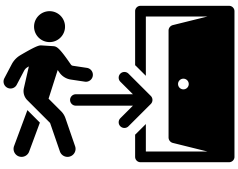
58th International Chemistry Olympiad Uzbekistan 2026

G0-1

English (Official)

General Instructions

- This exam has **9 problems**.
- You may begin working when the **START** signal is given. You have **5 hours** to complete the exam.
- All results must be written **in the appropriate answer boxes** with pen **on the answer sheets**. Use the back of the question sheets if you need scrap paper. Remember that **answers written outside the answer boxes will not be graded**. If you run out of space raise your question card.
- **Write** relevant calculations in the appropriate boxes when necessary. Full marks will be given for correct answers only when your work is shown.
- For the multiple choice questions, **if you want to change your answer, shade in** the tick box completely and then make **a new box next to it.**
- Use only the pen and calculator provided.
- The official English version of the exam is available upon request for clarification only.
- The supervisors will announce a **30-minute** warning before the **STOP** signal.
- You must stop your work immediately when the **STOP** signal is announced. Failure to stop writing can lead to nullification of your exam.
- After the supervisor tells you to do so, put **all sheets** back into the envelope. **Do not seal** the envelope.
- You are not allowed to leave your working place without permission. If you need any assistance, raise the corresponding non-verbal communication card.

		
I need a toilet break.	I have questions, or want the official English version for clarification.	I need to grab water, a snack, or take a break.

Meanings of the non-verbal communication cards.

GOOD LUCK!

58th International Chemistry Olympiad Uzbekistan 2026

G0-2

English (Official)

Problems and Grading Information

	Title	Question Pages	Answer Pages	Total Points	Percentage
1	A Journey through Time: The Secrets of Avicenna	4	5	25	7
2	Kinetics of the Belousov-Zhabotinsky reaction	4	6	35	6
3	Into Reticular Chemistry	7	5	63	7
4	The Nuclear Past of Uzbekistan	3	4	22	6
5	Cardiolipins	3	4	18	6
6	Carbon Nanorings	5	6	83	7
7	Nitrogen Fixation	4	5	54	7
8	Recycling of Carbon Dioxide	6	7	84	7
9	Cyclodextrin Chemistry	5	5	53	7
				Total	**60**

Physical Constants and Equations

Constants

Avogadro constant	$N_A = 6.022 \times 10^{23}\ \text{mol}^{-1}$
Universal gas constant	$R = 8.314\ \text{J K}^{-1}\ \text{mol}^{-1}$
Faraday constant	$F = 96\,485\ \text{C mol}^{-1}$
Planck constant	$h = 6.626 \times 10^{-34}\ \text{J s}$
Speed of light in vacuum	$c = 2.998 \times 10^{8}\ \text{m s}^{-1}$
Mass of electron	$m_e = 9.109 \times 10^{-31}\ \text{kg}$
Charge of electron	$e = 1.602 \times 10^{-19}\ \text{C}$
Standard pressure	$P^\circ = 1\ \text{bar} = 10^5\ \text{Pa}$
Ionic product of water at 25 °C	$K_w = 1.00 \times 10^{-14}$
Zero of the Celsius scale	$0\ ^\circ\text{C} = 273.15\ \text{K}$
Electronvolt	$1\ \text{eV} = 1.602 \times 10^{-19}\ \text{J}$
Watt	$1\ \text{W} = 1\ \text{J s}^{-1}$
Coulomb	$1\ \text{C} = 1\ \text{A s}$
Nanometre	$1\ \text{nm} = 1 \times 10^{-9}\ \text{m}$
Ångstrom	$1\ \text{Å} = 1 \times 10^{-10}\ \text{m}$
metric ton	$1\ \text{ton} = 1000\ \text{kg}$
litre	$1\ \text{L} = 1\ \text{dm}^3$

Equations

Ideal gas law	$PV = nRT$
Dalton law	$P_i = x_i P$
Beer–Lambert law	$A = \log_{10} \frac{I_0}{I} = \varepsilon c l$
Energy of a photon	$E = h\nu = \frac{hc}{\lambda}$
Heat and temperature change	$Q = nC_m \Delta T$
Gibbs energy definition	$G = H - TS$
Gibbs energy and equilibrium constant	$\Delta_r G^\circ = -RT ln K$
Enthalpy change dependence on temperature (at $\Delta_r C_p = const$)	$\Delta_r H_{T_2} = \Delta_r H_{T_1} + \Delta_r C_p (T_2 - T_1)$
Entropy change dependence on temperature (at $\Delta_r C_p = const$)	$\Delta_r S_{T_2} = \Delta_r S_{T_1} + \Delta_r C_p ln \frac{T_2}{T_1}$
Henderson–Hasselbalch equation	$pH = pK_a + log_{10} \frac{[\mathrm{A}^-]}{[\mathrm{HA}]}$
Average reaction rate	$r = \frac{\Delta c}{\Delta t}$
The rate law	$r = k[A]^x [B]^y$
Arrhenius law	$k = A exp\left(-\frac{E_a}{RT}\right)$
Integrated rate law for a 1st order reaction	$c = c_0 e^{-kt}$ $kt = ln \frac{c_0}{c}$
Lifetime of a reagent in a 1st order reaction	$\tau = \frac{1}{k}$
Integrated rate law for n-th order reaction ($n \neq 1$)	$kt = \frac{1}{n-1}(c^{1-n} - c_0^{1-n})$ for $n \neq 1$
Concentration of an intermediate in a consecutive reaction: $A \xrightarrow{k_1} B \xrightarrow{k_2} D$	$[\mathrm{B}] = \frac{k_1 [\mathrm{A}]_0}{k_2 - k_1}(e^{-k_1 t} - e^{-k_2 t})$
The ratio of products in the competitive reactions: $A \xrightarrow{k_1} B$, $A \xrightarrow{k_2} C$	$\frac{[\mathrm{B}]}{[\mathrm{C}]} = \frac{k_1}{k_2}$
Michaelis–Menten equation	$r_0 = r_{max} \frac{[\mathrm{S}]_0}{K_M + [\mathrm{S}]_0}$
Specific surface area	$s = \frac{S}{m}$
Progressions: arithmetic geometric	$a_n = a_1 + d\,(n-1)$ $a_n = a_1 q^{n-1}$
Sum of geometric progression	$\sum_{k=0}^{n} a_1 q^k = a_1 \frac{q^{n+1} - 1}{q - 1}$
Volume of a sphere with radius r	$V = \frac{4}{3}\pi r^3$
Surface area of sphere with radius r	$S = 4\pi r^2$
Volume of a cone with base radius r and height h	$V = \frac{1}{3}\pi r^2 h$
Volume of a cylinder with base radius r and height h	$V = \pi r^2 h$

Consider all gases ideal.

In equilibrium constant calculations, all concentrations are referenced to the concentration of 1 mol dm^{-3}

Periodic Table of Elements

1																	18
1 H 1.008	2											13	14	15	16	17	2 He 4.003
3 Li 6.94	4 Be 9.01											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 24.30	3	4	5	6	7	8	9	10	11	12	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 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.63	33 As 74.92	34 Se 78.97	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 95.95	43 Tc -	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	57-71	72 Hf 178.5	73 Ta 180.9	74 W 183.8	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 -	85 At -	86 Rn -
87 Fr -	88 Ra -	89-103	104 Rf -	105 Db -	106 Sg -	107 Bh -	108 Hs -	109 Mt -	110 Ds -	111 Rg -	112 Cn -	113 Nh -	114 Fl -	115 Mc -	116 Lv -	117 Ts -	118 Og -

57 La 138.9	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm -	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
89 Ac -	90 Th 232.0	91 Pa 231.0	92 U 238.03	93 Np -	94 Pu -	95 Am -	96 Cm -	97 Bk -	98 Cf -	99 Es -	100 Fm -	101 Md -	102 No -	103 Lr -