Assignment - Structure & Properties Matter
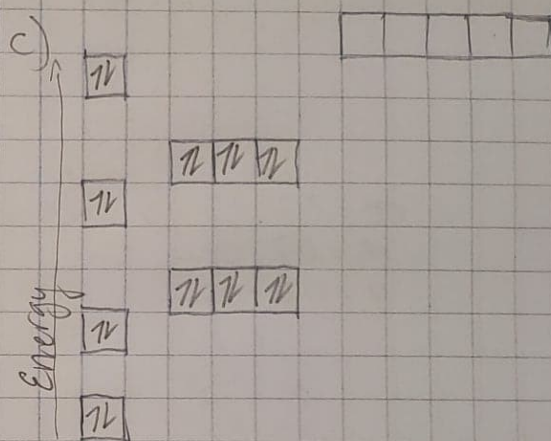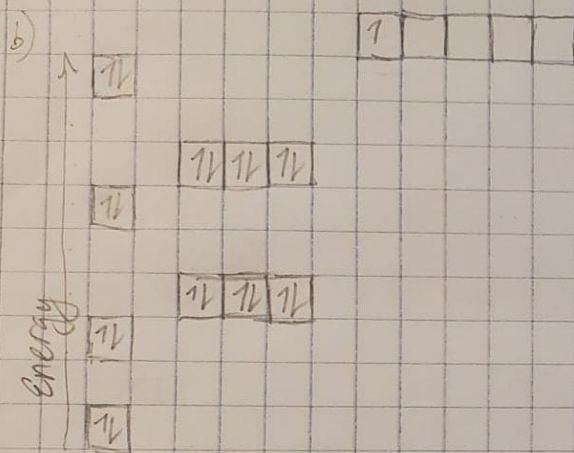
(I) David Waji
Due: Oct 15, 2020
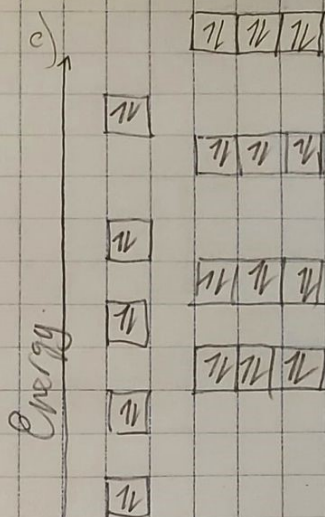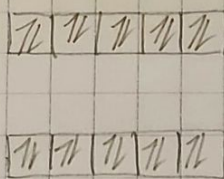
1. a)

e^-	n	l	m_l	m_s
1.	3	2	-2	$+\frac{1}{2}$
2.	4	0	0	$-\frac{1}{2}$

b)

c)

2. a)

e^-	n	l	m_l	m_s
1.	5	1	0	$-\frac{1}{2}$
2.	5	1	-1	$-\frac{1}{2}$
3.	5	1	1	$+\frac{1}{2}$

b)

c)

Energy (vertical axis labels)

3. a) $7 \cdot 3 + 4 + 1 = 26$
$26 - 4 \cdot 2 = 18$
$18 - 6 \cdot 3 = 0$

Structure of CCl_3H:

:Cl:
|
:Cl — C — H
|
:Cl:
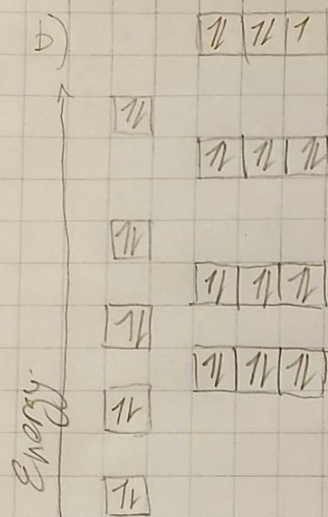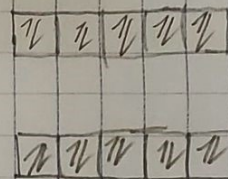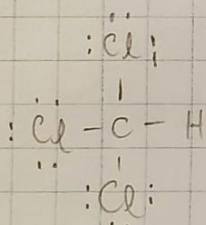
Hybridization: sp^3

b) $6 + 4 + 2 \cdot 1 = 12$
$12 - 4 \cdot 2 = 4$
$4 - 4 = 0$

Structure:

:O:
‖
C
H   H
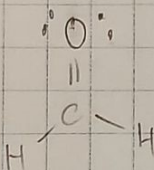
Hybridization: sp^2

c) $5 + 7 \cdot 5 = 40$
$40 - 5 \cdot 2 = 30$
$30 - 6 \cdot 5 = 0$

Structure of PF_5:

:F: :F:
  \   /
:F — P — :F:
      |
    :F:
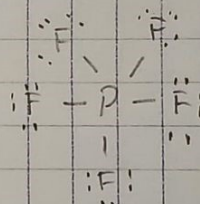
Hybridization: dsp^3

d) $8 + 4 \cdot 7 = 36$
$36 - 4 \cdot 2 = 28$
$28 - 6 \cdot 4 - 2 \cdot 2 = 0$

Structure of XeF_4:

:F: :F:
   \   /
      Xe
   /   \
:F: :F:
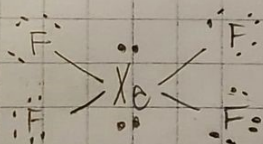
Hybridization: d^2sp^3

4, $5 + 6 \cdot 3 + 1 = 24$
$24 - 5 \cdot 2 = 14$
$14 - 2 \cdot 4 - 6 = 0$

$$\left[\ddot{\text{O}} = \underset{\underset{\ddot{\ddot{\text{O}}}}{|}}{\text{AK}} = \ddot{\text{O}} \right]^{-} \rightleftharpoons \left[\ddot{\text{O}} - \underset{\overset{\|}{\ddot{\text{O}}}}{\text{AK}} = \ddot{\text{O}} \right]^{-} \rightleftharpoons \left[\ddot{\text{O}} = \underset{\overset{\|}{\ddot{\text{O}}}}{\text{AK}} - \ddot{\text{O}} \right]^{-}$$