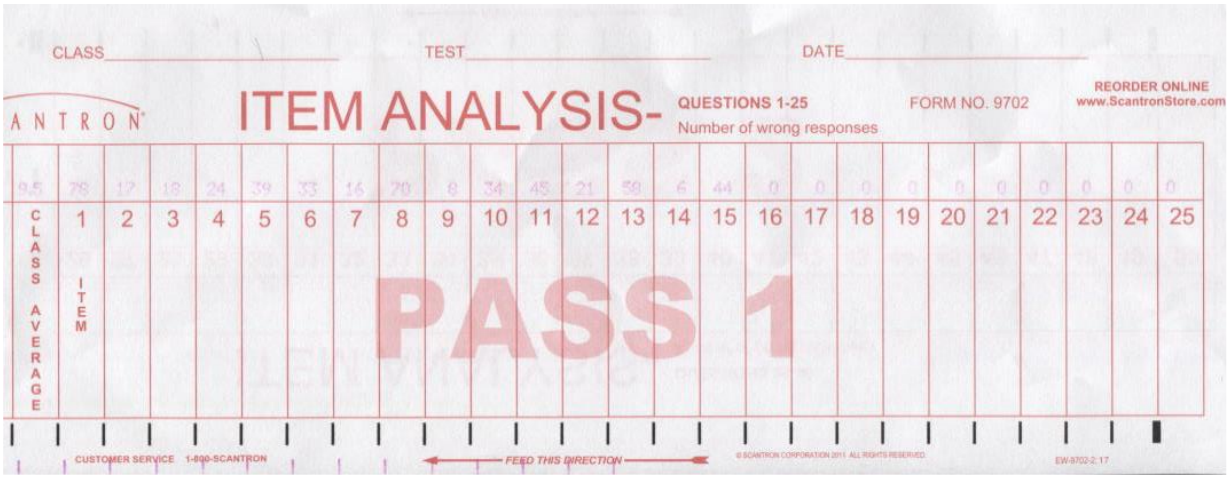
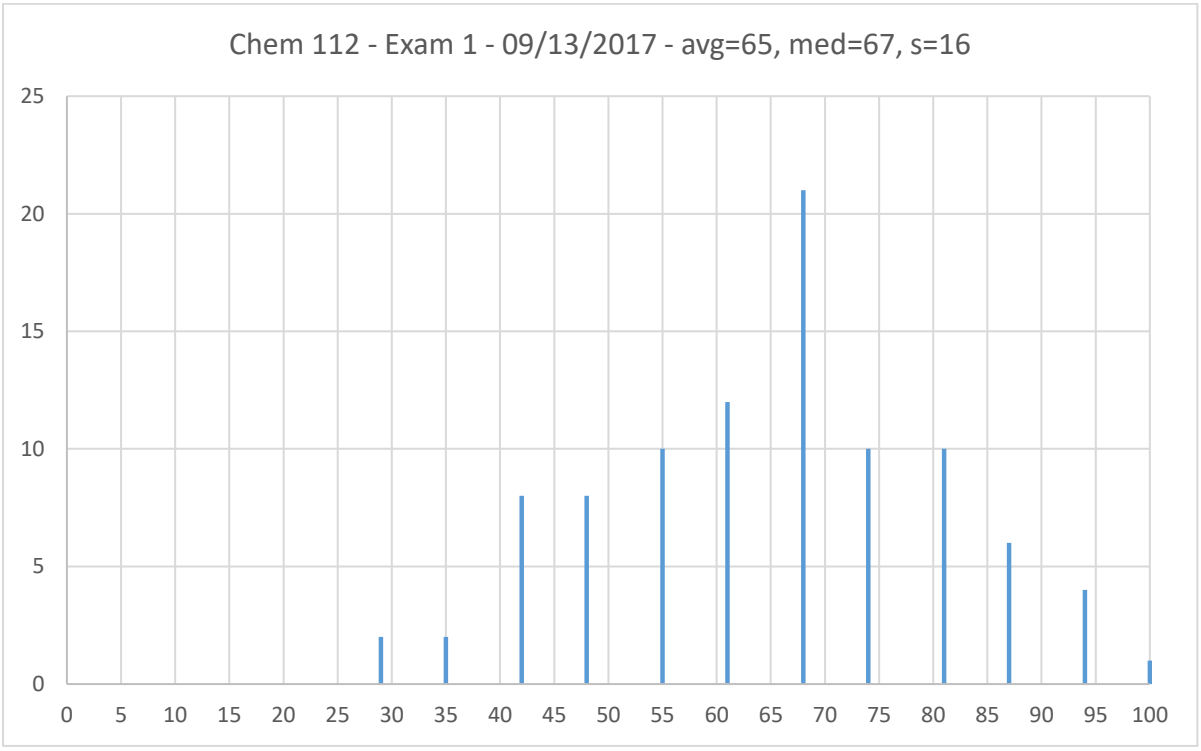
Answers

1] b 2] d 3] a 4] A 5]A 6]A 7]B 8]D 9]B
10] D 11] B 12] E 13]D 14] E 15]A





1																	18
1 **H** 1.008	2											13	14	15	16	17	2 **He** 4.0026
3 **Li** 6.94	4 **Be** 9.0122											5 **B** 10.81	6 **C** 12.011	7 **N** 14.007	8 **O** 15.999	9 **F** 18.998	10 **Ne** 20.180
11 **Na** 22.990	12 **Mg** 24.305	3	4	5	6	7	8	9	10	11	12	13 **Al** 26.982	14 **Si** 28.085	15 **P** 30.974	16 **S** 32.06	17 **Cl** 35.45	18 **Ar** 39.948
19 **K** 39.098	20 **Ca** 40.078	21 **Sc** 44.956	22 **Ti** 47.867	23 **V** 50.942	24 **Cr** 51.996	25 **Mn** 54.938	26 **Fe** 55.845	27 **Co** 58.933	28 **Ni** 58.693	29 **Cu** 63.546	30 **Zn** 65.38	31 **Ga** 69.723	32 **Ge** 72.630	33 **As** 74.922	34 **Se** 78.97	35 **Br** 79.904	36 **Kr** 83.798
37 **Rb** 85.468	38 **Sr** 87.62	39 **Y** 88.906	40 **Zr** 91.224	41 **Nb** 92.906	42 **Mo** 95.95	43 **Tc** (98)	44 **Ru** 101.07	45 **Rh** 102.91	46 **Pd** 106.42	47 **Ag** 107.87	48 **Cd** 112.41	49 **In** 114.82	50 **Sn** 118.71	51 **Sb** 121.76	52 **Te** 127.60	53 **I** 126.90	54 **Xe** 131.29
55 **Cs** 132.91	56 **Ba** 137.33	57-71 *	72 **Hf** 178.49	73 **Ta** 180.95	74 **W** 183.84	75 **Re** 186.21	76 **Os** 190.23	77 **Ir** 192.22	78 **Pt** 195.08	79 **Au** 196.97	80 **Hg** 200.59	81 **Tl** 204.38	82 **Pb** 207.2	83 **Bi** 208.98	84 **Po** (209)	85 **At** (210)	86 **Rn** (222)
87 **Fr** (223)	88 **Ra** (226)	89-103 #	104 **Rf** (265)	105 **Db** (268)	106 **Sg** (271)	107 **Bh** (270)	108 **Hs** (277)	109 **Mt** (276)	110 **Ds** (281)	111 **Rg** (280)	112 **Cn** (285)	113 **Nh** (286)	114 **Fl** (289)	115 **Mc** (289)	116 **Lv** (293)	117 **Ts** (294)	118 **Og** (294)

* Lanthanide series	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** 151.96	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** 173.05	71 **Lu** 174.97
# Actinide series	89 **Ac** (227)	90 **Th** 232.04	91 **Pa** 231.04	92 **U** 238.03	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** (262)

R = 8.314 J/K-mol = 0.0821 l-atm/K-mol

$$\ln P = \frac{-\Delta H_{vap}}{RT} + b \qquad u = \sqrt{\frac{3RT}{M}}$$

DO NOT OPEN THIS EXAM UNTIL YOU ARE INSTRUCTED TO DO SO

- Please print your name on the scantron
  - Last Name, First Name
  - That's all that's needed
- Sit in odd numbered seats.
- Books & Bags in the front of the room.
- No text entry calculators.
- Use the exams as scratch paper.
- Keep the exams when you are done.
- Turn in the scantrons.

100 total points. Questions 1-15 worth 6.5 points each. Question 16 worth 2.5 points.

1. One mole of H_2S gas escapes from a container by effusion in 77 seconds. How long would it take for one mole of NH_3 gas to escape from the same container?

a) 38.5 sec
b) 54 sec
c)154 sec
d) 109 sec
e) 122 sec

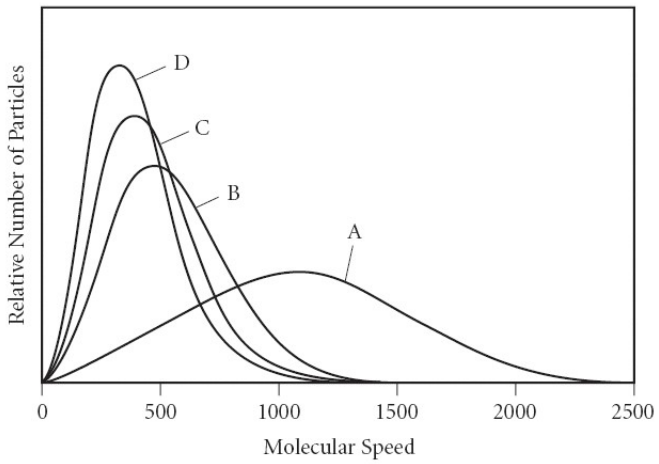
2. Air in a sealed container is heated from 25 ^{0}C to 36 ^{0}C. If the initial pressure is 3.80 atm, what is the final pressure?

a) 2.64 atm
b) 5.48 atm
c) 3.77 atm
d) 3.94 atm
e) 3.03 atm

3. A 6.60 g sample of a gaseous compound occupies a volume of 1.20 L at 27 ^{0}C and 0.967 atm. What is molecular weight of this compound?

a) 140 g/mol
b) 165 g/mol
c) 152 g/mol
d) 109 g/mol
e) 123 g/mol

4. Using the graph below, determine the gas that has the lowest density (mass/vol.) at STP.



A) A
B) B
C) C
D) D
E) All of the gases have the same density at STP.

5. A mixture of 10.0 g of Ne and 10.0 g Ar have a total pressure of 1.6 atm. What is the partial pressure of Ne?

A) 1.1 atm
B) 0.80 atm
C) 0.54 atm
D) 0.40 atm
E) 1.3 atm

6. A mixture of 1.0 mol He and 1.0 mol Ne are at STP in a rigid container. Which of the following statements is **true**?

A) Both gases have the same average kinetic energy.
B) Both gases contribute equally to the density of the mixture under these conditions.
C) Both gases have the same molecular speed.
D) The mixture has a volume of 22.4 L
E) All of the above are true.

7. Which one of these will diffuse the fastest at 25°C?

A) 2.0 M Ar
B) 1.0 M H_2
C) 2.0 M N_2
D) 0.5 M Ne
E) 2.0 M O_2

8. A container holds 3.0 g of hydrogen. If it is evacuated and filled with methane, CH_4, at the same temperature and pressure, what mass of methane does it now hold?

Atomic Molar Masses	
C	12.0 $g \cdot mol^{-1}$
H	1.0 $g \cdot mol^{-1}$

(A) 16 g (B) 19 g (C) 22.4 g (D) 24 g (E) 48 g

9. The STRONGEST intermolecular forces between molecules of NH_3 are

a. ionic bonds.
b. hydrogen bonds.
c. ion–dipole attractions.
d. London forces.
e. covalent bonds.

10. The mass of 560 cm^3 (STP) of an unknown gas is 1.60 g. This gas could be

Molar Masses	
CO_2	44. $g \cdot mol^{-1}$
Cl_2	71. $g \cdot mol^{-1}$
O_2	32. $g \cdot mol^{-1}$
SO_2	64. $g \cdot mol^{-1}$

(A) oxygen. (C) chlorine.

(B) carbon dioxide. (D) sulfur dioxide.

11. Choose the substance with the lowest surface tension.

A) CH_3OH
B) $CH_3CH_2CH_2CH_3$
C) CH_3CH_2OH
D) H_2O
E) $(CH_3)_2CO$

12. Place the following substances in order of **increasing** boiling point.

CH_3CH_2OH He CH_3OCH_3

A) He < CH_3CH_2OH < CH_3OCH_3
B) CH_3CH_2OH < He < CH_3OCH_3
C) CH_3CH_2OH < CH_3OCH_3 < He
D) CH_3OCH_3 < He < CH_3CH_2OH
E) He < CH_3OCH_3 < CH_3CH_2OH

13. Given that the boiling point of liquid is 166 ^{0}C which of the following would be of most help for the calculation of its vapor pressure at 133 ^{0}C.

a) The Heat of Fusion
b) The Heat of Sublimation
c) The Heat of Ionization
d) The Heat of Condensation
e) The Heat of Racemization

14. Identify the compound that has hydrogen bonding.

A) $(CH_3)_3N$
B) N_2
C) CH_3CH_3
D) HI
E) NH_3

15. Choose the pair of substances that are most likely to form a homogeneous solution.

A) C_6H_{14} and $C_{10}H_{20}$
B) KCl and C_5H_{12}
C) N_2O_4 and NH_4I
D) C_6H_{14} and H_2O
E) None of the pairs above will form a homogeneous solution.

16. My recitation meets at

a) 12:30 pm on Thursdays
b) 2:30 pm on Thursdays