

2024 CCO Answer Sheet

Name _____ School _____ Account Number _____

1. POLYMERS

a) *4 marks*

b) *1 mark*

c) 2 marks

d) 1 mark

e) 1 mark

f) 1 mark

g) 1 mark

h) 1 mark

2. ANALYTICAL CHEMISTRY

a) *3.0 marks*

A:

B:

C:

D:

F:

G:

H:

I:

J:

M:

b) *3 marks*

Formation of C:

Formation of D:

Formation of F:

Formation of G:

Decomposition of G:

Reaction of H with aluminum to produce A:

Reaction of D with sulfuric acid to produce K and L:

Formation of B from M:

c) 6.0 marks

3. INORGANIC CHEMISTRY and CRYSTAL STRUCTURES

a) *4 marks*

Molar mass: _____ $g \cdot mol^{-1}$

b) *1.5 marks*

B: _____ C: _____ D: _____ X: _____ Y: _____

c) *6 marks*

Density of structure I: _____ g · cm⁻³

Density of structure II: _____ g · cm⁻³

Density of structure III: _____ g · cm⁻³

Formula of A: _____

d) 0.2 marks

Name: _____

Property: _____

e) 0.3 marks

4. FERROCENE: ELECTRONS and ORBITALS

a) 0.5 marks

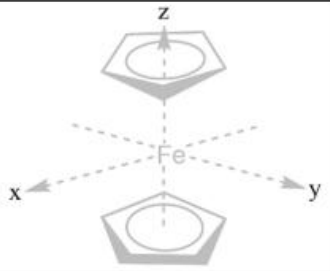
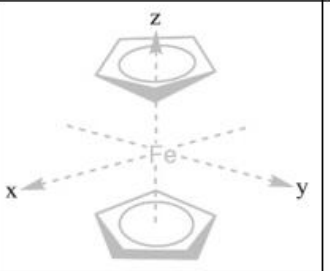
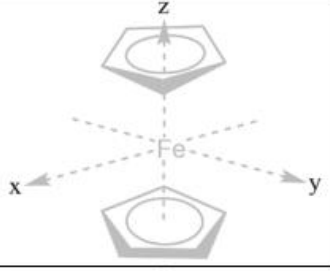
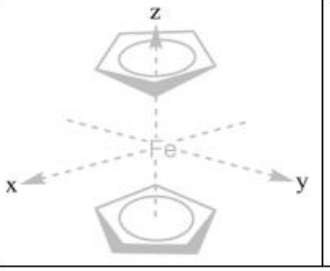
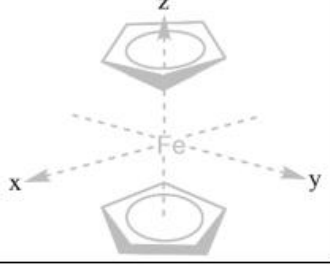
b) 1.5 marks

c) 2 marks

d) 3 marks

Diagram	Molecular Orbitals	Nodal Surfaces	Nature of Orbital
— — e ₂			
— — e ₁			
— a ₁			

g) 1.5 marks

d orbital	Drawing	Interacting orbital	d orbital	Drawing	Interacting orbital
$d_{x^2-y^2}$			d_{xz}		
d_{xy}			d_{yz}		
d_{z^2}					

5. PHYSICAL CHEMISTRY

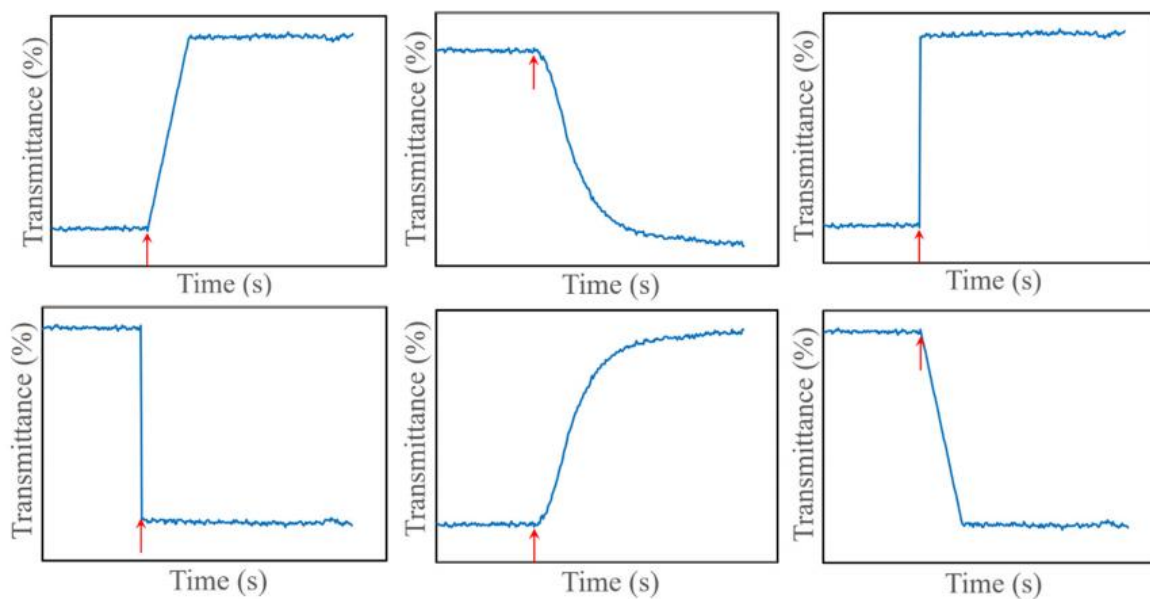
a) 0.5 marks

Order: _____

Units of k_{obs} : _____

b) 1 mark

c) 1 mark



d) 0.5 marks

e) **0.5 marks**

$$\frac{d[FeSCN]}{dt} =$$

f) **0.5 marks**

$k =$

g) **2 marks**

$$([Fe_e] + [SCN_e] + 1/K_c) =$$

h) 3 marks

i) 0.5 marks

j) 1.5 marks

k) 0.5 marks

l) 0.5 marks



1 H 1.008																	18 He 4.003
3 Li 6.941	4 Be 9.012	Relative Atomic Masses (2012, IUPAC) *For the radioactive elements the atomic mass of an important isotope is given										Masses Atomiques Relatives (IUPAC, 2012) *Dans le cas des éléments radioactifs, la masse atomique fournie est celle d'un isotope important					
11 Na 22.99	12 Mg 24.31	3	4	5	6	7	8	9	10	11	12	5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.96	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (269)	111 Rg (272)	112 Cn (285)	113 Nh (284)	114 Fl (289)	115 Mc (288)	116 Lv (292)	117 Ts (294)	118 Og (294)

58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
90 Th 232.0	91 Pa (231.0)	92 U (238.0)	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

Symbol **Value**
Symbole **Quantité numérique**

Atomic mass unit	<i>amu</i>	1.66054 x 10 ⁻²⁷ kg	Unité de masse atomique
Avogadro's number	<i>N_A</i>	6.022 x 10 ²³	Nombre d'Avogadro
Charge of an electron	<i>e</i>	1.60218 x 10 ⁻¹⁹ C	Charge d'un électron
Dissociation constant (H ₂ O)	<i>K_w</i>	1.00 x 10 ⁻¹⁴ (25°C)	Constante de dissociation de l'eau (H ₂ O)
Faraday's constant	<i>F</i>	96 485 C mol ⁻¹	Constante de Faraday
Gas constant	<i>R</i>	8.31451 J K ⁻¹ mol ⁻¹ 0.08206 L atm K ⁻¹ mol ⁻¹	Constante des gaz
Mass of an electron	<i>m_e</i>	9.10939 x 10 ⁻³¹ kg	Masse d'un électron
Mass of a neutron	<i>m_n</i>	1.67493 x 10 ⁻²⁷ kg	Masse d'un neutron
Mass of a proton	<i>m_p</i>	1.67262 x 10 ⁻²⁷ kg	Masse d'un proton
Planck's constant	<i>h</i>	6.62608 x 10 ⁻³⁴ J s	Constante de Planck
Speed of light	<i>c</i>	2.997925 x 10 ⁸ m s ⁻¹	Vitesse de la lumière
Rydberg constant	<i>R_H</i>	1.096 x 10 ⁷ m ⁻¹	Constante de Rydberg

1 Å = 1 x 10 ⁻¹⁰ m	STP/TPN	SATP/TPAN
1 atm = 101.325 kPa	273.15 K	298 K
1 bar = 1 x 10 ⁵ Pa	100 kPa	100 kPa