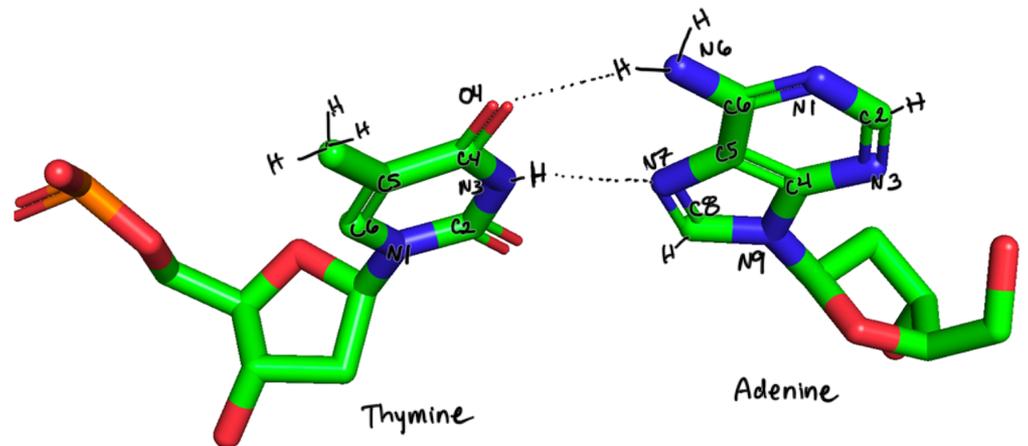


C – Draw on the figure at the bottom the interactions between the two bases; add hydrogen atoms if H-bonds are involved, and label the atoms involved using the base numbering system – 2pts.



A -The picture below shows a nucleoside diphosphate (carbons in gray color) with a water molecule (Red oxygen, two hydrogens shown as gray spheres).

A1 – Name the modified BASE

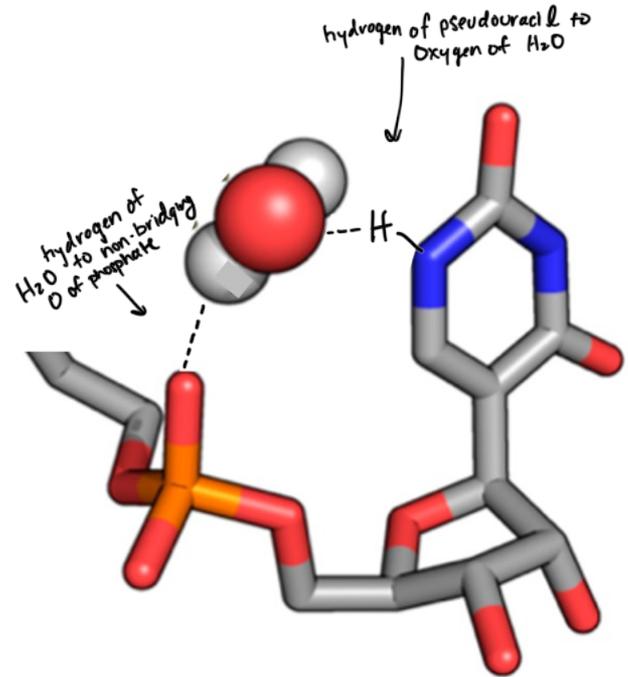
(no abbreviation)– 1pt.

pseudouracil (NOT pseudouridine)

A2 – Draw the potential interaction between the water molecule and the nucleoside monophosphate (add H atoms if H bonds are involved) – 2pts

A3 – Explain how the base modification allows the nucleoside to interact with water in a manner that would not be possible for a non-modified nucleoside 2pts.

A normal base would have a carbon at that position, so H-bonding w/ water would not be possible.



B -The picture below shows a nucleoside interacting with a protein (carbons in green color).

B1 – Name the modified nucleoside

(no abbreviation)– 1pt.

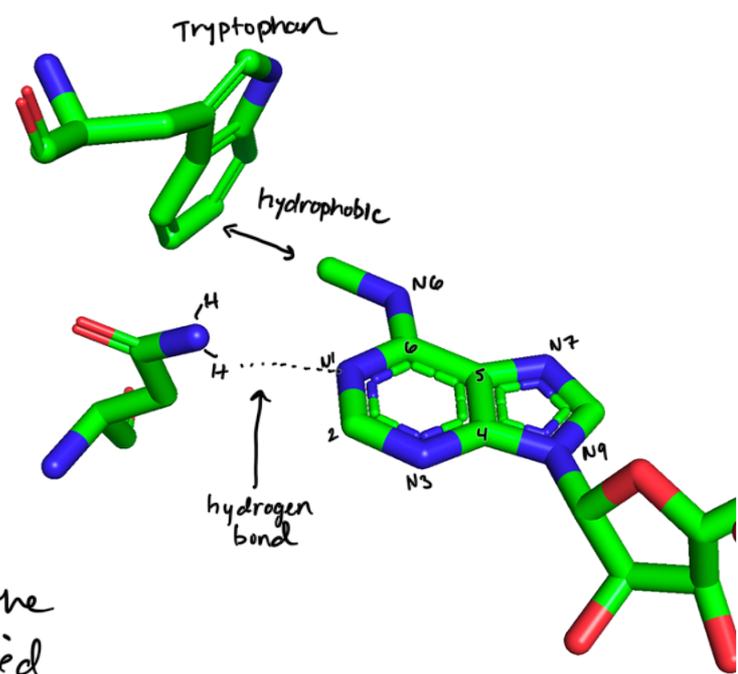
N(6)-methyladenosine OR N⁶-methyladenosine

B2 – Identify the interactions between the nucleoside and the amino acids shown in the structure. Describe them briefly below using the atoms numbering system for the base/sugar, and draw them on the structure– 2pts.

→ hydrophobic interaction btwn Trp and methyl group of the base @ position 6

B3 – Explain below how the interaction shown provides specificity for this protein for the modified nucleoside over the same non-modified nucleoside - 2pts.

→ ONLY the hydrophobic interaction at the top provides specificity for the modified base



A -Write in the boxes the type of sugar pucker represented (2pts).

Write in the boxes in which type of right-handed double helical structures each of these sugar pucker would be found (2pts).



C2' endo

B-form



C3' endo

A-form