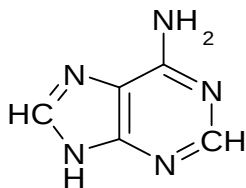
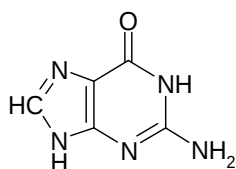


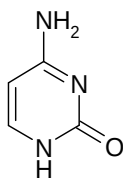
**Q1.(a) What is the name of the molecule? Is it a purine or a pyrimidine? [1]**



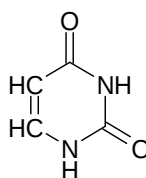
**Q1(b) Name the molecules shown below and pick the one which forms a Watson Crick base pair with the molecule shown in (a) above. [4]**



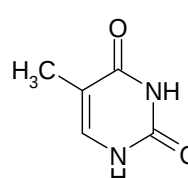
(i)



(ii)

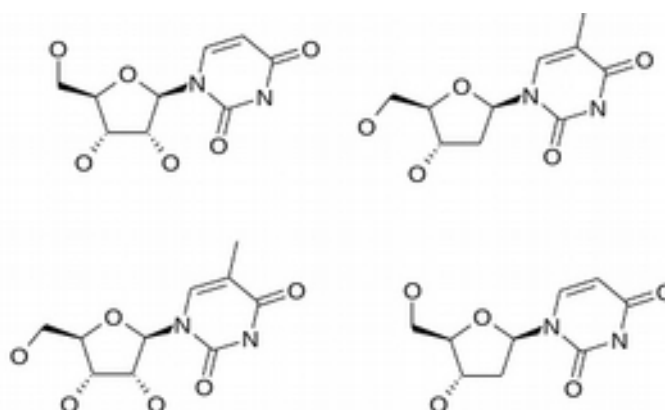


(iii)



(iv)

**Q1(c)**



**Which of the above structures represents a nucleoside likely to be present in a DNA molecule? Redraw its structure showing all the hydrogen atoms. Number the carbon atoms in the sugar ring and clearly depict the 3' and 5' OH groups. [5]**

**Q1(d) Discuss the essential differences between DNA and RNA structures. [6]**

**Q2 (a) How many residues must an  $\alpha$  helix contain in order to span the 30-Å-thick hydrocarbon core of a lipid bilayer? [2]**

**(b) How many residues in a  $\beta$  sheet are required to span this bilayer core if it is inclined by 30° with respect to the normal to the membrane plane? [2]**

**(c) Why do most transmembrane  $\alpha$  - helices and  $\beta$ -strands have more than these minimum numbers? [2]**

**Q2 (d) Illustrate the torsional degrees of freedom in a nucleotide. [4]**

**Q3 (a) What are non-bonded forces? .Explain briefly. [4]**