



## FIRST SEMESTER

## FINAL EXAM-I

<b>Date:</b> Sunday 06/04/1439 H	..... : الاسم				
<b>Time:</b> 1:00 - 4:00 pm	..... : الرقم الجامعي				
<b>Time allowed:</b> 180 minutes	..... : رقم الشعبة				
<b>Write your answer in the table below</b>					
<b>Q1:</b>	<b>Q8:</b>	<b>Q15:</b>	<b>Q22:</b>	<b>Q29:</b>	<b>Q36:</b>
<b>Q2:</b>	<b>Q9:</b>	<b>Q16:</b>	<b>Q23:</b>	<b>Q30:</b>	<b>Q37:</b>
<b>Q3:</b>	<b>Q10:</b>	<b>Q17:</b>	<b>Q24:</b>	<b>Q31:</b>	<b>Q38:</b>
<b>Q4:</b>	<b>Q11:</b>	<b>Q18:</b>	<b>Q25:</b>	<b>Q32:</b>	<b>Q39:</b>
<b>Q5:</b>	<b>Q12:</b>	<b>Q19:</b>	<b>Q26:</b>	<b>Q33:</b>	<b>Q40:</b>
<b>Q6:</b>	<b>Q13:</b>	<b>Q20:</b>	<b>Q27:</b>	<b>Q34:</b>	
<b>Q7:</b>	<b>Q14:</b>	<b>Q21:</b>	<b>Q28:</b>	<b>Q35:</b>	

IA																	VIII A
1	2										13	14	15	16	17	2	
H	He										III A	IV A	VA	VIA	VII A	He	
1.008	4.003															4.003	
3	4									5	6	7	8	9	10		
Li	Be									B	C	N	O	F	Ne		
6.94	9.01									10.811	12.01	14.01	16.00	19.00	20.18		
11	12	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Na	Mg	III B	IV B	VB	VIB	VIIB		VIII B	IB	IIB		Al	Si	P	S	Cl	Ar
23.00	24.31											26.98	28.09	30.97	32.07	35.45	39.98
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
39.09	40.08	44.96	47.87	50.94	52.00	54.94	55.85	58.93	58.69	63.546	65.41	69.72	72.64	74.9216	78.96	79.90	83.80
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
85.47	87.62	88.91	91.23	92.91	95.94	[98]	101.07	102.91	106.42	107.87	112.41	114.82	118.71	121.760	127.60	126.90	131.29
55	56	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
Cs	Ba	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
132.91	137.33	174.97	178.49	180.95	183.84	186.21	190.23	192.22	195.08	196.97	200.59	204.38	207.2	208.980	[209]	[210]	[222]
87	88	103	104	105	106	107	108	109	110	111	112	113					
Fr	Ra	Lr	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Uub	Uut					
[223]	[226]	[262]	[261]	[262]	[266]	[264]	[269]	[268]	[271]	[272]	[285]	[286]					

**Constants:**

1 atm = 760 torr = 101.325 kPa

R = 0.0821 atm L mol<sup>-1</sup> K<sup>-1</sup> = 8.314 J mol<sup>-1</sup> K<sup>-1</sup>

N<sub>A</sub> (Avogadro's Number) = 6.022 × 10<sup>23</sup>

1 atm.L = 101.325 J

**Q1:** How many significant figures are in  $8.3 \times 10^4$  molecules of oxygen?

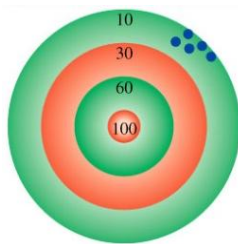
- A) 1
- B) 2
- C) 4
- D) 5

**Q2:** The density in ( $\text{Kg/m}^3$ ) of 5.70 g of a metal with a volume of  $22.4 \text{ cm}^3$ , is:

- A) 0.2544
- B) 2.544
- C) 25.44
- D) 254.4

**Q3:** This figure describes a measurement that is:

- A) Accurate and precise.
- B) Accurate but not precise.
- C) Precise but not accurate
- D) Not accurate and not precise



**Q4:** The speed of sound is 343 m/s. What is the speed of sound in **km/h**?

- A) 1235
- B)  $1.23 \times 10^6$
- C) 1556
- D)  $2.1 \times 10^4$

**Q5:** The formula for “diphosphorous pentaoxide”, is:

- A)  $\text{PO}_5$
- B)  $\text{P}_2\text{O}_6$
- C)  $\text{P}_5\text{O}_2$
- D)  $\text{P}_2\text{O}_5$

**Q6:** An example of a polyatomic cation, is:

- A) Hydroxide ion “ $\text{OH}^-$ ”
- B) Calcium ion “ $\text{Ca}^{+2}$ ”
- C) Ammonium ion “ $\text{NH}_4^+$ ”
- D) Hydrogen carbonate ion “ $\text{HCO}_3^-$ ”

**Q7:** The name of “ $\text{FeSO}_4$ ”, is:

- A) iron sulfate.
- B) iron(II) sulfate.
- C) iron(I) sulfate.
- D) iron(III) sulfate.

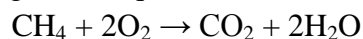
**Q8:** The scientist who determined the electric charge of the electron was:

- A) Robert Millikan
- B) John Dalton
- C) J. J. Thomson
- D) R. Chang

**Q9:** The concentration of an aqueous solution of “ $(\text{NH}_4)_2\text{SO}_4$ ” is 0.666 M. What is the mass of “ $(\text{NH}_4)_2\text{SO}_4$ ” if the volume of the solution is 666 mL?

- A) 14.8
- B) 1.0
- C) 443.6
- D) 58.6

**Q10:** According to the equation:



how many moles of methane  $\text{CH}_4$  will react with 7.0 moles of oxygen “ $\text{O}_2$ ” ?

- A) 1.0
- B) 3.5
- C) 7.0
- D) 14

**Q11:** The mass in (g) of one atom of iron “Fe”, is:

- A)  $6.02 \times 10^{-23}$
- B)  $1.66 \times 10^{-24}$
- C)  $9.27 \times 10^{-23}$
- D)  $55.85 \times 10^{-23}$

**Q12:** When 18.1 g of “NH<sub>3</sub>” and 90.4 g of “CuO” were allowed to react according to:



The mass of “Cu” in (g), is:

- A) 48.7
  - B) 83.6
  - C) 58.8
  - D) 72.2
- 

**Q13:**  $\text{X} + \text{O}_2 \rightarrow \text{XO}_2$

If 6.7 g of this element combines with 3.9 g of oxygen, what is the atomic mass of this element in (amu)?

- A) 65
  - B) 48
  - C) 55
  - D) 40
- 

**Q14:** The pressure in (atm) of  $12 \times 10^3$  moles of methane gas stored in 3000.0 L tank at 48 °C, is:

- A) 105.5
  - B) 15.8
  - C) 60.2
  - D) 117.5
- 

**Q15:** A gas sample occupies 0.40 L at 301 K and 1.0 atm. At what temperature in (K) will the gas sample occupy 0.85 L at the same pressure?

- A) 367
  - B) 415
  - C) 142
  - D) 640
- 

**Q16:** A gas sample occupies 300 mL at STP. What is the volume of the sample in (mL) if the pressure is doubled at constant temperature?

- A) 250
  - B) 150
  - C) 350
  - D) 600
- 

**Q17:** A cylinder contains exactly equal masses of the three gases CO<sub>2</sub>, N<sub>2</sub> and O<sub>2</sub>. Which one of the following statements is true?

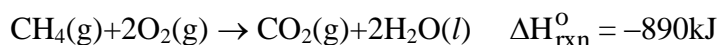
- A) The partial pressures of the three gases are equal.
  - B) The partial pressure of the CO<sub>2</sub> gas is the highest.
  - C) The partial pressure of the N<sub>2</sub> gas is the highest.
  - D) The partial pressure of the O<sub>2</sub> gas is the highest.
- 

**Q18:**  $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$

When 5.0 L of “H<sub>2</sub>” react with enough amount of “O<sub>2</sub>”, the volume in (L) of “H<sub>2</sub>O(g)” at constant temperature and pressure, is:

- A) 20.0
  - B) 10.0
  - C) 2.5
  - D) 5.0
- 

**Q19:** According to the following reaction:



the mass of “CH<sub>4</sub>” in (g) needed to supply 62692 kJ of heat energy, is:

- A) 1127
  - B) 1151
  - C) 1102
  - D) 1025
- 

**Q20:** In an exothermic reaction:

- A) The products energy is more than reactants energy
  - B) The products energy is less than reactants energy.
  - C) The products energy is equal to reactants energy.
  - D) Heat absorbed from the surroundings
- 

**Q21:** 362 g of silver has a heat capacity of 85.7 J/°C. The specific heat of silver, is:

- A) 0.24
  - B) 4.22
  - C) 1.59
  - D) 0.73
-

**Q22:** Which of the reactions below is an exothermic process?

- A)  $\text{Hg}(l) \rightarrow \text{Hg}(g)$
- B)  $\text{H}_2\text{O}(g) \rightarrow \text{H}_2\text{O}(l)$
- C)  $\text{H}_2\text{O}(s) \rightarrow \text{H}_2\text{O}(g)$
- D)  $\text{H}_2\text{O}(s) \rightarrow \text{H}_2\text{O}(l)$

**Q23:** From the following thermochemical equation,  
 $2\text{NO}(g) + \text{O}_2(g) \rightarrow 2\text{NO}_2(g)$   $\Delta H = -114.60 \text{ kJ/mol}$   
 $\Delta E$  in (***kJ***) at 298K, is:

- A) - 117.08
- B) + 112.12
- C) + 117.08
- D) -112.12

**Q24:** A piece of “Cu” at 150 °C was mixed with 250 g of “Al” at 50 °C. If the final temperature of the mixture became 100 °C, the mass in (***g***) of copper, is:  
*(specific heat of “Cu” = 0.385 J/g°C and specific heat of “Al” = 0.900 J/g °C)*

- A) 89.22
- B) 429.2
- C) 584.4
- D) 758.6

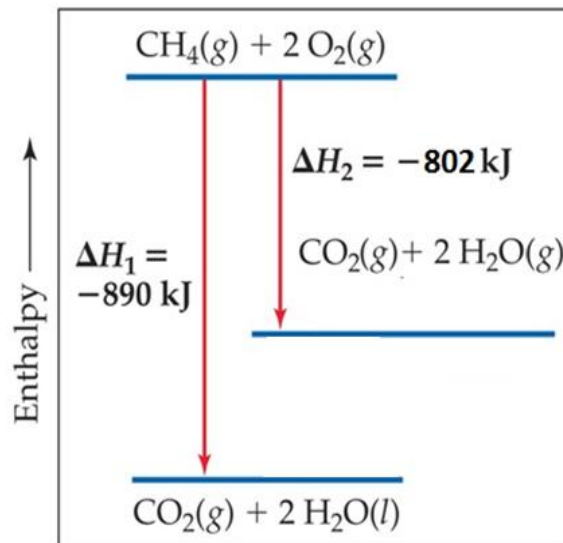
**Q25:** The volume of an ideal gas decreased from 3.48 L to 1.43 L. If the external pressure was 3.75 atm, what is the value of the work “w” in (***J***)?

- A) + 778.96
- B) + 698.77
- C) + 578.79
- D) - 878.96

**Q26:** According to the following equation :  
 $2\text{ZnS}(s) + 3\text{O}_2(g) \rightarrow 2\text{ZnO}(s) + 2\text{SO}_2(g)$   $\Delta H = -879 \text{ kJ}$   
 The heat given off in (***kJ***) per gram of ZnS, is :

- A) - 6.22
- B) - 4.51
- C) - 9.02
- D) - 12.2

**Q27:** From data illustrated in the diagram below:



The change in enthalpy of the following reaction (***in kJ***), is:  $\text{H}_2\text{O}(g) \rightarrow \text{H}_2\text{O}(l)$

- A) - 88
- B) - 44
- C) + 44
- D) + 88

**Q28:** For which of the following reactions does  $\Delta H_{\text{rxn}}^{\circ} = \Delta H_{\text{f}}^{\circ}$

- A)  $\frac{1}{2} \text{H}_2(g) + \frac{1}{2} \text{N}_2(g) + \frac{3}{2} \text{O}_2(g) \rightarrow \text{HNO}_3(l)$
- B)  $\text{H}_2(g) + \text{CuO}(s) \rightarrow \text{H}_2\text{O}(g) + \text{Cu}(s)$
- C)  $\text{O}(g) + \text{O}_2(g) \rightarrow \text{O}_3(g)$
- D)  $2\text{H}_2(g) + \text{O}_2(g) \rightarrow 2\text{H}_2\text{O}(g)$

**Q29:** Using the following equations:



The standard enthalpy of formation of carbon disulfide “CS<sub>2</sub>” [  $\text{C}(s) + 2\text{S}(s) \rightarrow \text{CS}_2(l)$  ], is :

- A) - 87.3
- B) -174.6
- C) 174.6
- D) 87.3

**Q30:** The solubility of a gas in a liquid depends on:

- 1- The nature of the liquid solvent
- 2- The nature of the gas
- 3- The temperature
- 4- The partial pressure of the gas

- A) All of them  
B) 2, 3, 4 only  
C) 1, 3, 4 only  
D) 3,4 only

**Q31:** A solution is prepared by dissolving 36.5 g  $\text{CaI}_2$  in 0.750 kg of water. What is the molality of the solution?

- A) 1.97  
B) 1.03  
C) 0.17  
D) 0.29

**Q32:** The unit of "mole fraction" is:

- A) mol  
B) has no unit  
C)  $\text{mol}^{-1}$   
D)  $\text{mol}\cdot\text{g}^{-1}$

**Q33:** The freezing point in ( $^{\circ}\text{C}$ ) of an aqueous solution of a non electrolyte solute that has a boiling point of  $103.8^{\circ}\text{C}$ , is:

( $k_f$  of water =  $1.86^{\circ}\text{C}/\text{m}$  and  $k_b$  of water =  $0.52^{\circ}\text{C}/\text{m}$ )

- A) -7.7  
B) -9.8  
C) -11.2  
D) -13.6

**Q34:** If the concentration of " $\text{H}_2\text{SO}_4$ " is 95.0% by mass, the molality (m) of the acid, is:

- A) 177.6  
B) 193.7  
C) 215.4  
D) 110.6

**Q35:** From data illustrated in the diagram below:



200 g Sucrose  
" $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ "  
+ 750 g water

200 g Glucose  
" $\text{C}_6\text{H}_{12}\text{O}_6$ "  
+ 750 g water

Which of the following statements is true?

- A) The sucrose solution has the highest vapor pressure.  
B) The glucose solution has the highest vapor pressure.  
C) The sucrose solution has the lowest vapor pressure.  
D) The two solutions have the same vapor pressure.

**Q36:** 15.58 g of a non-electrolyte substance was dissolved in 150 g of water. If the boiling point of the solution increased by  $0.3^{\circ}\text{C}$ , the molar mass in ( $\text{g}/\text{mol}$ ) of this compound is:

( $k_b$  of water =  $0.52^{\circ}\text{C}/\text{m}$ )

- A) 48  
B) 122  
C) 180  
D) 360

**Q37:** Osmotic pressure of nonelectrolyte solution depends on temperature and:

- A) the nature of solute.  
B) the nature of solvent.  
C) the vapor pressure of solvent.  
D) the concentration of solution.

**Q38:** If the solubility of acetylene gas in acetone is  $0.5 \text{ mol/L}$  at 1 atm. What is the solubility of acetylene gas in ( $\text{mol/L}$ ) if its partial pressure becomes 12.5 atm ?

- A) 5.25  
B) 7.25  
C) 6.25  
D) 8.25

**Q39:** The mass in (g) of “CH<sub>2</sub>OH-CH<sub>2</sub>OH” (nonelectrolyte) that should be dissolved in 1.0 kg of water to decrease the freezing point by 10°C, is:

( $k_f$  of water = 1.86 °C/m)

- A) 334
  - B) 275
  - C) 420
  - D) 395
- 

**Q40:** The osmotic pressure, at 300 K, of an aqueous solution obtained by dissolving 2.0 g of a nonelectrolyte substance in water to make 200 mL solution is 0.03 atm. The molar mass in (g/mol) of this substance is:

- A)  $8.1 \times 10^4$
  - B)  $1.3 \times 10^4$
  - C)  $8.2 \times 10^3$
  - D)  $3.1 \times 10^3$
-