GENERAL AND INORGANIC CHEMISTRY, BJ07A1030
EXAM 17.9.2026
Allowed materials: Handbook for equations, Calculator and tools for writing
Also allowed: Self written A4 paper with equations. It must be returned with the exam answers.
Exam include 4 appendices
Each question, max 20 p

QUESTION 1
Following solution is prepared: 17.2 g of ethylene glycol ($C_2H_6O_2$) is dissolved into 0.500 kg of water. Total volume of the solution prepared is 515 ml. Calculate
A) Molarity of the solution
B) Molality of the solution
C) Mass-% on ethylene glycol
D) Mole fractions of the solution

QUESTION 2
5.1 g solid aluminum (Al) is mixed with 100 g of 30 m-% HCl
a) How many grams of $AlCl_3$ is formed?
b) How much (in volume) H_2 is formed? (T=300 K ja p= 101 325 Pa)

QUESTION 3
When pressure is 101 kPa and temperature 585K, 56.4 % of NOCl is reacting as follows:
$2\ NOCl(g) \leftrightarrow 2\ NO(g) + Cl_2(g)$
a) Calculate the equilibrium constant, K_p
b) What is the total pressure if the partial pressure of chlorine (Cl_2) is same as it is for NOCl? Temperature is 585K.

QUESTION 4
Complete the redox reactions below. Write the oxidation half-reaction, the reduction half-reaction, and the overall balanced reaction. Reaction (a) takes place under acidic conditions, and reaction (b) takes place under basic conditions.
a) $Zn^{2+}(aq) + NH_4^+(aq) \rightarrow Zn(s) + NO_3^-(aq)$
b) $MnO_4^-(aq) + SO_3^{2-}(aq) \rightarrow MnO_4^{2-}(aq) + SO_4^{2-}(aq)$

QUESTION 5
Calculate the pH of the 0,05 mol/dm^3 CH_3COONa -solution. (CH_3COONa = salt)
Acid constant, $K_a(CH_3COOH) = 1{,}8 \cdot 10^{-5}$ mol/dm^3

GENERAL AND INORGANIC CHEMISTRY, BJ07A1030

EXAM 17.9.2026

Allowed materials: Handbook for equations, Calculator and tools for writing

Also allowed: Self written A4 paper with equations. It must be returned with the exam answers.

Exam include 4 appendices

Appendix 1: PERIODIC TABLE, MOLAR MASS (g/mol)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H 1,008																	2 He 4,003
3 Li 6,94	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 47,87	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 238,0	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

Appendix 2: NAMING THE COMPOUNDS

Compound	Name	Compound	Name
Cation		**Anions (-1 charge) continues**	
NH_4^+	Ammonium	NO_2^-	Nitrite
Anions (-1 charge)		NO_3^-	Nitrate
CH_3COO^-	Acetate	**Anions (-2 charge)**	
CN^-	Cyanide	CO_3^{2-}	Carbonate
ClO^-	Hypochlorite	CrO_4^{2-}	Chromate
ClO_2^-	Chlorite	$Cr_2O_7^{2-}$	Dichromate
ClO_3^-	Chlorate	O_2^{2-}	Peroxide
ClO_4^-	Perchlorate	HPO_4^{2-}	Hydrogen phosphate
$H_2PO_4^-$	Dihydrogen phosphate or biphosphate	SO_3^{2-}	Sulphite
HCO_3^-	Hydrogen carbonate or bicarbonate	SO_4^{2-}	Sulphate
HSO_4^-	Hydrogen sulphate or bisulphate	$S_2O_3^{2-}$	Thiosulphate
OH^-	Hydroxide	**Anions (-3 charge)**	
MnO_4^-	Permanganate	PO_4^{3-}	Phosphate

Ligands	Name	Ligands	Name
Cl^-	Chloro	H_2O	Aqua
Br^-	Bromo	NH_3	Ammine
OH^-	Hydroxo	CO	Carbonyl
CN^-	Cyano	NO	Nitrosyl
S^{2-}	Thio		
SCN^-	Thiocyanato		
CO_3^{2-}	Carbonato		
$C_2O_4^{2-}$	Oxalato		
NO_2^-	Nitro		
NH_2^-	Amido		
H^-	Hydrido (in boron, B, compounds hydro)		

Appendix 3: SOME CONSTANT

General gas constant, R = 8,3145 J/mol K

Ionic product of water (25 °C), $K_w = 1 \cdot 10^{-14}$ $(mol/dm^3)^2$

GENERAL AND INORGANIC CHEMISTRY, BJ07A1030
EXAM 17.9.2026
Allowed materials: Handbook for equations, Calculator and tools for writing
Also allowed: Self written A4 paper with equations. It must be returned with the exam answers.
Exam include 4 appendices

Appendix 4: STANDARD POTENTIALS

Reduction reactions	E / V
$Li^+ + e^- \rightarrow Li$	- 3,04
$K^+ + e^- \rightarrow K$	-2,93
$Ba^{2+} + 2e^- \rightarrow Ba$	-2,91
$Ca^{2+} + 2e^- \rightarrow Ca$	-2,87
$Na^+ + e^- \rightarrow Na$	-2,71
$Mg^{2+} + 2e^- \rightarrow Mg$	-2,38
$Al^{3+} + 3e^- \rightarrow Al$	- 1,66
$Zn^{2+} + 2\ e^- \rightarrow Zn$	- 0,76
$Fe^{2+} + 2\ e^- \rightarrow Fe$	- 0,45
$Co^{2+} + 2\ e^- \rightarrow Co$	- 0,28
$Ni^{2+} + 2\ e^- \rightarrow Ni$	- 0,26
$Sn^{2+} + 2\ e^- \rightarrow Sn$	- 0,14
$Pb^{2+} + 2\ e^- \rightarrow Pb$	- 0,13
$2\ H^+ + 2\ e^- \rightarrow H_2$	0
$Cu^{2+} + 2\ e^- \rightarrow Cu$	0,34
$Fe^{3+} + e^- \rightarrow Fe^{2+}$	0,77
$Ag^+ + e^- \rightarrow Ag$	0,80
$Cl_2 + 2\ e^- \rightarrow 2\ Cl$	1,36
$Au^{3+} + 3\ e^- \rightarrow Au$	1,50
$F_2 + 2\ e^- \rightarrow 2F$	2,87