

L3-CHEMR



Mana Tohu Mātauranga o Aotearoa  
New Zealand Qualifications Authority

## Level 3 Chemistry 2023

### RESOURCE BOOKLET

Refer to this booklet to answer the questions in your Question and Answer Booklets.

Check that this booklet has pages 2–3 in the correct order and that none of these pages is blank.

**YOU MAY KEEP THIS SHEET AT THE END OF THE EXAMINATION.**

**Formulae for 91390: Demonstrate understanding of thermochemical principles and the properties of particles and substances**

$$n = cV$$

$$n = \frac{m}{M}$$

$$q = mc\Delta T$$

$$\Delta_r H^\circ = \frac{-q}{n}$$

$$\Delta_r H^\circ = \sum \Delta_f H^\circ(\text{products}) - \sum \Delta_f H^\circ(\text{reactants})$$

**Formulae for 91392: Demonstrate understanding of equilibrium principles in aqueous systems**

$$\text{pH} = -\log[\text{H}_3\text{O}^+]$$

$$[\text{H}_3\text{O}^+] = 10^{-\text{pH}}$$

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 1 \times 10^{-14} \text{ at } 25^\circ\text{C}$$

$$\text{p}K_a = -\log K_a$$

$$K_a = 10^{-\text{p}K_a}$$

$$K_a = \frac{[\text{H}_3\text{O}^+][\text{A}^-]}{[\text{HA}]}$$

$$K_s = s^2$$

$$K_s = 4s^3$$

$$n = cV$$

$$n = \frac{m}{M}$$

**Complex ions for 91392: Demonstrate understanding of equilibrium principles in aqueous systems**



# PERIODIC TABLE OF THE ELEMENTS

18

Atomic number		Relative atomic mass																	
1	2																		
3																			
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
1	2																		
3	4																		
5	6																		
7	8																		
9	10																		
11	12																		
13	14																		
15	16																		
17	18																		
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
<b>K</b>	<b>Ca</b>	<b>Sc</b>	<b>Ti</b>	<b>V</b>	<b>Cr</b>	<b>Mn</b>	<b>Fe</b>	<b>Co</b>	<b>Ni</b>	<b>Cu</b>	<b>Zn</b>	<b>Ga</b>	<b>Ge</b>	<b>As</b>	<b>Se</b>	<b>Br</b>	<b>Kr</b>		
39.1	40.1	45.0	47.9	50.9	52.0	54.9	55.9	58.9	58.7	63.6	65.4	69.7	72.6	74.9	79.0	79.9	83.8		
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54		
<b>Rb</b>	<b>Sr</b>	<b>Y</b>	<b>Zr</b>	<b>Nb</b>	<b>Mo</b>	<b>Tc</b>	<b>Ru</b>	<b>Rh</b>	<b>Pd</b>	<b>Ag</b>	<b>Cd</b>	<b>In</b>	<b>Sn</b>	<b>Sb</b>	<b>Te</b>	<b>I</b>	<b>Xe</b>		
85.5	87.6	88.9	91.2	92.9	95.9	98.9	101	103	106	108	112	115	119	122	128	127	131		
55	56	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86		
<b>Cs</b>	<b>Ba</b>	<b>Lu</b>	<b>Hf</b>	<b>Ta</b>	<b>W</b>	<b>Re</b>	<b>Os</b>	<b>Ir</b>	<b>Pt</b>	<b>Au</b>	<b>Hg</b>	<b>Tl</b>	<b>Pb</b>	<b>Bi</b>	<b>Po</b>	<b>At</b>	<b>Rn</b>		
133	137	175	179	181	184	186	190	192	195	197	201	204	207	209	210	210	222		
87	88	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118		
<b>Fr</b>	<b>Ra</b>	<b>Lr</b>	<b>Rf</b>	<b>Db</b>	<b>Sg</b>	<b>Bh</b>	<b>Hs</b>	<b>Mt</b>	<b>Ds</b>	<b>Rg</b>	<b>Cn</b>	<b>Nh</b>	<b>Fl</b>	<b>Mc</b>	<b>Lv</b>	<b>Ts</b>	<b>Og</b>		
223	226	262	261	262	263	264	265	268	271	272	277								

Lanthanide Series	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	<b>La</b>	<b>Ce</b>	<b>Pr</b>	<b>Nd</b>	<b>Pm</b>	<b>Sm</b>	<b>Eu</b>	<b>Gd</b>	<b>Tb</b>	<b>Dy</b>	<b>Ho</b>	<b>Er</b>	<b>Tm</b>	<b>Yb</b>
	139	140	141	144	147	150	152	157	159	163	165	167	169	173
Actinide Series	89	90	91	92	93	94	95	96	97	98	99	100	101	102
	<b>Ac</b>	<b>Th</b>	<b>Pa</b>	<b>U</b>	<b>Np</b>	<b>Pu</b>	<b>Am</b>	<b>Cm</b>	<b>Bk</b>	<b>Cf</b>	<b>Es</b>	<b>Fm</b>	<b>Md</b>	<b>No</b>
	227	232	231	238	237	239	241	244	249	251	252	257	258	259

