ANSWERS ARE TO BE WRITTEN ON THIS PAPER IN THE SPACES PROVIDED

Note: Please check the Data Sheet on page 18 of this exam paper for information required to answer questions.

[2 marks]
$K_a = 4.6 \times 10^{-4}$
$K_a = 3.0 \times 10^{-8}$
$K_a = 1.8 \times 10^{-5}$
[2 marks]
5°C.

QUESTION 3	[2 marks]
Dissolving sodium nitrite (NaNO ₂) in water gives a basic solution. We equation showing how the nitrite ion is responsible for this effect.	rite a balanced chemical
QUESTION 4	[4 marks]
Calculate the pH of a 0.05 M aqueous solution of formic acid, HCOOH. The 1.8×10^{-4} .	e K_a for formic acid is

	ESTION 5	[3 marks]						
What is the pH of a formic acid (HCO ₂ H)/sodium formate (NaHCO ₂) buffer solution if $[HCO_2H] = 0.50 \text{ M}$ and $[HCO_2^-] = 0.70 \text{ M}$? The p K_a for formic acid is 3.74.								
QUI	ESTION 6	[4 marks]						
The	solubility product, $K_{\rm sp}$, for silver chromate, Ag ₂ CrO ₄ , is 2.6×10^{-12} at 25°C.							
(i)	Write an expression for $K_{\rm sp}$ in terms of the concentration of ${\rm Ag}^+$ and ${\rm CrO_4}^{2-}$ is solution.	ons present in						
(i)		ons present in						
(i)								
	Solution. What is the maximum amount of Ag_2CrO_4 that can be dissolved in pure water at 2							
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NUMERICAL DATA

Ionisation constant for water at 25°C: $K_{\rm w} = 1.01 \times 10^{-14}$

Gas constant: $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$

Faraday constant: $F = 96485.34 \text{ C mol}^{-1}$

								C	HEMI	zo seme
			7 Fra	6 C	5 Ru	4 Pot	3 S (22.98	2	G	1 Hy
		87 Fr Francium (223)	55 Cs Cesium 132.905 4519	37 Rb Rubidium 85.4678	19 X Potassium 39.0983	11 Na Sodium 22.989 769 28	3 Li Lithium 6.941	Group 1	1 H Hydrogen 1.007 94	
	or invial names by the IUPAC	ematic name	88 Ra Radium (226)	56 Ba Barium 137.327	38 Sr Strontium 87.62	20 Ca Calcium 40.078	12 Mg Magnesium 24.3050	4 Be Beryllium 9.012 182	Group 2	
	e IUPAC.	es and symbols be used until	Actinium (227)	57 La Lanthanum 138.905 47	39 Y Yttrium 88.905 85	21 Sc Scandium 44.955 912	Group 3			
		The systematic names and symbols for elements greater than 112 will be used until the approval	104 Rf Rutherfordium (261)	72 Hf Hafnium 178.49	40 Zr Zirconium 91.224	22 Ti Titanium 47.867	Group 4			
90 Th Thorium 232.038 06	58 Ce Cerium 140.116		105 Dubnium (262)	73 Ta Tantalum 180.947 88	Nb Niobium 92.906 38	23 V Vanadium 50.9415	Group 5			Per
91 Pa Protactinium 231.035 88	Praseodymium 140.907 65		106 Sg Seaborgium (266)	74 W Tungsten 183.84	42 Mo Molybdenum 95.94	24 Cr Chromium 51.9961	Group 6			Periodic Table of the Elements
92 Uranium 238.028 91	Neodymium 144.242		107 Bh Bohrium (264)	75 Re Rhenium 186.207	Tc Tc Technetium (98)	25 Mn Manganese 54.938 045	Group 7			able o
93 Np Neptunium (237)	Pm Pm Promethium (145)		108 Hs Hassium (277)	76 OS Osmium 190.23	Ruthenium 101.07	26 Fe Iron 55.845	Group 8			of the
94 Pu Plutonium (244)	62 Sm Samarium 150.36		109 Mt Meitnerium (268)	77 Ir Iridium 192.217	45 Rh Rhodium 102.905 50	27 Co Cobalt 58.933 195	Group 9			Elem
95 Am Americium (243)	63 Eu Europium 151.964	The discoveries	Ds Ds Darmstadtium	78 Pt Platinum 195.084	46 Pd Palladium 106.42	28 Ni Nickel 58.6934	Group 10			ents
96 Cm Curium (247)	64 Gd Gadolinium 157.25	The discoveries of elements with atomic numbers 112, 114, and 116 have been reported but not fully confirmed	111 Rg Roentgenium (272)	79 Au Gold 196.966 569	47 Ag Silver 107.8682	29 Cu Copper 63.546	Group 11			
97 BK Berkelium (247)	65 Tb Terbium 158.925 35	ith atomic n	112 Cn Copernicum (285)	80 Hg Mercury 200.59	48 Cd Cadmium 112.411	30 Zn Zinc 65.409	Group 12			
98 Cf Californium (251)	Dy Dysprosium 162.500	umbers 112, 11		81 Thallium 204.3833	49 In Indium 114.818	31 Ga Gallium 69.723	13 Al Aluminum 26.981 5386	5 Boron 10.811	Group 13	
99 ES Einsteinium (252)	67 Ho Holmium 164.930 32	4, and 116 hav	Uuq* Ununquadium (289)	82 Pb Lead 207.2	50 Sn Tin 118.710	32 Ge Germanium 72.64	Silicon 28.0855	6 C Carbon 12.0107	Group 14	
100 Fm Fermium (257)	68 Er Erbium 167.259	e been repor		83 Bi Bismuth 208.980 40	Sb Antimony 121.760	33 AS Arsenic 74.921 60	15 P Phosphorus 30.973 762	7 Nitrogen 14.0067	Group 15	
101 Md Md Mendelevium (258)	69 Tm Thulium 168.934 21	rted but not fully	116 Uuh* Ununhexium (292)	84 Po Polonium (209)	52 Te Tellurium 127.60	34 Se Selenium 78.96	16 Sulfur 32.065	8 Oxygen 15.9994	Group 16	
102 No Nobelium (259)	70 Yb Ytterbium 173.04	y confirmed.		Astatine (210)	53 lodine 126.904 47	35 Br Bromine 79.904	17 C I Chlorine 35,453	9 F Fluorine 18.998 4032	Group 17	
103 Lr Lawrencium (262)	71 Lu Lutetium 174.967			86 Rn Radon (222)	54 Xe Xenon 131.293	36 Kr Krypton 83.798	18 Ar Argon 39.948	10 Ne Neon 20.1797	2 He Helium 4.002 60	Group 18

The atomic masses listed in this table reflect the precision of current measurements. (Each value listed in parentheses is the mass number of that radioactive element's most stable or most common isotope.)