. Carboxylic acids and esters are isomers of each other.
POINTS: 0 / 1
FEEDBACK:
REF: 343

___ 4. Esterification, or the formation of an ester, is an example of which type of reaction?
a. hydrogenation
b. substitution
c. addition
d. condensation

ANSWER: D
Esterification forms a water molecule, making it a condensation reaction.
POINTS: 0 / 1
FEEDBACK:

REF: 344

___ 5. Esterification requires the process of reflux, which is best defined as:
a. separation of immiscible liquids using a separating funnel.
b. extended heating of a mixture without any loss of reactants or products.
c. extended heating to raise the rate of reaction.
d. separation of liquids of different boiling points.

ANSWER: B
Reflux is extended heating, required as esterification is normally a slow reaction. Heating raises the reaction rate.
POINTS: 0 / 1
FEEDBACK:
REF: 345

___ 6. Which of the following conditions is not required for esterification?
a. reflux
b. addition of concentrated sulfuric acid
c. addition of one reagent in excess
d. addition of a metal catalyst

ANSWER: D
A metal catalyst is not required for esterification.
POINTS: 0 / 1
FEEDBACK:
REF: 345

___ 7. Purification of an ester requires three steps. Which option shows these three steps in the correct order?
a. Washing to remove water soluble substances → addition of sodium carbonate → repeat washing
b. Washing to remove water soluble substances → addition of sodium carbonate → distillation
c. Addition of sodium carbonate → washing to remove water soluble substances →distillation
d. Addition of sodium carbonate → distillation → washing to remove water soluble substances

ANSWER: B
Solution is washed to remove any water-soluble substances, sodium carbonate added to remove excess carboxylic acid, then distilled to purify the final ester.
POINTS: 0 / 1
FEEDBACK:
REF: 345

___ 8. Examples of organic acids and organic bases include:
a. Acids: aldehydes and ketones Bases: amines
b. Acids: carboxylic acids Bases: hydroxides and oxides
c. Acids: carboxylic acids Bases: amines
d. Acids: sulfuric and nitric acids Bases: amines

ANSWER: C
Carboxylic acids and amines are organic acids and bases. Aldehydes and ketones are not acids. Other acids and bases mentioned are not organic.
POINTS: 0 / 1
FEEDBACK:

REF: 349

___ 9. Organic acids tend not to have very low pH values because:
a. they are weak acids that only partially ionise.
b. their large size means they only partially ionise.
c. most organic acids are unreactive.
d. they behave differently to other acids and do not donate protons.

ANSWER: A
Organic acids are weak acids so do not produce many hydrogen ions, thus pH is not low.
POINTS: 0 / 1
FEEDBACK:
REF: 350

___ 10. Which of the following shows a balanced equation for the reaction between ethanoic acid and magnesium hydroxide?
a. $CH_3COOH(aq) + Mg(OH)_2(aq) \rightarrow Mg^{2+}(aq) + CH_3COO^-(aq) + 2H_2O(l)$
b. $2CH_3COOH(aq) + Mg(OH)_2(aq) \rightarrow Mg^{2+}(aq) + 2CH_3COO^-(aq) + 2H_2O(l)$
c. $CH_3COOH(aq) + MgOH(aq) \rightarrow Mg^{2+}(aq) + CH_3COO^-(aq) + H_2O(l)$
d. $2CH_3COOH(aq) + Mg(OH)_2(aq) \rightarrow Mg^{2+}(aq) + 2CH_3CO^-(aq) + 2H_2O(l)$

ANSWER: B
Acid + base → salt + water. Ensure reactions are balanced.
POINTS: 0 / 1
FEEDBACK:
REF: 350

___ 11. Hydrochloric acid is added to methanamine. The organic product of this reaction is:
a. methyl aminechloride.
b. ammonium chloride.
c. methylammonium chloride.
d. methanamine chloride.

ANSWER: C
Methylammonium chloride is the correct IUPAC name.
POINTS: 0 / 1
FEEDBACK:
REF: 351

___ 12. Which of the following is not a use of detergents?
a. break down grease and oil
b. increase the wettability of a liquid
c. act as an emulsifier
d. act as a surfactant to remove grease and oil

ANSWER: A
Detergents do not break down grease and oil, only remove it from a surface.
POINTS: 0 / 1
FEEDBACK:
REF: 352

___ 13. Which of the following correctly describes the structure of a soap/detergent molecule?
a. a hydrophilic hydrocarbon tail with a polar head.
b. a hydrophobic hydrocarbon tail with a non-polar hydrophobic head.
c. a hydrophobic hydrocarbon tail with a hydrophilic polar or ionic head.
d. a hydrophilic hydrocarbon tail with a hydrophilic polar or ionic head.

d. a hydrophilic hydrocarbon tail with a hydrophilic polar or ionic head.

ANSWER: C
The hydrocarbon tail is hydrophobic. The head is either ionic or has polar functional groups and is hydrophilic.
POINTS: 0 / 1
FEEDBACK:
REF: 353

___ 14. A saponification reaction involves:
a. the hydrolysis of fatty acids to fatty acid anions.
b. the addition of glycerol to fatty acids.
c. the formation of fats and oils from fatty acids.
d. the hydrolysis of fats to fatty acid anions.

ANSWER: D
Production of soap involves hydrolysis of fats to anions that are the soap anions.
POINTS: 0 / 1
FEEDBACK:
REF: 354

___ 15. The operation of soaps can be broken into several steps shown below in the wrong order. What is the correct order of the steps below?
1. Soap molecules surround the grease forming a micelle.
2. Agitation causes the grease to lift off a surface.
3. Hydrophobic head of the soap ion forms ion-dipole bonds with water molecules.
4. Micelles repel each other and are washed away.
5. Hydrophobic tail of the soap ion forms dispersion forces with grease.
a. 4, 1, 2, 3, 5
b. 5, 3, 2, 1, 4
c. 5, 2, 3, 1, 4
d. 2, 3, 5, 4, 1

ANSWER: B
Soap ions bond to grease and water, then agitation helps lift the grease, then a micelle forms. Negatively charged micelles repel and remain suspended.
POINTS: 0 / 1
FEEDBACK:
REF: 357

___ 16. Hard water:
a. contains high levels of calcium and manganese ions.
b. contains high levels of sodium and magnesium ions.
c. contains high levels of calcium and magnesium ions.
d. contains high levels of sodium and potassium ions.

ANSWER: C
Hard water contains higher than normal levels of calcium and magnesium ions.
POINTS: 0 / 1
FEEDBACK:
REF: 359

___ 17. Which of the following equations correctly represents the action of hard water on soap ions?
a. $2RCOO^{-}(s) + Ca^{2+}(aq) \rightarrow (RCOO)_2Ca(s)$
b. $RCOO^{-}(aq) + Ca^{2+}(aq) \rightarrow RCOOCa(s)$
c. $2RCOO^{-}(aq) + Ca^{2+}(aq) \rightarrow (RCOO)_2Ca(s)$
d. $2RCOO^{-}(aq) + Ca^{2+}(aq) \rightarrow (RCOO)_2Ca(aq)$

d. $2K_3C_6H_5O_7(aq) + 3Cu^{2+}(aq) \rightarrow (K_3C_6H_5O_7)_2Cu_3(aq)$

ANSWER: A
Hard water results in a solid precipitate of the soap ion called scum.
POINTS: 0 / 1
FEEDBACK:
REF: 359

___ 18. Which of the tests below will return a positive for only one type of functional group studied?
a. oxidation with dichromate ions
b. addition of bromine
c. addition of sodium carbonate
d. addition of water

ANSWER: C
Addition of water is not a functional group test. Use of bromine and dichromate ions will give positives for multiple functional groups.
POINTS: 0 / 1
FEEDBACK:
REF: 360

___ 19. Which of the following shows an example of a multistep synthesis of an organic compound?
a. ethene added to water to produce ethanol that is added to water to produce a dilute solution
b. ethene added to water to produce ethanol that is oxidised to produce ethanoic acid
c. ethene added to water to produce ethanol that is distilled to purify the ethanol
d. ethene added to water to produce ethanol by fermentation

ANSWER: B
Multi-step synthesis results in at least two compounds being formed in sequence from a start reactant.
POINTS: 0 / 1
FEEDBACK:
REF: 361

___ 20. Flow charts:
a. show steps in the production of a chemical and how the chemicals move through a chemical process.
b. only show the chemical reactions that occur in production of a particular chemical.
c. does not need to include information about energy or special conditions.
d. involve only chemistry and do not provide information about equipment or process.

ANSWER: A
Flow charts show all steps, equipment, chemistry and conditions required for producing a chemical.
POINTS: 0 / 1
FEEDBACK:
REF: 361

Retake