

See back cover for an English translation of this cover

3

L3-CHEMMR



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Te Mātauranga Matū, Kaupae 3, 2021

PUKAPUKA RAUEMI

Tirohia tēnei pukapuka hei whakatutuki i ngā tūmahi o ō Pukapuka Tūmahi, Tuhinga hoki.

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2–5 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

KA TAEA TĒNEI PUKAPUKA TE PUPURI HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

Ngā tikanga tātai mō 91390M: Te whakaatu māramatanga ki ngā tikanga matūrewarau me ngā āhuatanga o ngā korakora me ngā matū

$$n = cV$$

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

$$q = mc\Delta T \qquad \Delta_r H^\circ = \frac{-q}{n}$$

$$\Delta_r H^\circ = \sum \Delta_f H^\circ(\text{ngā hua}) - \sum \Delta_f H^\circ(\text{ngā pūmatū hohe})$$

Ngā tikanga tātai mō 91392M: Te whakaatu māramatanga ki ngā mātāpono taurite i ngā pūnaha waiwai

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

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

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

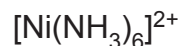
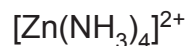
$$K_a = \frac{[\text{H}_3\text{O}^+][\text{A}^-]}{[\text{HA}]}$$

$$K_s = s^2 \qquad K_s = 4s^3$$

$$n = cV$$

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

Ngā katote tuatini mō 91392M: Te whakaatu māramatanga ki ngā mātāpono taurite i ngā pūnaha waiwai



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

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

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

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

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

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

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

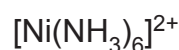
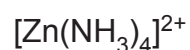
$$K_s = s^2$$

$$K_s = 4s^3$$

$$n = cV$$

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

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



TE TAKA PŪMOTU

Papatipu ngota hāngai

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57	La	139	Ce	140	Pr	141	Nd	144	Pm	147	Sm	150	Eu	152	Gd	157	Tb	159	Dy	163	Ho	165	Er	167	Tm	169	Yb	173
89	Ac	227	Th	232	Pa	231	U	238	Np	237	Pu	239	Am	241	Cm	244	Bk	249	Cf	251	Es	252	Fm	257	Md	258	No	259

PERIODIC TABLE OF THE ELEMENTS

Atomic number																		H 1.0	Relative atomic mass																																																																																																																																																				
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Li 6.9	Be 9.0	Na 23.0	Mg 24.3	K 39.1	Ca 40.1	Sc 45.0	Ti 47.9	V 50.9	Cr 52.0	Mn 54.9	Fe 55.9	Co 58.9	Ni 58.7	Cu 63.6	Zn 65.4	Ga 69.7	Ge 72.6	As 74.9	Se 79.0	Br 79.9	Kr 83.8	Rb 85.5	Sr 87.6	Y 88.9	Zr 91.2	Nb 92.9	Mo 95.9	Tc 98.9	Ru 101	Rh 103	Pd 106	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127	Xe 131	Cs 133	Ba 137	Lu 175	Hf 179	Ta 181	W 184	Re 186	Os 190	Ir 192	Pt 195	Hg 201	Tl 204	Pb 207	Bi 209	Po 210	At 210	Rn 222	Fr 223	Ra 226	Lr 262	Rf 261	Db 262	Sg 263	Bh 264	Hs 265	Mt 268	Ds 271	Rg 272	Cn 277	Nh 113	Fl 114	Mc 115	Lv 116	Ts 117	Og 118																																																																																														

Lanthanide Series	57	La 139	Ce 140	Pr 141	Nd 144	Pm 147	Sm 150	Eu 152	Gd 157	Tb 159	Dy 163	Ho 165	Er 167	Tm 169	Yb 173
Actinide Series	89	Ac 227	Th 232	Pa 231	U 238	Np 237	Pu 239	Am 241	Cm 244	Bk 249	Cf 251	Es 252	Fm 257	Md 258	No 259

English translation of the wording on the front cover

L3-CHEMMR

Level 3 Chemistry, 2021

RESOURCE BOOKLET

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

Check that this booklet has pages 2–5 in the correct order and that none of these pages is blank.

YOU MAY KEEP THIS BOOKLET AT THE END OF THE EXAMINATION.