Wöhler's Urea and the End of Vital Force

Chemists once believed only living things could make organic compounds. In 1828 Friedrich Wöhler heated an inorganic salt and made urea.

Name: Date: Score: ____ / 19

A. Fill in the blanks

1. Wöhler made urea in the year ____.

2. Wöhler heated ammonium ____.

3. The idea that only living things make organic compounds was the ____ force theory.

4. Kolbe synthesised ____ acid.

5. Berthelot synthesised ____.

B. True or False

6. Ammonium cyanate is an inorganic salt. True / False

7. Berzelius supported the vital force theory. True / False

8. Urea and ammonium cyanate have different atoms. True / False

9. The vital force idea ended in a single day. True / False

C. Assertion and reason

10. Assertion (A): Wöhler's experiment challenged the vital force theory.
Reason (R): He made an organic compound from an inorganic salt.

(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: _____

11. Assertion (A): Urea and ammonium cyanate have the same formula CH_4N_2O.
Reason (R): The same atoms are arranged differently.

(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

12. The formula of urea is:

(a) NH_4CNO
(b) NH_2CONH_2
(c) CH_3COOH
(d) CH_4

Answer: _____

13. Which came first?

(a) Berthelot's methane
(b) Kolbe's acetic acid
(c) Wöhler's urea
(d) none

Answer: _____

14. Urea is found in:

(a) urine
(b) glass
(c) salt
(d) metal

Answer: _____

15. Wöhler's result showed that an organic compound can be made:

(a) only by plants
(b) from an inorganic salt
(c) only by kidneys
(d) only in animals

Answer: _____

E. Numerical problems

16. How many hydrogen atoms are in one urea molecule?

17. How many years after Wöhler did Berthelot make methane?

F. Short answer questions

18. What was the vital force theory?

G. Match the columns

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

Column A	Column B	Your answer
1. Wöhler	(a) vital force	1 → ____
2. Kolbe	(b) urea	2 → ____
3. Berthelot	(c) acetic acid	3 → ____
4. Berzelius	(d) methane	4 → ____

Detailed solutions

1. 1828

2. cyanate

3. vital

4. acetic

5. methane

6. True. That is why the result was so striking.

7. True. He held that life was needed.

8. False. They have the same atoms in a new arrangement.

9. False. It faded gradually.

10. (a) R explains A.

11. (a) R explains A.

12. (b) NH_2CONH_2. Two NH_2 groups on a C=O.

13. (c) Wöhler's urea. 1828.

14. (a) urine. Living bodies excrete it.

15. (b) from an inorganic salt. No living thing was needed.

16. NH_2CONH_2: 2 + 2. **Answer: 4**

17. 1856 − 1828. **Answer: 28**

18. It said organic compounds needed a special power found only in living things.

19. 1 → (b), 2 → (c), 3 → (d), 4 → (a). Each chemist matches his link.