Vinegar to Nylon: Uses of Carboxylic Acids

Where carboxylic acids are used: formic acid in industry, acetic acid as a solvent and vinegar, adipic acid for nylon-6,6 through amide links, sodium benzoate as a food preservative, fatty-acid salts as soap, and aspirin as a medicine.

Name: Date: Score: ____ / 15

A. Fill in the blanks

1. Vinegar is a dilute solution of ____ acid.

2. Sodium benzoate is used as a food ____.

3. Nylon-6,6 is made from hexamethylenediamine and ____ acid.

4. Soap is the sodium salt of a long-chain ____ acid.

B. True or False

5. Formic acid is used in the leather and electroplating industries. True / False

6. In nylon-6,6 the units are joined by ester links. True / False

7. Aspirin is a carboxylic acid. True / False

C. Assertion and reason

8. Assertion (A): Soap removes grease.
Reason (R): Its non-polar tail dissolves grease and its ionic head stays in water.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

9. Assertion (A): Adipic acid can form a long polymer chain with a diamine.
Reason (R): It has a –COOH group at each end.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

D. Choose the correct option

10. The IUPAC name of adipic acid is:

(a) butanedioic acid
(b) pentanedioic acid
(c) hexanedioic acid
(d) heptanedioic acid

Answer: _____

11. Esters of benzoic acid are used in:

(a) perfumery
(b) explosives
(c) fertilisers
(d) batteries

Answer: _____

12. When an amide link forms in nylon, the molecule lost is:

(a) CO_2 (b) H_2O

(c) HCl (d) NH_3

Answer: _____

E. Numerical problems

13. How many carbon atoms are in one molecule of adipic acid?

F. Short answer questions

14. Explain how an amide link forms between a –COOH group and an $–NH_2$ group.

G. Match the columns

15. Match each item in Column A with the correct item in Column B.

Column A	Column B	Your answer
1. formic acid	(a) vinegar	1 → ____
2. acetic acid	(b) nylon-6,6	2 → ____
3. adipic acid	(c) food preservative	3 → ____
4. sodium benzoate	(d) leather, electroplating	4 → ____

Detailed solutions

1. acetic

2. preservative

3. adipic

4. fatty

5. True. NCERT lists rubber, textile, dyeing, leather and electroplating.

6. False. They are joined by amide links –CO–NH–.

7. True. Acetylsalicylic acid carries a –COOH group.

8. (a) R explains A.

9. (a) R explains A.

10. (c) hexanedioic acid. HOOC–$(CH_2)_4$–COOH has six carbons.

11. (a) perfumery. They have pleasant smells.

12. (b) H_2O. A condensation reaction loses water.

13. HOOC–$(CH_2)_4$–COOH. **Answer: 6**

14. The N lone pair attacks the carbonyl carbon; water is lost; –CO–NH– forms.

15. 1 → (d), 2 → (a), 3 → (b), 4 → (c). Each acid matches one use.