```
ATOM    100  P    DA A   6      15.060  13.659  14.706  1.00 10.00           P
ATOM    101  OP1  DA A   6      14.114  12.694  15.318  1.00 10.00           O
ATOM    102  OP2  DA A   6      16.053  13.109  13.762  1.00 10.00           O
ATOM    103  O5'  DA A   6      14.197  14.848  14.023  1.00 10.00           O
ATOM    104  C5'  DA A   6      13.168  15.423  14.895  1.00 10.00           C
ATOM    105  C4'  DA A   6      12.160  16.099  14.010  1.00 10.00           C
ATOM    106  O4'  DA A   6      12.788  17.233  13.398  1.00 10.00           O
ATOM    107  C3'  DA A   6      11.539  15.272  12.883  1.00 10.00           C
ATOM    108  O3'  DA A   6      10.115  15.440  12.877  1.00 10.00           O
ATOM    109  C2'  DA A   6      12.266  15.763  11.646  1.00 10.00           C
ATOM    110  C1'  DA A   6      12.558  17.191  11.965  1.00 10.00           C
ATOM    111  N9   DA A   6      13.775  17.791  11.392  1.00 10.00           N
ATOM    112  C8   DA A   6      15.001  17.245  11.178  1.00 10.00           C
ATOM    113  N7   DA A   6      15.882  18.098  10.683  1.00 10.00           N
ATOM    114  C5   DA A   6      15.184  19.294  10.598  1.00 10.00           C
ATOM    115  C6   DA A   6      15.554  20.575  10.156  1.00 10.00           C
ATOM    116  N6   DA A   6      16.769  20.924   9.713  1.00 10.00           N
ATOM    117  N1   DA A   6      14.605  21.532  10.221  1.00 10.00           N
ATOM    118  C2   DA A   6      13.382  21.243  10.650  1.00 10.00           C
ATOM    119  N3   DA A   6      12.922  20.063  11.106  1.00 10.00           N
ATOM    120  C4   DA A   6      13.887  19.126  11.047  1.00 10.00           C

ATOM    366  P    DT B  19      15.275  30.434   4.030  1.00 10.00           P
ATOM    367  OP1  DT B  19      14.401  31.249   3.131  1.00 10.00           O
ATOM    368  OP2  DT B  19      16.559  31.031   4.453  1.00 10.00           O
ATOM    369  O5'  DT B  19      14.398  30.065   5.351  1.00 10.00           O
ATOM    370  C5'  DT B  19      13.150  29.372   5.104  1.00 10.00           C
ATOM    371  C4'  DT B  19      12.966  28.356   6.184  1.00 10.00           C
ATOM    372  O4'  DT B  19      13.470  27.050   6.276  1.00 10.00           O
ATOM    373  C3'  DT B  19      12.498  28.839   7.545  1.00 10.00           C
ATOM    374  O3'  DT B  19      11.095  29.170   7.506  1.00 10.00           O
ATOM    375  C2'  DT B  19      12.884  27.730   8.476  1.00 10.00           C
ATOM    376  C1'  DT B  19      13.222  26.542   7.610  1.00 10.00           C
ATOM    377  N1   DT B  19      14.411  25.807   8.085  1.00 10.00           N
ATOM    378  C2   DT B  19      14.233  24.573   8.678  1.00 10.00           C
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ATOM	379	O2	DT B	19	13.155	24.022	8.847	1.00	10.00	O
ATOM	380	N3	DT B	19	15.401	23.980	9.068	1.00	10.00	N
ATOM	381	C4	DT B	19	16.689	24.455	8.964	1.00	10.00	C
ATOM	382	O4	DT B	19	17.622	23.771	9.381	1.00	10.00	O
ATOM	383	C5	DT B	19	16.777	25.752	8.346	1.00	10.00	C
ATOM	384	C7	DT B	19	18.116	26.399	8.177	1.00	10.00	C
ATOM	385	C6	DT B	19	15.665	26.361	7.942	1.00	10.00	C

1. Given above are ATOMIC CO-ORDINATES of 1 base pair in B DNA DUPLEX.
    a. Which nucleotide bases are involved in base pairing?
    b. Calculate the distance between the two carbons attached to base in each individual chain A and B.
    c. Calculate the distance between the HYDROGEN BOND DONOR ATOMS in the base pair for ALL HB pairs.
    d. Calculate the TORSION ANGLES: α; β; γ; δ; χ;
    e. Calculate the helix DIAMETER.
    f. Can you calculate the base pair inclination?
    g. Can you determine the SUGAR PUCKER?
    h.
2. The above DNA structure co-ordinates were obtained from *114d.pdb* file. Download this file and VIEW the DNA structure in 3D using software like PYMOL.