

See back cover for an English  
translation of this cover

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L3-CHEMR



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

## Te Mātauranga Matū, Kaupae 3, 2013

2.00 i te ahiahi Rātū 19 Whiringa-ā-rangi 2013

**PUKA RAUEMI**  
mō 91390M, 91391M, 91392M

Tirohia tēnei puka hei whakautu i ngā pātai i roto i ō pukapuka Pātai, Whakautu hoki.

Tirohia mehemea kei roto nei ngā whārangi 2–3 e raupapa tika ana, ā, kāore hoki he whārangi wātea.

**KA TAEA TĒNEI PEPA TE PUPURI HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.**

# TE TAKA PŪMOTU

18

Tau Iraoho																		1		H 1.0																																																																																																																																																																																																	
Papatipu Rāpoi Ngota																		2		He 4.0																																																																																																																																																																																																	
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21																																																																																																																																																																																																			
Li 6.9	Be 9.0	Na 23.0	Mg 24.3	K 39.1	Ca 40.1	Kr 83.8	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 63.5	Zn 65.4	Ga 69.7	Ge 72.6	As 74.9	Se 79.0	Br 79.9	Kr 83.8	Xe 131	Rn 222																																																																																																																																																																																													
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70																																																																																																																																																																																				
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	Ag 108	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127	Xe 131	Cs 133	Ba 137	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	Lu 175	Hf 179	Ta 181	W 184	Re 186	Os 190	Ir 192	Pt 195	Au 197	Hg 201	Tl 204	Pb 207	Bi 209	Po 210	At 210	Rn 222																																																																																																																																																																				
87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
Fr 223	Ra 226	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	Lr 262	Rf 261	Db 262	Sg 263	Bh 264	Hs 265	Mt 268	Ds 271	Rg 272	Cn 277	Fl 289	Lv 292	Uu 294	Uu 295	Uu 296	Uu 297	Uu 298	Uu 299	Uu 300	Uu 301	Uu 302	Uu 303	Uu 304	Uu 305	Uu 306	Uu 307	Uu 308	Uu 309	Uu 310	Uu 311	Uu 312	Uu 313	Uu 314	Uu 315	Uu 316	Uu 317	Uu 318	Uu 319	Uu 320	Uu 321	Uu 322	Uu 323	Uu 324	Uu 325	Uu 326	Uu 327	Uu 328	Uu 329	Uu 330	Uu 331	Uu 332	Uu 333	Uu 334	Uu 335	Uu 336	Uu 337	Uu 338	Uu 339	Uu 340	Uu 341	Uu 342	Uu 343	Uu 344	Uu 345	Uu 346	Uu 347	Uu 348	Uu 349	Uu 350	Uu 351	Uu 352	Uu 353	Uu 354	Uu 355	Uu 356	Uu 357	Uu 358	Uu 359	Uu 360	Uu 361	Uu 362	Uu 363	Uu 364	Uu 365	Uu 366	Uu 367	Uu 368	Uu 369	Uu 370	Uu 371	Uu 372	Uu 373	Uu 374	Uu 375	Uu 376	Uu 377	Uu 378	Uu 379	Uu 380	Uu 381	Uu 382	Uu 383	Uu 384	Uu 385	Uu 386	Uu 387	Uu 388	Uu 389	Uu 390	Uu 391	Uu 392	Uu 393	Uu 394	Uu 395	Uu 396	Uu 397	Uu 398	Uu 399	Uu 400																																																																															

# 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
		<b>H</b> 1.0																	<b>He</b> 4.0
3	4	<b>Li</b> 6.9	<b>Be</b> 9.0											5	6	7	8	9	10
11	12	<b>Na</b> 23.0	<b>Mg</b> 24.3											13	14	15	16	17	18
19	20	<b>K</b> 39.1	<b>Ca</b> 40.1	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
37	38	<b>Rb</b> 85.5	<b>Sr</b> 87.6	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
55	56	<b>Cs</b> 133	<b>Ba</b> 137	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
87	88	<b>Fr</b> 223	<b>Ra</b> 226	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104
				105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
				121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136
				137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152
				153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168
				169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184
				185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
				201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216
				217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232
				233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248
				249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264
				265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
				281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296
				297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312

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

*English translation of the wording on the front cover*

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## Level 3 Chemistry, 2013

2.00 pm Tuesday 19 November 2013

### RESOURCE SHEET for 91390, 91391, 91392

Refer to this sheet 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.**