

Name: _____

Student number: _____

Chemistry 1E03/1A03

Test 2

June 5, 2018

McMaster University

VERSION 1

13:30 – 15:00

Instructors: Drs. R.S. Dumont and L. Davis

Duration: 120 minutes

This test contains 19 numbered pages printed on both sides. There are **25** multiple-choice questions appearing on pages numbered 3 to 15. Page 16 and 17 are extra space for rough work. Page 18 includes some useful data and equations. There is a periodic table on page 19. You may tear off the last page to view the periodic table and the data provided.

You must enter your name and student number on the question sheets, as well as on the answer sheet. Your invigilator will be checking your student card for identification.

You are responsible for ensuring that your copy of the question paper is complete. Bring any discrepancy to the attention of your invigilator.

All questions are each worth 2 mark; the total marks available are 50. There is **no** additional penalty for incorrect answers.

BE SURE TO ENTER THE CORRECT VERSION OF YOUR TEST (shown near the top of page 1), IN THE SPACE PROVIDED ON THE ANSWER SHEET.

ANSWER ALL QUESTIONS ON THE ANSWER SHEET, IN PENCIL.

Instructions for entering multiple-choice answers are given on page 2.

SELECT ONE AND ONLY ONE ANSWER FOR EACH QUESTION from the answers **(A)** through **(E)**. **No work written on the question sheets will be marked.** The question sheets may be collected and reviewed in cases of suspected academic dishonesty.

Academic dishonesty may include, among other actions, communication of any kind (verbal, visual, etc.) between students, sharing of materials between students, copying or looking at other students' work. If you have a problem, please ask the invigilator to deal with it for you. Do not make contact with other students directly. Keep your eyes on your own paper - looking around the room may be interpreted as an attempt to copy.

Only Casio FX 991 electronic calculators may be used; but they must **NOT** be transferred between students. Use of periodic tables or any aids, other than those provided, is not allowed.

1. Which of the following statements is(are) **TRUE**?

- (i) TeCl_2 is a bent molecule.
- (ii) All of the atoms of TeCl_3^+ are in the same plane.
- (iii) TeCl_4 has one nonbonding pair of electrons on tellurium.

- A) iii
- B) i
- C) i, iii
- D) ii
- E) i, ii

2. Choose the **FALSE** statement about the Lewis structure of the peroxide anion, O_2^{2-} :

- A) Two resonance forms are required to describe bonding in this anion.
- B) The oxygen-oxygen bond is a single bond.
- C) Each oxygen atom has 3 nonbonding electron pairs.
- D) Each oxygen atom carries a formal charge of -1.
- E) Each oxygen atom obeys the octet rule.

3. Which of the following statements are **TRUE**?

- (i) Br atoms are smaller than As atoms.
- (ii) O has a higher first ionization energy than N.
- (iii) Li has a higher magnitude of electron affinity than O.
- (iv) Ba is easier to ionize than Sr.
- (v) Cl^- is a larger ion than Ca^{2+} .

- .
- A) i, iii, v
 - B) all
 - C) i, iv, v
 - D) ii, iii, v
 - E) i, ii, iv

4. The O–H bond enthalpy in water is approximately 467 kJ mol^{-1} . What is the **wavelength** of the photon with just enough energy to break one O–H bond?

- .
- A) 23.7 nm
 - B) 4130 nm
 - C) 467 nm
 - D) 256 nm
 - E) 213 nm

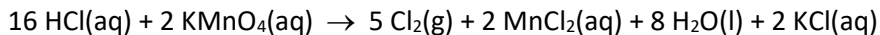
5. Identify the **incorrect** combination of quantum numbers (n, ℓ, m_ℓ) for the given atomic orbitals:

- A) 4s (4, 0, 0)
- B) 2p (2, 1, 0)
- C) 2p (2, 1, -1)
- D) 3s (3, 0, 1)
- E) 3d (3, 2, -2)

6. During experiment 2, Cycles of Copper, a student obtains a percent yield of 108%. What is the most likely source of error?

- A) Copper oxide was lost during the decanting step.
- B) 108% is a valid yield as the atomic weight of copper at the end of the experiment is higher than at the start.
- C) There was residual solvent left within the copper precipitate at the end of the experiment.
- D) Not all of the zinc reacted with the Cu^{2+} (aq) to yield Cu(s).
- E) The student accidentally added too much nitric acid in the first step.

7. Identify the **oxidizing agent** in the following reaction.



- .
A) $\text{MnCl}_2\text{(aq)}$
B) $\text{K}^+\text{(aq)}$
C) $\text{H}^+\text{(aq)}$
D) $\text{Cl}^-\text{(aq)}$
E) $\text{MnO}_4^-\text{(aq)}$

8. Which statement is **FALSE** regarding the following three product-favored reactions?

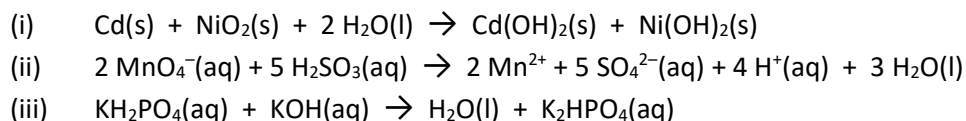
- (i) $\text{HCl(g)} + \text{NH}_3\text{(g)} \rightarrow \text{NH}_4\text{Cl(s)}$
(ii) $\text{H}_2\text{SO}_3\text{(aq)} + \text{NaOCl(aq)} \rightarrow \text{NaHSO}_3\text{(aq)} + \text{HOCl(aq)}$
(iii) $\text{KH}_2\text{PO}_4\text{(aq)} + \text{KOH(aq)} \rightarrow \text{H}_2\text{O(l)} + \text{K}_2\text{HPO}_4\text{(aq)}$

- .
A) All of these reactions are Brønsted-Lowry acid-base reactions.
B) In reaction (ii), H_2SO_3 is acting as a Brønsted-Lowry acid.
C) NH_4^+ is the conjugate acid of NH_3 .
D) HOCl is the conjugate acid of OCl^- .
E) HOCl is a stronger acid than H_2SO_3 .

9. Dichromate ions, $\text{Cr}_2\text{O}_7^{2-}(\text{aq})$, react with zinc metal in acid solution to produce $\text{Cr}^{3+}(\text{aq})$ and $\text{Zn}^{2+}(\text{aq})$ ions. When the reaction is balanced, such that the smallest possible integers appear as stoichiometric coefficients, what is the **coefficient** of Zn^{2+} ?

.
A) 2
B) 6
C) 4
D) 1
E) 3

10. Which statement is **TRUE** regarding the following three reactions?

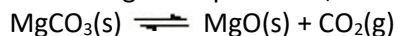


.
A) In reaction (iii), HPO_4^{2-} is the conjugate acid of $\text{H}_2\text{PO}_4^{-}$.
B) In reaction (i), NiO_2 is the reducing agent.
C) In reaction (i), $\text{Cd}(\text{s})$ is oxidized.
D) In reaction (ii), sulfur is reduced.
E) In reaction (iii), $\text{H}_2\text{PO}_4^{-}$ is acting as a Brønsted-Lowry base.

11. An unknown aqueous solution contains either KNO_3 or K_3PO_4 . Addition of which **one** of the following aqueous solutions provides a simple visual test that identifies the unknown?

- .
A) CaBr_2
B) Na_2SO_4
C) RbOH
D) LiBr
E) NaCl

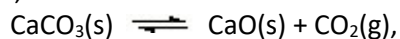
12. Select the one **false** statement concerning the equilibrium,



for which $\Delta H^\circ = 100.6 \text{ kJ}$.

- .
A) Adding $\text{MgO}(\text{s})$ does not change the amount of $\text{MgCO}_3(\text{s})$.
B) Removing $\text{CO}_2(\text{g})$ increases the amount of $\text{MgO}(\text{s})$.
C) Doubling the amount of all three species (with the volume of the reaction vessel fixed) has no effect on the equilibrium.
D) Halving the size of the reaction vessel increases the amount of $\text{MgCO}_3(\text{s})$.
E) Increasing the temperature increases the amount of $\text{MgO}(\text{s})$.

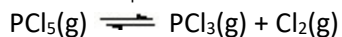
13. For the heterogeneous reaction,



the equilibrium constant at 112°C is $K_p = 0.220$. If the partial pressure of $\text{CO}_2(\text{g})$ is 0.50 bar at this same temperature, which one of the following statements is **TRUE**?

- A) $Q > K$, the reaction will proceed to the right.
B) $Q < K$, the reaction will proceed to the left.
C) $Q < K$, the reaction will proceed to the right.
D) $Q = K$, the system is at equilibrium.
E) $Q > K$, the reaction will proceed to the left.

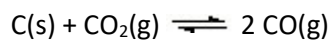
14. 1.41 bar of $\text{PCl}_5(\text{g})$, 7.95 bar of $\text{PCl}_3(\text{g})$ and 7.95 bar of $\text{Cl}_2(\text{g})$ are at equilibrium in a reaction vessel. Calculate the **equilibrium constant** K_p for



at the temperature of the equilibrium mixture.

- A) 9.71
B) -1.30
C) 28.6
D) 51.8
E) 44.8

15. The equilibrium constant K_p for



is 1.52 at 700°C. If the partial pressure of CO in an equilibrium mixture at 700°C is 1.30 bar, what is the **partial pressure** of CO₂ (in bar)?

- A) 1.30
B) 1.11
C) 0.900
D) 0.860
E) 1.17

16. A student creates a calibration curve relating the absorbance of FeSCN²⁺(aq) to the concentration of FeSCN²⁺(aq). The slope of this plot is 1.68. If a student mixes 10.0 mL of 0.20 M Fe³⁺(aq) with 10.0 mL of 0.40 M SCN⁻(aq) an absorbance of 0.084 is observed. What is the **equilibrium constant** for the reaction?

- A) 3.2
B) 6.7
C) 12
D) 120
E) 44

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17. Heroin, a derivative of morphine, is a powerful analgesic and a powerful narcotic agent. **Calculate K_b** for heroin if the pH of a 1.7×10^{-3} M solution was found to be 9.60.

- .
A) 9.5×10^{-7}
B) 2.3×10^{-2}
C) 8.3×10^{-7}
D) 1.5×10^{-7}
E) 3.7×10^{-7}

18. Your stomach (volume = 2.5 L) has a pH of 1.00 because of the presence of HCl. **How many grams of $Mg(OH)_2$** (58.3 g mol^{-1}) do you need to add to completely neutralize the acid in your stomach?

- .
A) 7.3 g
B) 15 g
C) 21 g
D) 2.9 g
E) 5.8 g

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19. A 2.60 g sample of propanoic acid ($\text{CH}_3\text{CH}_2\text{COOH}$, molar mass = 74.1 g mol^{-1} , $K_a = 1.40 \times 10^{-5}$) was dissolved in water and made up to a final volume of 100. mL in water. **What is the pH of this solution?**

- A) 2.66
B) 4.85
C) 3.26
D) 2.32
E) 1.82

20. Order the following species according to **increasing acid dissociation constant, K_a** :

CH_3COOH , CF_3COOH , CH_2FCOOH , $\text{CH}_3\text{CH}_2\text{OH}$

- A) $\text{CH}_3\text{COOH} < \text{CF}_3\text{COOH} < \text{CH}_2\text{FCOOH} < \text{CH}_3\text{CH}_2\text{OH}$
B) $\text{CH}_3\text{COOH} < \text{CH}_2\text{FCOOH} < \text{CF}_3\text{COOH} < \text{CH}_3\text{CH}_2\text{OH}$
C) $\text{CH}_3\text{CH}_2\text{OH} < \text{CF}_3\text{COOH} < \text{CH}_2\text{FCOOH} < \text{CH}_3\text{COOH}$
D) $\text{CH}_3\text{CH}_2\text{OH} < \text{CH}_3\text{COOH} < \text{CH}_2\text{FCOOH} < \text{CF}_3\text{COOH}$
E) $\text{CF}_3\text{COOH} < \text{CH}_2\text{FCOOH} < \text{CH}_3\text{CH}_2\text{OH} < \text{CH}_3\text{COOH}$

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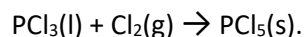
21. Dissolving 4.24 g of CaF_2 in 50.0 mL of pure water at 20.00°C results in a solution with temperature 16.79°C . What is the **enthalpy of dissolution of CaF_2 (in kJ mol^{-1})**? Assume that the specific heat of the solution equals $4.18 \text{ J K}^{-1} \text{ g}^{-1}$.

- .
A) +13.4
B) +1.05
C) -1.05
D) -13.4
E) -671

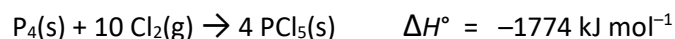
22. A chemical reaction with an enthalpy change $\Delta H^\circ = -400 \text{ kJ}$ is carried out in a calorimeter containing 1500 cm^3 of pure water initially at 25.0°C . What is the **final temperature** (in $^\circ\text{C}$) of the water?

- .
A) 67.5
B) -28.7
C) 336.7
D) 69.3
E) 88.8

23. $\text{PCl}_5(\text{s})$ can be prepared by the reaction,

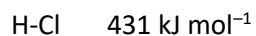
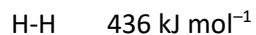
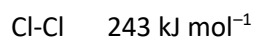


Calculate the **enthalpy change** (in kJ) that accompanies the production of 100.0 g of $\text{PCl}_5(\text{s})$ by the above reaction, given the following data.



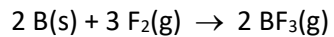
- A) +124.7
B) -258.1
C) +59.31
D) -124.7
E) -59.31

24. Determine the **enthalpy of formation** (in kJ mol^{-1}) of hydrogen chloride gas using the following bond enthalpy data:



- A) 17.1
B) -91.5
C) 91.5
D) -17.1
E) -53.4

25. Considering the reaction



and the data below, identify the **FALSE** statement(s).

enthalpy of formation of $\text{B(g)} = 563 \text{ kJ mol}^{-1}$

bond enthalpy of F-F bond = 159 kJ mol^{-1}

bond enthalpy of B-F bond = 646 kJ mol^{-1}

- (i) The reaction is a redox reaction.
- (ii) The reaction of boron and fluorine is endothermic.
- (iii) The sublimation of boron is an endothermic process.
- (iv) $\text{F}_2(\text{g})$ is a highly reactive species.

.

- A) ii
- B) ii, iv
- C) i, iii
- D) ii, iii
- E) iii, iv

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Extra space for rough work.

Name: _____

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Extra space for rough work.

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Some general data are provided on this page.

A Periodic Table with atomic weights is provided on the next page.

$$R = 8.3145 \text{ J K}^{-1} \text{ mol}^{-1} = 0.08314 \text{ L bar K}^{-1} \text{ mol}^{-1}$$

$$c = 2.9979 \times 10^8 \text{ m s}^{-1}$$

$$m_e = 9.10 \times 10^{-31} \text{ kg}$$

$$N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$$

$$h = 6.6256 \times 10^{-34} \text{ Js}$$

$$1 \text{ bar} = 100.0 \text{ kPa}$$

$$1 \text{ J} = 1 \text{ kg m}^2 \text{ s}^{-2} = 0.01 \text{ L bar} = 1 \text{ Pa m}^3$$

$$1 \text{ cm}^3 = 1 \text{ mL}$$

$$1 \text{ Hz} = 1 \text{ cycle/s}$$

$$0^\circ\text{C} = 273.15 \text{ K}$$

$$1 \text{ m} = 10^9 \text{ nm} = 10^{10} \text{ \AA}$$

$$1 \text{ g} = 10^3 \text{ mg}$$

De Broglie wavelength:

$$\lambda = h / mv = h / p$$

Hydrogen atom energy levels:

$$E_n = -R_E / n^2 = -2.180 \times 10^{-18} \text{ J} / n^2$$

Density of water:

$$1.00 \text{ g mL}^{-1}$$

Specific heat capacity of water:

$$4.18 \text{ J K}^{-1} \text{ g}^{-1}$$

Solubility Guidelines for Common Ionic Solids

1. Alkali metal and ammonium salts are *soluble*.
2. Nitrate, chlorate, perchlorate, hydrogen carbonate and ethanoate salts are *soluble*.
3. Sulfate salts are *soluble*, *except* for the calcium, strontium, barium and lead salts which are *insoluble*.
4. Chloride, bromide and iodide salts are *soluble*, *except* for the silver, lead and mercury I salts which are *insoluble*.
5. Silver, lead and mercury I salts are *insoluble*, unless deemed soluble by rule 2 or 3.
6. Sulfide salts are *insoluble*, *except* for the alkali metal, ammonium, and alkaline earth salts which are *soluble*.
7. Oxide and hydroxide salts are *insoluble*, *except* for the alkali metal, ammonium, calcium, strontium and barium salts which are *soluble*.
8. Carbonate and phosphate are *insoluble*, *except* for the alkali metal and ammonium salts.

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PERIODIC TABLE
OF THE ELEMENTS

I 1	II 2	Transition Metals										VIII 8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
3 Li 6.941	4 Be 9.0122	11 Na 22.990	12 Mg 24.305	13 Al 26.982	14 Si 28.086	15 P 30.974	16 S 32.066	17 Cl 35.453	18 Ar 39.948	19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.88	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.847	27 Co 58.933	28 Ni 58.69	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.922	34 Se 78.96	35 Br 79.904	36 Kr 83.80																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.94	43 Tc [98]	44 Ru 101.07	45 Rh 102.91	46 Pd 105.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.75	52 Te 127.60	53 I 126.90	54 Xe 131.29	55 Cs 132.91	56 Ba 137.33	57 *La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm [145]	62 Sm 150.36	63 Eu 151.97	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
87 Fr [223]	88 Ra 226.03	89 **Ac 227.03	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np 237.05	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 [262]	104 Unq [261]	105 Unp [262]	106 Unh [263]	107 Uup [264]	108 Uub [265]	109 Uut [266]	110 Uuq [267]	111 Uuh [268]	112 Uus [269]	113 Uut [270]	114 Uuq [271]	115 Uuh [272]	116 Uus [273]	117 Uut [274]	118 Uuq [275]	119 Uuh [276]	120 Uus [277]	121 Uut [278]	122 Uuq [279]	123 Uuh [280]	124 Uus [281]	125 Uut [282]	126 Uuq [283]	127 Uuh [284]	128 Uus [285]	129 Uut [286]	130 Uuq [287]	131 Uuh [288]	132 Uus [289]	133 Uut [290]	134 Uuq [291]	135 Uuh [292]	136 Uus [293]	137 Uut [294]	138 Uuq [295]	139 Uuh [296]	140 Uus [297]	141 Uut [298]	142 Uuq [299]	143 Uuh [300]	144 Uus [301]	145 Uut [302]	146 Uuq [303]	147 Uuh [304]	148 Uus [305]	149 Uut [306]	150 Uuq [307]	151 Uuh [308]	152 Uus [309]	153 Uut [310]	154 Uuq [311]	155 Uuh [312]	156 Uus [313]	157 Uut [314]	158 Uuq [315]	159 Uuh [316]	160 Uus [317]	161 Uut [318]	162 Uuq [319]	163 Uuh [320]	164 Uus [321]	165 Uut [322]	166 Uuq [323]	167 Uuh [324]	168 Uus [325]	169 Uut [326]	170 Uuq [327]	171 Uuh [328]	172 Uus [329]	173 Uut [330]	174 Uuq [331]	175 Uuh [332]	176 Uus [333]	177 Uut [334]	178 Uuq [335]	179 Uuh [336]	180 Uus [337]	181 Uut [338]	182 Uuq [339]	183 Uuh [340]	184 Uus [341]	185 Uut [342]	186 Uuq [343]	187 Uuh [344]	188 Uus [345]	189 Uut [346]	190 Uuq [347]	191 Uuh [348]	192 Uus [349]	193 Uut [350]	194 Uuq [351]	195 Uuh [352]	196 Uus [353]	197 Uut [354]	198 Uuq [355]	199 Uuh [356]	200 Uus [357]	201 Uut [358]	202 Uuq [359]	203 Uuh [360]	204 Uus [361]	205 Uut [362]	206 Uuq [363]	207 Uuh [364]	208 Uus [365]	209 Uut [366]	210 Uuq [367]	211 Uuh [368]	212 Uus [369]	213 Uut [370]	214 Uuq [371]	215 Uuh [372]	216 Uus [373]	217 Uut [374]	218 Uuq [375]	219 Uuh [376]	220 Uus [377]	221 Uut [378]	222 Uuq [379]	223 Uuh [380]	224 Uus [381]	225 Uut [382]	226 Uuq [383]	227 Uuh [384]	228 Uus [385]	229 Uut [386]	230 Uuq [387]	231 Uuh [388]	232 Uus [389]	233 Uut [390]	234 Uuq [391]	235 Uuh [392]	236 Uus [393]	237 Uut [394]	238 Uuq [395]	239 Uuh [396]	240 Uus [397]	241 Uut [398]	242 Uuq [399]	243 Uuh [400]	244 Uus [401]	245 Uut [402]	246 Uuq [403]	247 Uuh [404]	248 Uus [405]	249 Uut [406]	250 Uuq [407]	251 Uuh [408]	252 Uus [409]	253 Uut [410]	254 Uuq [411]	255 Uuh [412]	256 Uus [413]	257 Uut [414]	258 Uuq [415]	259 Uuh [416]	260 Uus [417]	261 Uut [418]	262 Uuq [419]	263 Uuh [420]	264 Uus [421]	265 Uut [422]	266 Uuq [423]	267 Uuh [424]	268 Uus [425]	269 Uut [426]	270 Uuq [427]	271 Uuh [428]	272 Uus [429]	273 Uut [430]	274 Uuq [431]	275 Uuh [432]	276 Uus [433]	277 Uut [434]	278 Uuq [435]	279 Uuh [436]	280 Uus [437]	281 Uut [438]	282 Uuq [439]	283 Uuh [440]	284 Uus [441]	285 Uut [442]	286 Uuq [443]	287 Uuh [444]	288 Uus [445]	289 Uut [446]	290 Uuq [447]	291 Uuh [448]	292 Uus [449]	293 Uut [450]	294 Uuq [451]	295 Uuh [452]	296 Uus [453]	297 Uut [454]	298 Uuq [455]	299 Uuh [456]	300 Uus [457]	301 Uut [458]	302 Uuq [459]	303 Uuh [460]	304 Uus [461]	305 Uut [462]	306 Uuq [463]	307 Uuh [464]	308 Uus [465]	309 Uut [466]	310 Uuq [467]	311 Uuh [468]	312 Uus [469]	313 Uut [470]	314 Uuq [471]	315 Uuh [472]	316 Uus [473]	317 Uut [474]	318 Uuq [475]	319 Uuh [476]	320 Uus [477]	321 Uut [478]	322 Uuq [479]	323 Uuh [480]	324 Uus [481]	325 Uut [482]	326 Uuq [483]	327 Uuh [484]	328 Uus [485]	329 Uut [486]	330 Uuq [487]	331 Uuh [488]	332 Uus [489]	333 Uut [490]	334 Uuq [491]	335 Uuh [492]	336 Uus [493]	337 Uut [494]	338 Uuq [495]	339 Uuh [496]	340 Uus [497]	341 Uut [498]	342 Uuq [499]	343 Uuh [500]	344 Uus [501]	345 Uut [502]	346 Uuq [503]	347 Uuh [504]	348 Uus [505]	349 Uut [506]	350 Uuq [507]	351 Uuh [508]	352 Uus [509]	353 Uut [510]	354 Uuq [511]	355 Uuh [512]	356 Uus [513]	357 Uut [514]	358 Uuq [515]	359 Uuh [516]	360 Uus [517]	361 Uut [518]	362 Uuq [519]	363 Uuh [520]	364 Uus [521]	365 Uut [522]	366 Uuq [523]	367 Uuh [524]	368 Uus [525]	369 Uut [526]	370 Uuq [527]	371 Uuh [528]	372 Uus [529]	373 Uut [530]	374 Uuq [531]	375 Uuh [532]	376 Uus [533]	377 Uut [534]	378 Uuq [535]	379 Uuh [536]	380 Uus [537]	381 Uut [538]	382 Uuq [539]	383 Uuh [540]	384 Uus [541]	385 Uut [542]	386 Uuq [543]	387 Uuh [544]	388 Uus [545]	389 Uut [546]	390 Uuq [547]	391 Uuh [548]	392 Uus [549]	393 Uut [550]	394 Uuq [551]	395 Uuh [552]	396 Uus [553]	397 Uut [554]	398 Uuq [555]	399 Uuh [556]	400 Uus [557]	401 Uut [558]	402 Uuq [559]	403 Uuh [560]	404 Uus [561]	405 Uut [562]	406 Uuq [563]	407 Uuh [564]	408 Uus [565]	409 Uut [566]	410 Uuq [567]	411 Uuh [568]	412 Uus [569]	413 Uut [570]	414 Uuq [571]	415 Uuh [572]	416 Uus [573]	417 Uut [574]	418 Uuq [575]	419 Uuh [576]	420 Uus [577]	421 Uut [578]	422 Uuq [579]	423 Uuh [580]	424 Uus [581]	425 Uut [582]	426 Uuq [583]	427 Uuh [584]	428 Uus [585]	429 Uut [586]	430 Uuq [587]	431 Uuh [588]	432 Uus [589]	433 Uut [590]	434 Uuq [591]	435 Uuh [592]	436 Uus [593]	437 Uut [594]	438 Uuq [595]	439 Uuh [596]	440 Uus [597]	441 Uut [598]	442 Uuq [599]	443 Uuh [600]	444 Uus [601]	445 Uut [602]	446 Uuq [603]	447 Uuh [604]	448 Uus [605]	449 Uut [606]	450 Uuq [607]	451 Uuh [608]	452 Uus [609]	453 Uut [610]	454 Uuq [611]	455 Uuh [612]	456 Uus [613]	457 Uut [614]	458 Uuq [615]	459 Uuh [616]	460 Uus [617]	461 Uut [618]	462 Uuq [619]	463 Uuh [620]	464 Uus [621]	465 Uut [622]	466 Uuq [623]	467 Uuh [624]	468 Uus [625]	469 Uut [626]	470 Uuq [627]	471 Uuh [628]	472 Uus [629]	473 Uut [630]	474 Uuq [631]	475 Uuh [632]	476 Uus [633]	477 Uut [634]	478 Uuq [635]	479 Uuh [636]	480 Uus [637]	481 Uut [638]	482 Uuq [639]	483 Uuh [640]	484 Uus [641]	485 Uut [642]	486 Uuq [643]	487 Uuh [644]	488 Uus [645]	489 Uut [646]	490 Uuq [647]	491 Uuh [648]	492 Uus [649]	493 Uut [650]	494 Uuq [651]	495 Uuh [652]	496 Uus [653]	497 Uut [654]	498 Uuq [655]	499 Uuh [656]	500 Uus [657]	501 Uut [658]	502 Uuq [659]	503 Uuh [660]	504 Uus [661]	505 Uut [662]	506 Uuq [663]	507 Uuh [664]	508 Uus [665]	509 Uut [666]	510 Uuq [667]	511 Uuh [668]	512 Uus [669]	513 Uut [670]	514 Uuq [671]	515 Uuh [672]	516 Uus [673]	517 Uut [674]	518 Uuq [675]	519 Uuh [676]	520 Uus [677]	521 Uut [678]	522 Uuq [679]	523 Uuh [680]	524 Uus [681]	525 Uut [682]	526 Uuq [683]	527 Uuh [684]	528 Uus [685]	529 Uut [686]	530 Uuq [687]	531 Uuh [688]	532 Uus [689]	533 Uut [690]	534 Uuq [691]	535 Uuh [692]	536 Uus [693]	537 Uut [694]	538 Uuq [695]	539 Uuh [696]	540 Uus [697]	541 Uut [698]	542 Uuq [699]	543 Uuh [700]	544 Uus [701]	545 Uut [702]	546 Uuq [703]	547 Uuh [704]	548 Uus [705]	549 Uut [706]	550 Uuq [707]	551 Uuh [708]	552 Uus [709]	553 Uut [710]	554 Uuq [711]	555 Uuh [712]	556 Uus [713]	557 Uut [714]	558 Uuq [715]	559 Uuh [716]	560 Uus [717]	561 Uut [718]	562 Uuq [719]	563 Uuh [720]	564 Uus [721]	565 Uut [722]	566 Uuq [723]	567 Uuh [724]	568 Uus [725]	569 Uut [726]	570 Uuq [727]	571 Uuh [728]	572 Uus [729]	573 Uut [730]	574 Uuq [731]	575 Uuh [732]	576 Uus [733]	577 Uut [734]	578 Uuq [735]	579 Uuh [736]	580 Uus [737]	581 Uut [738]	582 Uuq [739]	583 Uuh [740]	584 Uus [741]	585 Uut [742]	586 Uuq [743]	587 Uuh [744]	588 Uus [745]	589 Uut [746]	590 Uuq [747]	591 Uuh [748]	592 Uus [749]	593 Uut [750]	594 Uuq [751]	595 Uuh [752]	596 Uus [753]	597 Uut [754]	598 Uuq [755]	599 Uuh [756]	600 Uus [757]	601 Uut [758]	602 Uuq [759]	603 Uuh [760]	604 Uus [761]	605 Uut [762]	606 Uuq [763]	607 Uuh [764]	608 Uus [765]	609 Uut [766]	610 Uuq [767]	611 Uuh [768]	612 Uus [769]	613 Uut [770]	614 Uuq [771]	615 Uuh [772]	616 Uus [773]	617 Uut [774]	618 Uuq [775]	619 Uuh [776]	620 Uus [777]	621 Uut [778]	622 Uuq [779]	623 Uuh [780]	624 Uus [781]	625 Uut [782]	626 Uuq [783]	627 Uuh [784]	628 Uus [785]	629 Uut [786]	630 Uuq [787]	631 Uuh [788]	632 Uus [789]	633 Uut [790]	634 Uuq [791]	635 Uuh [792]	636 Uus [793]	637 Uut [794]	638 Uuq [795]	639 Uuh [796]	640 Uus [797]	641 Uut [798]	642 Uuq [799]	643 Uuh [800]	644 Uus [801]	645 Uut [802]	646 Uuq [803]	647 Uuh [804]	648 Uus [805]	649 Uut [806]	650 Uuq [807]	651 Uuh [808]	652 Uus [809]	653 Uut [810]	654 Uuq [811]	655 Uuh [812]	656 Uus [813]	657 Uut [814]	658 Uuq [815]	659 Uuh [816]	660 Uus [817]	661 Uut [818]	662 Uuq [819]	663 Uuh [820]	664 Uus [821]	665 Uut [822]	666 Uuq [823]	667 Uuh [824]	668 Uus [825]	669 Uut [826]	670 Uuq [827]	671 Uuh [828]	672 Uus [829]	673 Uut [830]	674 Uuq [831]	675 Uuh [832]	676 Uus [833]	677 Uut [834]	678 Uuq [835]	679 Uuh [836]	680 Uus [837]	681 Uut [838]	682 Uuq [839]	683 Uuh [840]	684 Uus [841]	685 Uut [842]	686 Uuq [843]	687 Uuh [844]	688 Uus [845]	689 Uut [846]	690 Uuq [847]	691 Uuh [848]	692 Uus [849]	693 Uut [850]	694 Uuq [851]	695 Uuh [852]	696 Uus

END OF EXAM