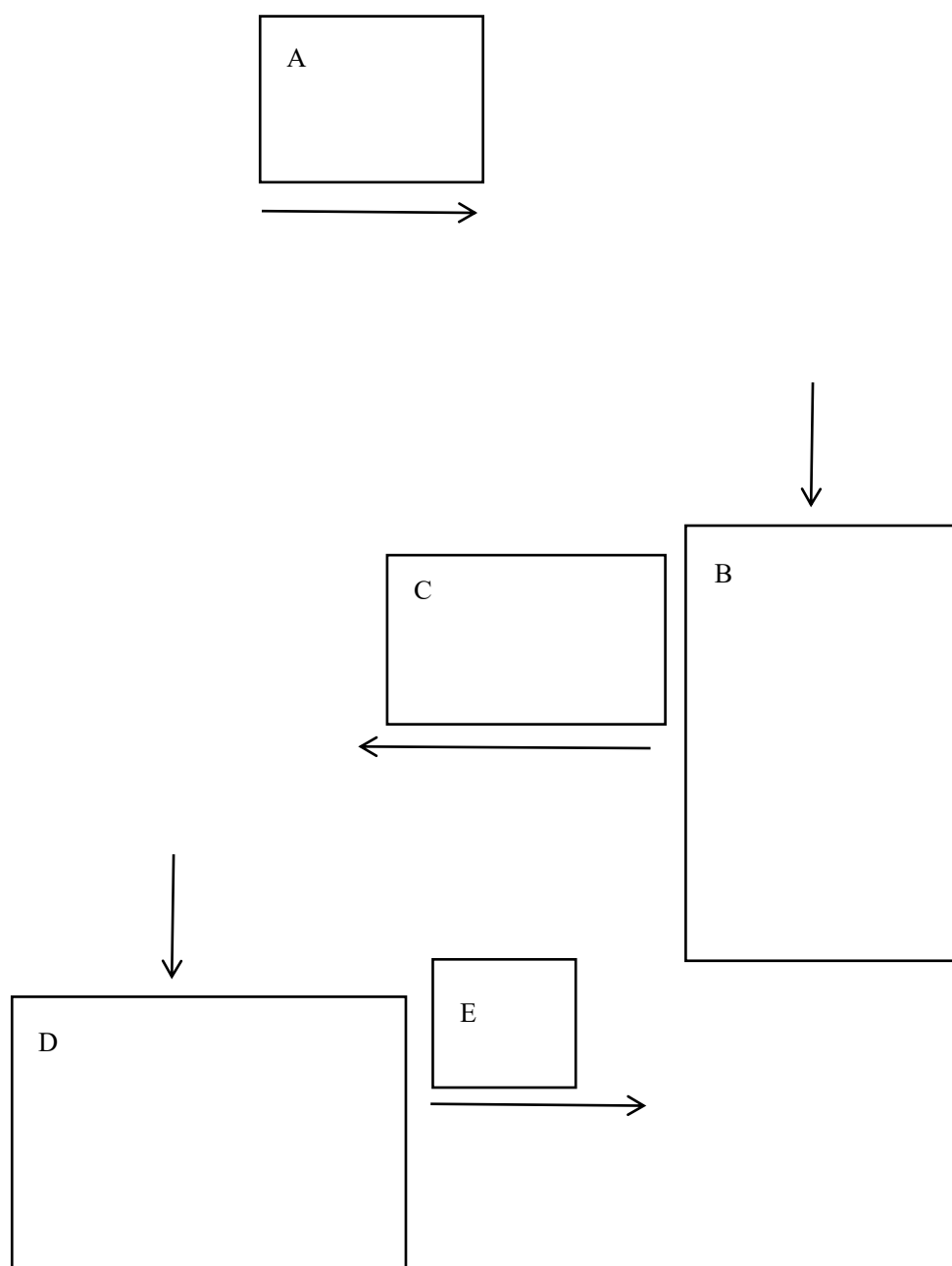


2023 CCO Answer Sheet

Name _____ School _____ Account Number _____

1. ORGANIC CHEMISTRY

a) 4 marks



b) 3.5 marks

c) 4.5 marks

Protons	Chemical Shift (ppm)	Integration	Multiplicity Splitting pattern
a			
b			
c			

2. ANALYTICAL CHEMISTRY

a) *2.8 marks*

A:

B:

C:

D:

E:

F:

G:

H:

b) *3.2 marks*

Reaction to produce **B**

Reaction to produce **C**

Reaction to produce **D**

Reaction to produce **E**

Reaction to produce **F**

Reaction to produce **G**

Reaction to produce **H**

Reaction of **H** with $\text{HNO}_3(\text{aq})$ to produce sulfur and **A**

c) *0.5 marks*

d) *0.5 marks*

e) *0.5 marks*

f) 0.5 marks

g) 0.5 marks

h) 0.5 marks

i) 3 marks

3. INORGANIC CHEMISTRY

a) *1 mark*

b) *2 marks*

c) *1 mark*

d) *4 marks*

e) 1 mark

f) 1 mark

g) 1 mark

h) 1 mark

4. BIOCHEMISTRY

a) *2 marks*

b) 1 mark

c) 1 mark

d) 2 marks

e) 1.5 marks

f) 1 mark

g) 1.5 marks

h) 2 marks

5. PHYSICAL CHEMISTRY

a) *1.5 marks*

Anode	
Cathode	
Total Cell	

b) *1 mark*

c) 3 marks

d) 2 marks

e) 3 marks

f) 0.5 marks

g) 1 mark



1 H 1.008											13	14	15	16	17	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										5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	3	4	5	6	7	8	9	10	11	12	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
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
1 atm	= 101.325 kPa
1 bar	= 1 x 10 ⁵ Pa

STP/TPN	SATP/TPAN
273.15 K	298 K
100 kPa	100 kPa