NERE RENEW R





Mātai Matū, Kaupae 3, 2022

TE 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.

E ĀHEI ANA TŌ PUPURI KI TĒNEI PUKAPUKA HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

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

$$n = cV$$

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

$$q = mc\Delta T$$

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

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

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

$$pH = -\log[H_3O^+] \qquad [H_3O^+] = 10^{-pH}$$

$$K_w = [H_3O^+][OH^-] = 1 \times 10^{-14} \text{ i te } 25 \text{ °C}$$

$$pK_a = -\log K_a \qquad K_a = 10^{-pK_a}$$

$$K_a = \frac{[H_3O^+][A^-]}{[HA]}$$

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

$$n = cV$$

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

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

[Ag(CN) ₂] ⁻	$[Ag(NH_3)_2]^+$
[AI(OH) ₄] ⁻	[Cu(NH ₃) ₄] ²⁺
[Pb(OH) ₄] ²⁻	[Zn(OH) ₄] ²⁻
$[Zn(NH_3)_4]^{2+}$	$[Ni(NH_3)_6]^{2+}$
[Ni(CN) ₄] ²⁻	

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

pH =
$$-\log[H_3O^+]$$
 [H_3O^+]= 10^{-pH}
 $K_w = [H_3O^+][OH^-] = 1 \times 10^{-14}$ at 25 °C
p $K_a = -\log K_a$ $K_a = 10^{-pK_a}$
 $K_a = \frac{[H_3O^+][A^-]}{[HA]}$
 $K_s = s^2$ $K_s = 4s^3$
 $n = cV$

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

$[Ag(CN)_2]^-$	$[Ag(NH_3)_2]^+$
[Al(OH) ₄] ⁻	[Cu(NH ₃) ₄] ²⁺
[Pb(OH) ₄] ²⁻	[Zn(OH) ₄] ²⁻
$[Zn(NH_3)_4]^{2+}$	$[Ni(NH_3)_6]^{2+}$
$[Ni(CN)_4]^{2-}$	

TE TAKA PŪMOTU

[
18	2	He	4.0	10	Ne	20.2	18	Ar	40.0	36	Kr	83.8	54	Xe	131	98	Rn	222	118	Og	
			17	6		19.0	17	C	35.5	35	Br	79.9	53	Ι	127	85	At	210	117	Ts	
			91	8	0	16.0	16	S	32.1	34	Se	79.0	52	Te	128	84	P_0	210	116	Lv	
			15	7	Z	14.0	15	Ь	31.0	33	As	74.9	51	Sb	122	83	Bi	209	115	Mc	
			14	9	C	12.0	14	Si	28.1	32	Ge	72.6	50	Sn	119	82	Pb	207	114	F	
			13	5	В	10.8	13	A	27.0	31	Сa	2.69	49	In	115	81	Ι	204	113	N	
									12	30	Zn	65.4	48	Cd	112	80	Hg	201	112	Cn	277
		ite							II	29	Cu	63.6	47	Ag	108	62	Au	197	1111	Rg	272
		/hakatair							0I	28	ï	58.7	46	Pd	106	78	Pt	195	110	Ds	271
		Papatipu ngota whakatairite							6	27	Co	58.9	45	Rh	103	77	Ir	192	109	Mt	268
		Papatip							8	26	Fe	55.9	44	Ru		92	Os	190	108	Hs	265
	1	Н	1.0						_	25	Mn	54.9	43	Tc	6.86	75	Re	186	107	Bh	264
ı	Tau iraoho								9	24	$C_{\mathbf{r}}$	52.0	42	Mo	95.9	74	*	184	106	S	263
	Та								5	23	>	50.9	41	N _P	92.9	73	Га	181	105	Db	262
									4	22	Ţ	47.9	40	\mathbf{Zr}	91.2	72	Hf	179	104	Rf	261
									E	21	Sc	45.0	39	Τ	88.9	71	Lu	175	103	Γ r	5 262 261 262 263 264
			7	4	Be	9.0	12	Z	24.	50	Ü	40.	38	S	87.	99	Ba	13′	88	Ra	22(
			I	3	Ľ	6.9	11	Na	23.0	19	×	39.1	37	Rb	85.5	55	Cs	133	87	Fr	223

Те	27	58	59	09	61	62	63	64	9	99	<i>L</i> 9	89	69	70
Raupapa	La	Ce	Pr	Nd	Pm	Sm	Eu	РS	$\mathbf{T}\mathbf{p}$	Dy	Ho	Er	Tm	A
Lanthanide	139	140	141	144	147	150	152	157	159	163	165	167	169	173
Te	68	06	91	92	93	94	95	96	26	86	66	100	101	102
Raupapa	Ac	Th	Pa	n	Np	Pu	Am	Cm	Bk	Ct	Es	Fm	Md	No
Actinide	227	232	231	238	237	239	241	244	249	251		257	258	259

PERIODIC TABLE OF THE ELEMENTS

18	2	He	4.0	10	Ne	20.2	18	Ar	40.0	36	Kr	83.8	54	Xe	131	98	Rn	222	118	Og	
!			17	6	<u>F</u>	19.0	17	ت ت	35.5	35	Br	79.9	53	1	127	85	At	210	117	L	
			91	8	0	16.0	16	S	32.1	34	Se	79.0	52	Te	128	84	P_0	210	116	Lv	
			15	7	Z	14.0	15	Ь	31.0	33	As	74.9	51	Sp	122	83	Bi	209	115	Mc	
			14	9	C	12.0	14	Si	28.1	32	Ge	72.6	50	\mathbf{Sn}	119	82	Pb	207	114	I	
			13	5	B	10.8	13	A	27.0	31	Сa	2.69	49	In	115	81	Ι	204	113	N	
									12	30	Zn	65.4	48	Cq	112	80	Hg	201	112	Cn	277
									II	29	Cu	63.6	47	Ag	108	62	Au	197	1111	Rg	272
		mass							0I	28	Z	58.7	46	Pd	106	78	Pt	195	110	Ds	271
		Relative atomic mass							6	27	Co	58.9	45	Rh	103	77	ľ	192	109	Mt	268
		Relativ							8	26	Fe	55.9	44		101	92	Os	190	108	Hs	265
	1	Н	1.0						_	25	Mn	54.9	43	Ic	6.86	75	Re	186	107	Bh	264
	umber								9	24	Cr	52.0	42	\mathbf{Mo}	95.9	74	*	184	106	S	263
	Atomic number								5	23	>	50.9	41	NP	92.9	73	Ta	181	105	Db	262 263 264
	7								4	22	Ξ	47.5	40	\mathbf{Zr}	91.2	72	Ht	179	104	Rf	261
									3	21	Sc	45.0	39	Y	88.9	71	Lu	175	103	Lr	262
			2	4	Be	9.0	12	Mg	24.3	20	Ca	40.1	38	Sr	9.78	99	Ba	137	88	Ra	226
			I	3	Ľ	6.9	11	Na	23.0	19	¥	39.1	37	Rb	85.5	55	Cs	133	87		223

	57	58	59	09	61	62	63	64	65	99	29	89	69	70
anthanide	La	Ce	Pr	Nd	Pm	Sm	Eu	P5	Tp	Dy	Ho	Er	Tm	Vb
Series	139	140	141	144	147	150	152	157	159	163	165	167	169	173
	68	06	91	92	93	94	95	96	76	86	66	100	101	102
Actinide	Ac	Th	Pa	Ω	dN	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No
Series	227	232	231	238	237	239	241	244	249	251	252	257	258	259

English translation of the wording on the front cover

Level 3 Chemistry 2022

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.