**2000-ASL**
**CHEM**

SECTIONS
A & C

HONG KONG EXAMINATIONS AUTHORITY

HONG KONG ADVANCED LEVEL EXAMINATION 2000

# CHEMISTRY AS-LEVEL SECTIONS A AND C

## Question-Answer Book

8.30 am – 11.30 am (3 hours)

This paper must be answered in English

**INSTRUCTIONS FOR SECTIONS A AND C**

1. Write your Candidate Number, Centre Number and Seat Number in the spaces provided on this cover.
2. Answer **ALL** questions in Section A and **ONE** question in Section C.
3. Write your answers in the spaces provided in this Question-Answer Book.
4. Supplementary answer sheets will be supplied on request. Write your Candidate Number on each sheet and fasten them with string to this Question-Answer Book.
5. A Periodic Table is printed on page 1 of this Question-Answer Book.

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|---|---|---|---|---|---|---|
| Candidate Number | | | | | | |
| Centre Number | | | | | | |
| Seat Number | | | | | | |

| | Marker's Use Only | Examiner's Use Only |
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| | Marker No. | Examiner No. |
| A 1 | | |
| A 2 | | |
| A 3 | | |
| A 4 | | |
| A 5 | | |
| A 6 | | |
| A Total | | |
| C 13/14+ | | |

+ Delete whichever is inappropriate

| Checker's Use Only | | |
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| C Total | | |

## PERIODIC TABLE ☐ ☐

GROUP ☐☐

atomic number ☐☐

relative atomic mass ☐☐☐

| I | II | | | | | | | | | | | III | IV | V | VI | VII | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 **H** 1.008 | | | | | | | | | | | | | | | | | 2 **He** 4.003 |
| 3 **Li** 6.941 | 4 **Be** 9.012 | | | | | | | | | | | 5 **B** 10.81 | 6 **C** 12.01 | 7 **N** 14.01 | 8 **O** 16.00 | 9 **F** 19.00 | 10 **Ne** 20.18 |
| 11 **Na** 22.99 | 12 **Mg** 24.31 | | | | | | | | | | | 13 **Al** 26.98 | 14 **Si** 28.09 | 15 **P** 30.97 | 16 **S** 32.06 | 17 **Cl** 35.45 | 18 **Ar** 39.95 |
| 19 **K** 39.10 | 20 **Ca** 40.08 | 21 **Sc** 44.96 | 22 **Ti** 47.90 | 23 **V** 50.94 | 24 **Cr** 52.00 | 25 **Mn** 54.94 | 26 **Fe** 55.85 | 27 **Co** 58.93 | 28 **Ni** 58.70 | 29 **Cu** 63.55 | 30 **Zn** 65.38 | 31 **Ga** 69.72 | 32 **Ge** 72.59 | 33 **As** 74.92 | 34 **Se** 78.96 | 35 **Br** 79.90 | 36 **Kr** 83.80 |
| 37 **Rb** 85.47 | 38 **Sr** 87.62 | 39 **Y** 88.91 | 40 **Zr** 91.22 | 41 **Nb** 92.91 | 42 **Mo** 95.94 | 43 **Tc** **(98)** | 44 **Ru** 101.1 | 45 **Rh** 102.9 | 46 **Pd** 106.4 | 47 **Ag** 107.9 | 48 **Cd** 112.4 | 49 **In** 114.8 | 50 **Sn** 118.7 | 51 **Sb** 121.8 | 52 **Te** 127.6 | 53 **I** 126.9 | 54 **Xe** 131.3 |
| 55 **Cs** 132.9 | 56 **Ba** 137.3 | 57 * **La** 138.9 | 72 **Hf** 178.5 | 73 **Ta** 180.9 | 74 **W** 183.9 | 75 **Re** 186.2 | 76 **Os** 190.2 | 77 **Ir** 192.2 | 78 **Pt** 195.1 | 79 **Au** 197.0 | 80 **Hg** 200.6 | 81 **Tl** 204.4 | 82 **Pb** 207.2 | 83 **Bi** 209.0 | 84 **Po** (209) | 85 **At** (210) | 86 **Rn** (222) |
| 87 **Fr** (223) | 88 **Ra** (226) | 89 ** **Ac** (227) | 104 **Rf** (261) | 105 **Db** (262) | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 58 **Ce** 140.1 | 59 **Pr** 140.9 | 60 **Nd** 144.2 | 61 **Pm** (145) | 62 **Sm** 150.4 | 63 **Eu** 152.0 | 64 **Gd** 157.3 | 65 **Tb** 158.9 | 66 **Dy** 162.5 | 67 **Ho** 164.9 | 68 **Er** 167.3 | 69 **Tm** 168.9 | 70 **Yb** 173.0 | 71 **Lu** 175.0 |
| ** | 90 **Th** 232.0 | 91 **Pa** (231) | 92 **U** 238.0 | 93 **Np** (237) | 94 **Pu** (244) | 95 **Am** (243) | 96 **Cm** (247) | 97 **Bk** (247) | 98 **Cf** (251) | 99 **Es** (252) | 100 **Fm** (257) | 101 **Md** (258) | 102 **No** (259) | 103 **Lr** (260) |

## SECTION A

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Answer **ALL** questions. Write your answers in the spaces provided.

1. The atomic number of element $X$ is smaller than 19. The first to sixth ionization enthalpies of $X$, in kJ $mol^{-1}$, are listed below :

786, 1580, 3230, 4360, 16000 and 20000

(a) What is the meaning of the first ionization enthalpy of an element ?

(2 marks)

(b) Explain why the successive ionization enthalpies of $X$ increase.

(2 marks)

(c) To which group of the Periodic Table does $X$ belong ? Explain your answer.

(3 marks)



Go on to the next page

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2. In the laboratory, there are three bottles labelled *A*, *B* and *C*. Each bottle contains one of the following reagents :

Do not write in this margin

$Cl_2(aq)$, NaI(aq) and KBr(aq)

Three tests were carried out using the reagents in the bottles. The results are summarized in the table below :

| Test | Observation |
|---|---|
| Mixing reagent in bottle *A* with reagent in bottle *B* | No observable change |
| Mixing reagent in bottle *A* with reagent in bottle *C* | Mixture turned brown |
| Mixing reagent in bottle *B* with reagent in bottle *C* | Mixture turned brown |

(a) Deduce which bottle contains $Cl_2(aq)$. Write the relevant chemical equations.

(3 marks)

(b) If hexane is also provided, suggest how you would carry out an experiment to identify the contents of the other two bottles.

(2 marks)

(c) State ONE safety precaution which should be taken when performing the experiment you have suggested in (b).

(1 mark)


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