



الشري ^{ویا} علی نبض ^{قلع}

Jordan University of Science and Technology Department of Applied Chemical Sciences CH 103 First Exam

| Student's Name: | | Instructor: |
|-------------------|----------|-------------|
| Student's Number: | Section: | Serial No: |

*****Circle the most correct answer.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| | | | | | | | | | | | | | | | | | | | |

| hydrogen |] | | | | | | | | | | | | | | | | [| helium |
|--------------------|---------------------|--------|---------------------|-------------------------|------------------------|----------------------|--------------------|---------------------|----------------------|----------------------|---------------------|-----------------------|-----------------------|----------------------|-----------------------|--------------------|--------------------|-----------------|
| h. | | | | | | | | | | | | | | | | | | |
| н | | | | | | | | | | | | | | | | | | не |
| 1.0079 lithium | hendlum | | | Key: | element nome | | | | | | | | boron | carbon | nitrogen | 071/060 | fluorine | 4.0026 |
| 3 | 4 | | | ate | omic numb | ber | | | | | | | 5 | 6 | 7 | 8 | 9 | 10 |
| Li | Be | | | S | ymbo | ol | | | | | | | B | С | Ν | 0 | F | Ne |
| 6.941 eodium | 9.0122 megnesium | | | atomic we | ight (mean rela | tive mass) | | | | | | | 10.811 eluminium | 12.011 silicon | 14.007 phosphorus | 15.999 eulfur | 18.998 chlorine | 20.180 |
| 11 | 12 | | | | | | | | | | | | 13 | 14 | 15 | 16 | 17 | 18 |
| Na | Mg | | | | | | | | | | | | AI | Si | Ρ | S | CI | Ar |
| 22.990 | 24.305 | | aaandium | tite plum | un n dium | ala sa sa luma | | lean | achalt | piekel | | alac | 26.982 | 28.086 | 30.974 | 32.065 | 35.453 | 39.948 |
| 19 | 20 | | scandium 21 | 22 | 23 | chromium 24 | manganese 25 | 26 | 27 | 28 | copper 29 | 30 | gallium 31 | germanium 32 | arsenic 33 | selenium 34 | 35 | 36 |
| Κ | Ca | | Sc | Ti | V | Cr | Mn | Fe | Со | Ni | Cu | Zn | Ga | Ge | As | Se | Br | Kr |
| 39.098 | 40.078 | | 44.956 | 47.867 | 50.942 | 51.996 | 54.938 | 55.845 | 58.933 | 58.693 | 63.546 | 65.39 | 69.723 | 72.61 | 74.922 | 78.96 | 79.904 | 83.80 |
| 37 | 38 | | 39 | 2irconium 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 |
| Dh | Sr | | V | Zr | Nb | Mo | To | Du | Dh | Dd | ۸a | Cd | In | Sn | Sh | To | | Yo |
| NU | 31 | | | 21 | | NIC | | NU | | гu | Ay | Cu | | 311 | 30 | 16 | 400.00 | Ve |
| 85.468 caesium | 87.62 barium | | lutetium | 91.224 hafnium | 92.906 tantalum | 95.94 tungsten | [98] rhenium | osmium | 102.91 iridium | platinum | 107.87 gold | 112.41 mercury | 114.82 thallium | 118.71 lead | 121.76 bismuth | polonium | astatine | 131.29 radon |
| 55 | 56 | 57-70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 |
| Cs | Ba | * | Lu | Hf | Та | W | Re | Os | lr | Pt | Au | Hg | TI | Pb | Bi | Po | At | Rn |
| 132.91 franclum | 137.33 radium | | 174.97 Jawrandum | 178.49 rutherfordium | 180.95 dubpium | 183.84 seeboroium | 186.21 bobrium | 190.23 baseium | 192.22 meitnerium | 195.08 upuppilium | 196.97 upupupium | 200.59 upuphium | 204.38 | 207.2 ununguadium | 208.98 | [209] | [210] | [222] |
| 87 | 88 | 89-102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | | 114 | | | | |
| Fr | Ra | ** | Lr | Rf | Db | Sa | Bh | Hs | Mt | Uun | Uuu | Uub | | Uua | | | | |
| [223] | [226] | | [262] | [261] | [262] | [266] | [264] | [269] | [268] | [271] | [272] | [277] | | [289] | | | | |
| | | | | | | | | | | | | | | | , | | | |
| | | | lanthanum | cerium | praseodymium | neodymium | promethium | samarium | europium | aadolinium | terbium | dvsprosium | holmium | erbium | thulium | vtterbium | | |
| | | | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | | |
| | *lantha | noids | La | Се | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Но | Er | Tm | Yb | | |
| | | | 138.91 actinium | 140.12 thorium | 140.91 protactinium | 144.24 uranium | [145] neptunium | 150.36 plutonium | 151.96 americium | 157.25 curium | 158.93 herkelium | 162.50 californium | 164.93 einsteinium | 167.26 fermium | 168.93 mendelevium | 173.04 nobelium | | |
| | | | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | | |
| | **actine | oids | Ac | Th | Pa | U | Np | Pu | Am | Cm | Bk | Cf | Es | Fm | Md | No | | |
| | | | [227] | 232.04 | 231.04 | 238.03 | [237] | [244] | [243] | [247] | [247] | [251] | [252] | [257] | [258] | [259] | | |

Q1) How many significant figures are there in the measurement 1000 \pm 100?

A) 5 B) 2 C) 3 D) 4

Q2) How many significant figures should be retained in the result of the following calculation?

Q3) The quantity 1.0 mg/cm² is the same as 1.0 x g/mm²? A) 10 B) 10^{-2} C) 10^{-5} D) 10^{-6}

Q4) If the temperature of dry ice is -78 $^{\circ}$ C, what is its temperature in Kelvin?

A) 351 K B) 95 K C) 195 k D) 451 K

Q5) How many grams of hydrogen are in 65 g of $C_2H_2O_2$ (molar mass = 58.0 g/mol)?

A) 2.3 B) 27 C) 18 D) 36

Q6) How many carbon atoms are there in 1.00 g of $C_6H_{12}O_6$ (molar mass = 180. g/mol)? A) 6.00 B) 4.01 x 10²² C) 3.34 x 10²¹ D) 2.01 x 10²²

Q7) For complete reaction of 6.0 moles of Al (molar mass = 27.0 g/mol) according to the equation:

 $4 \operatorname{Al}(s) + 3O_2(g) \longrightarrow 2\operatorname{Al}_2O_3(s)$

A) You need 3.0 moles of O_2 to produce 2.0 moles of AI_2O_3

- B) You need 4.5 moles of O_2 to produce 3.0 moles of Al_2O_3
- C) You need 8.0 moles of O_2 to produce 2.0 moles of Al_2O_3

D) You need 18.0 moles of O_2 to produce 12.0 moles of AI_2O_3

Q8) If you begin with 1.14 g of Al (molar mass = 27.0 g/mol), how many grams of Br_2 (molar mass = 159.8 g/mol) are required for complete reaction?

 $2AI(s) + 3Br_2(I) \rightarrow AI_2Br_6(s)$

A) 3.04 g B) 10.1 g C) 22.7 g D) 15.1 g

Q9) The reaction of 2.5 g of Al (molar mass = 27.0 g/mol) with 2.5 g of O_2 (molar mass = 32.0 g/mol) produced 2.5 g of Al_2O_3 (molar mass = 102.0 g/mol). The % yield of the reaction is: 4Al(s) + 3O₂(g) \longrightarrow 2Al₂O₃(s)

A) 74% B) 37% C) 53% D) 66%

Q10) How many grams of $KMnO_4$ (molar mass = 158.0 g/mol) are needed to prepare 500. ml of a 0.0125 M solution?

A) 0.494 g B) 3.13 g C) 0.395 g D) .988 g

Q11) How many millilitres of 12.0 M HCl solution are needed to prepare 500. ml of 0.100 M HCl solution?

A) 4.17 ml B) 2.50 ml C) 3.33 ml D) 1.67 ml

Q12) A 31.5 ml of H_2SO_4 of unknown concentration was titrated with 0.0134 M NaOH (aq). It took 47.8 ml of the base to reach the endpoint of the titration. The concentration (M) of the acid was: $H_2SO_4 + 2 NaOH \longrightarrow Na_2SO_4 + 2H_2O$

A) 0.0102 B) 0.00508 C) 0.0508 D) 0.102

Q13) How many grams of Na₂CO₃ (molar mass = 106.0 g/mol) are required for complete reaction with 55.0 ml of 0.155 M HNO₃? Na₂CO₃ (aq) + 2HNO₃ (aq) \longrightarrow 2NaNO₃ (aq) + CO₂ (g) + H₂O (l)

A) 0.370 g B) 0.452 g C) 0.205 g D) 0.287 g

Q14) Which of the following represents the largest gas pressure?

A) 1.0 atm B) 1.0 Pa C) 1.0 mm Hg D) 1.0 kPa

Q15) A sample of N_2 is contained in a 255 ml flask at 24°C and a pressure of 45.6 mmHg. What is the pressure of the gas if its volume becomes 750 ml at 14°C?

A) 16.1 mm Hg B) 39.0 mm Hg C) 15.0 mm Hg D) 26.8 mm Hg

Q16) What is the molar mass of unknown gas if 1.38 grams of that gas occupies a volume of 673 mL at STP? A) 97 g/mol B) 63 g/mol C) 57 g/mol D) 46 g/mol

Q17) Which of the following gases diffuses the fastest? A) Cl_2 B) CO C) NO_2 D) CO_2

Q18) Equal masses of helium and neon are placed in separate containers of equal volume at the same temperature.

A) Pressure of He is greater than that of Ne.

B) Density of He is larger than that of Ne.

C) Number of Ne atoms is larger than that of He.

D) Both have the same number of moles.



 $2 \text{ NO}(g) + O_2(g) \longrightarrow 2 \text{ NO}_2(g)$

reaction is finished.

25°C.

A) 0.666 atm B) 0.222 atm C) 0.444 atm D) 0.333 atm





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The Answers:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| | D | С | С | A | D | B | B | С | D | A | | B | A | С | D | B | | D | С |

