1. (3) Write the **IUPAC name** (including $E$ or $Z$ designation) for the following compound:

![IUPAC name diagram]

**(E)-1-bromo-3-chloro-4-ethyl-2-methyl-3-heptene**

2. (3) Draw in the box the **skeletal structure** of 3-vinylcyclopentene:

![Skeletal structure diagram]

3. (2) Which of the following alkenes is the most **stable**? (circle correct answer):

![Alkene options]

4. (4) Specify the **degree of unsaturation** of the following formulas (put number in the box):

- ![Degree of unsaturation 1](image)
- ![Degree of unsaturation 2](image)
- ![Degree of unsaturation 3](image)
- ![Degree of unsaturation 4](image)

5. (7) For the two-step reaction shown below: (a) Use curved arrows to show the flow of electrons in each step, and (b) Label the nucleophile and the electrophile by placing **Nu** or **E** in the box.

![Reaction diagram]

6. (3) Which of the following species is **NOT** a nucleophile?

- $\text{Cl}^-$
- $\text{H}_2\text{O}$
- $\text{C}_2\text{H}_5\text{OH}$
- ![Nucleophile option 1](image)
- $\text{HO}^-$
- $\text{NH}_3$
- $\text{CH}_3\text{NH}_2$

7. (3) Complete the following reaction by drawing the appropriate **product** in the provided box:

![Reaction diagram]

or

![Reaction diagram]

**Overall Score: 25**