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/20 1. a) $\overset{+6}{As_2}\overset{-6}{O_3}$ Arsenic (III) oxide

b) $\overset{+6}{In_2}\overset{-6}{O_3}$ Indium oxide (No numeral)

c) $\overset{+2}{Mn}\overset{-2}{SO_4}$ Manganese (II) sulfate

d) $\overset{+2}{Na_2}\overset{-2}{SO_4}$ Sodium sulfate

e) N_2O_4 Dinitrogen tetroxide

-2 per error.

/20 2. a) Pb^{4+} & Cl^- : $PbCl_4$

b) Ga^+ & S^{2-} : Ga_2S

c) NH_4^+ & NO_3^- : NH_4NO_3

d) Cu^{2+} & O^{2-} : CuO

e) SO_3

-2 per error (symbol...)

• if ratio of two elements wrong -3 if no work shown (if original charges shown -2)

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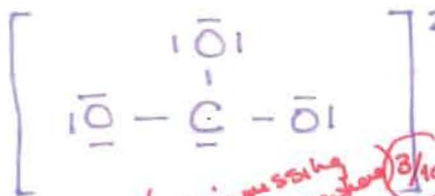
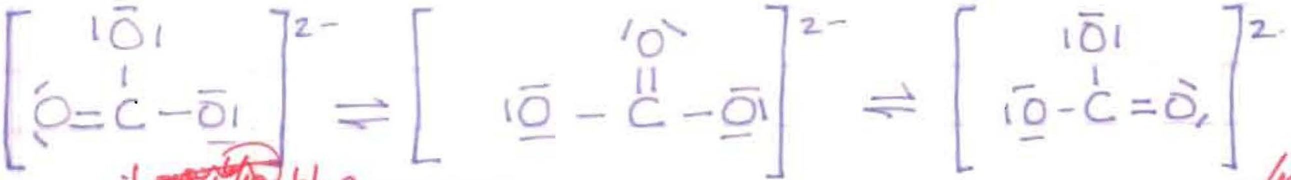
3. a) C : 4
$3 \times O$: 18
2− : 2/24
−6/18

/20

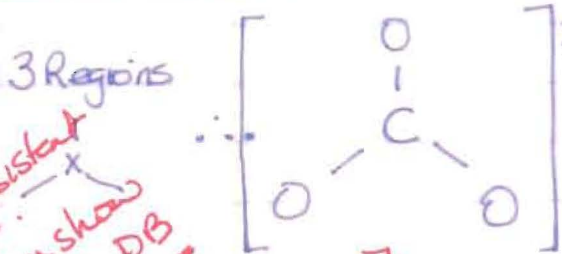


−1 if charge not shown
(pair missing anywhere) 3/10 if no further than this



−4 if no resonance structures.
6/10
/10

3 Regions



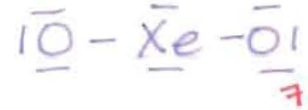
−1 if not shown

TRIANGULAR
3

7
/10

full marks if geometry consistent w. Lewis. Can show LP, DB

b Xe: 8
$2 \times O$: 12/20
$-\frac{4}{16}$



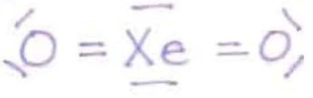
7/10

FC: −Xe− : 8 − (4+2) = +2

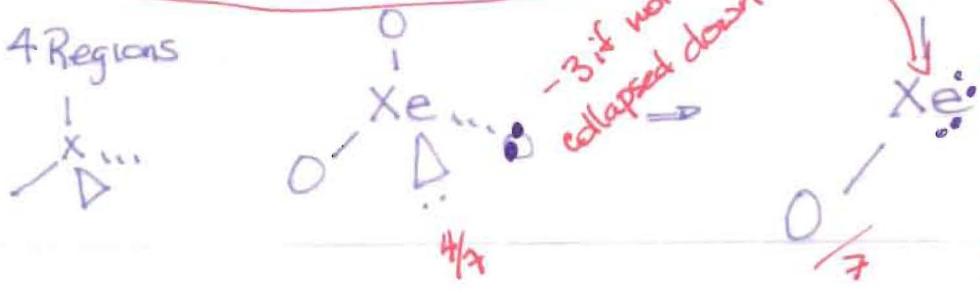
|O− : 6 − (6+1) = −1

/10

−3 if no D.B. or −2 if 1 D.B.



4 Regions



−3 if not collapsed down
−2 if LP not shown on Xe

4/7
/7

BENT or ANGULAR
/3

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/20 4. V = 25.0 L

$n = \frac{3.50 \times 10^3 \, g}{37.99 \, g/mol} = 92.1295 \, mol$ (3)

(a: 1/3) 0.01085 mol

F(g) — (2/3) if n = 184.26 ($F_2(g)$) −1

T = 19°C + 273 = 292 K (2) conversion

a) P (25.0 L) = (92.1295 mol)(0.08206 L·atm/K·mol)(292 K) (2) choice

P (25.0 L) = 2207.5628 L·atm

(2) calc (1) S.F.

P = 88.3 atm

−2 if no unit shown

/10

b) $\left(P + \frac{(1.16)(92.1295)^2}{(25.0)^2}\right)(25.0 - (92.1295)(0.02896)) = (92.1295)(0.08206)(292)$

(P + 15.7534 atm)(22.3319 L) = 2207.5628 L·atm

P + 15.7534 atm = 98.8524 atm

P = 83.1 atm −1 S.F.

−1 if calc error
−2 if no units shown

/5

no double deduction if wrong R here, right one above... −2

c) Preal LOWER than predicted : IMF's dominate

/5

if "size" : 2/5 ; OR if their $P_{ideal} < P_{real}$ — size: 5/5, IMF: 2/5