

**Higher Chemistry: Unit 1 - CCS Part Bi****HOMEWORK 2**

The answers (and questions) to Homework 2 are below. You should now mark your answers and review any errors. A 10 minutes screencast of the answers with full explanation can be found here - [ANSWERS to HOMEWORK 2 with explanations.](#)

All higher chemistry homeworks are out of 20 so you can grade your own progress:

16 or above = A

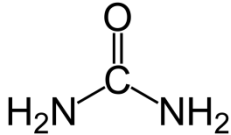
13-15 = B

10-12 = C

If you score below 10, you should take some time to read and watch these lessons again. If you are still unsure of where you are going wrong, you should ask in the questions channel on MS Teams

Answers to Homework 2

- | | |
|------|-------|
| 1. A | 7. C |
| 2. D | 8. C |
| 3. A | 9. D |
| 4. C | 10. A |
| 5. B | 11. B |
| 6. D | 12. C |

| Question | | Expected Response | | | Max Mark | Addition Guidance | | | | | | |
|---|------------------------|---|-----|-------|----------|---|------------------------|---|--|--|---|---|
| 13 | | <table border="1"><tr><td>LDF</td><td>Pd-Pd</td><td>H-Bonds</td></tr><tr><td>H₂ Cl₂ NCl₃</td><td>PF₃ HBr</td><td>HF H₂O NH₃</td></tr></table> | LDF | Pd-Pd | H-Bonds | H ₂ Cl ₂ NCl ₃ | PF ₃ HBr | HF H ₂ O NH ₃ | | | 4 | (½ mark for each correctly placed molecule, rounded down to whole number) |
| LDF | Pd-Pd | H-Bonds | | | | | | | | | | |
| H ₂ Cl ₂ NCl ₃ | PF ₃ HBr | HF H ₂ O NH ₃ | | | | | | | | | | |
| 14 | (a) | The liquids in group A are polar (molecules) | | | 1 | | | | | | | |
| | (b) | CCl ₄ would not be deflected / no deflection | | | 1 | | | | | | | |
| 15 | (a) |  | | | 1 | Or any other accepted structure | | | | | | |
| | (c) | Hydrogen bonds | | | 1 | Follow on accepted from accepted different structure. | | | | | | |
| | | Total = | | | 20 | | | | | | | |



Homework 2 - Types of Bonding and Intermolecular Forces

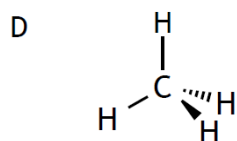
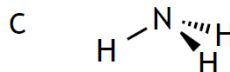
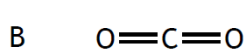
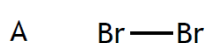
- Which of the following is not an example of a Van der Waals' force?
 - Covalent bond
 - Hydrogen bond
 - London dispersion force
 - Permanent dipole - permanent dipole attraction
- Which of the following bonds is the least polar?
 - C - F
 - C - Cl
 - C - Br
 - C - I
- Which of the following chlorides is likely to have the least ionic character?
 - BeCl_2
 - CaCl_2
 - LiCl
 - CsCl
- Which of the following compounds exists as discrete molecules?
 - Aluminium oxide
 - Silicon dioxide
 - Sulfur dioxide
 - Iron (II) oxide
- Which of the following compounds has polar molecules?
 - CO_2
 - NH_3
 - CCl_4
 - CH_4
- The two hydrogen atoms in a molecule of hydrogen are held together by
 - a hydrogen bond
 - a London Dispersion Force
 - a polar covalent bond
 - a non-polar covalent bond



7. Hydrogen will form a non-polar covalent bond with an element which has an electronegativity value of
- A 0.9
 - B 1.5
 - C 2.2
 - D 2.5
8. The shapes of some common molecules are shown. Each molecule contains at least one polar covalent bond. Which of the following molecules is non-polar?
- A $\text{H} - \text{Cl}$
 - B
 - C $\text{O} = \text{C} = \text{O}$
 - D
9. Which of the following covalent compounds is made up of non-polar molecules?
- A Water
 - B Ammonia
 - C Hydrogen fluoride
 - D Carbon tetrachloride
10. Which of the following shows the types of bonding in **decreasing** order of strength?
- A covalent: hydrogen : London dispersion
 - B covalent : London dispersion : hydrogen
 - C hydrogen : covalent : London dispersion
 - D London dispersion : hydrogen : covalent
11. Why do the melting and boiling points of elements in group 7 increase as you go down the group?
- A Because they are non-metals
 - B Because of an increase in strength of London dispersion forces
 - C Because of an increase in strength of covalent bonds
 - D Because elements only contain non-polar covalent bonds



12. Which of the following has more than one type of van der Waals' force operating between its molecules in the liquid state?



13. Copy the table below and place each of the formula given into the correct column



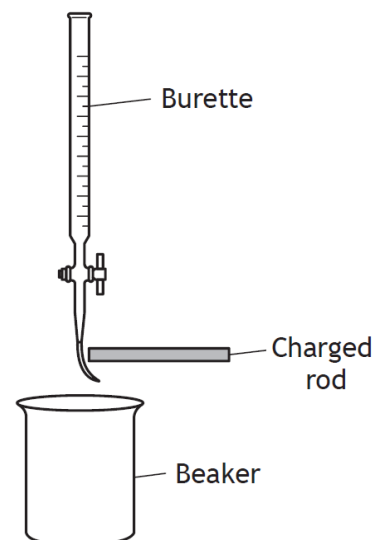
| Strongest Intermolecular Force Present | | |
|--|-------------------------------|----------------|
| London Dispersion Forces | Permanent Dipole Interactions | Hydrogen Bonds |
| | | |

(4)

14. Jimmy noticed that when a charged rod is held near a stream of water, the water is deflected. Jimmy carried out the experiment using other liquids and was able to place his results in two groups.

| Group A - Deflected | Group B - Not deflected |
|-------------------------------|----------------------------------|
| Water Propanone Ethanol | Cyclohexane Pentane Hexene |

- (a) Why did the liquids in Group A deflect, but those in Group B did not? (1)
- (b) Predict whether tetrachloromethane, CCl_4 , would be deflected by the charged rod. (1)



15. Urea is a covalent molecular substance with the formula $\text{CO}(\text{NH}_2)_2$.

- (a) Draw the structure of urea. (1)
- (b) Using the structure in (a), name the strongest type of intermolecular force present in urea. (1)

Total = 20