Name of a student ---------------------------- Signature ---------------------------- No. --------

University of Mustansiriyah                        1st Semester-2021

Department of Chemistry                            1st Exam-paper Ⅱ

**Q1: Circle the right answer for all of the following:**                    (50 points)

1: According to van der Waal's corrections if $V_{Real} < V_{Perfect}$ of any gas that means the gas has:

Answer:        a) non-polar particles        b) polar particles        c) small particles        d) big particles

2: Calculate the weight of $CO_2$ gas (44 g.$mol^{-1}$) in a $0.5 \times 10^4$ mL cylinder at $20 \times 10^2$ kPa and 25 °C.

Answer:        a) 180 g $mol^{-1}$    b) 180 g    c) 180 mol    d) 180 kg

3: Calculate the density of $CO_2$ placed in a $22.4 \times 10^3$ mL cylinder at $20 \times 10^2$ kPa and 298 K.

Answer:        a) 36.06 kg $L^{-1}$        b) 36.06 g $L^{-1}$        c) 36.06 g        d) 36.06 $L^{-1}$

4: According to Graham's law the heaviest gas has?

Answer:        a) low rate        b) high rate        c) middle rate        d) low density

5: A gas occupies 20 $dm^3$ at 90 °C and 760 torr pressure. What would be its volume at STP?

Answer:        a) 15.04 mL        b) 15.04 $dm^3$        c) 15.04 $L^{-1}$        d) 15.04 $dm^{-3}$

6: A vessel contains a certain amount of gas at $80 \times 10^5$ Pa. The gas is transferred to another tank 20 $dm^3$ with pressure of $20 \times 10^5$ Pa. What should be its volume?

Answer:        a) 0.5 L        b) 0.5 Pa L        c) 0.5 Pa $dm^3$        d) 0.5 $L^{-1}$

7: According to Avogadro's law n is directly proportional with volume at constant?

Answer:        a) p & V        b) T & p        c) T & V        d) p & n        e) R & P

8: Attractive and repulsive forces between particles are present in a?

Answer:        a) perfect gas        b) non-ideal gas        c) ideal gas        d) noble gas

9: It can follow the direct proportional between temperature and volume through the law of

Answer:        a) Van der Waal        b) Graham        c) Charles        d) Gay-Lussac

10: The mol fraction of atmospheric pressure is equal to?

Answer:        a) zero        b) one        c) two        d) three

**Q2:** The following data have been observed for 10000 mg of $CO_2$ gas at 273 K. Calculate the best value of the molar mass of $CO_2$.        (25 points)

| p/$10^2$ kPa | 1.00 | 2.00 | 3.00 |
|---|---|---|---|
| V/L | 4.00 | 7.50 | 11.75 |

**Q3:** A perfect gas undergoes isothermal expansion, which increases its volume by 2.48 $dm^3$. The $p_i$ and $V_i$ of the gas are $2 \times 10^2$ kPa and 2.14 $dm^3$, respectively. Calculate the $p_f$ of the gas in (i) bar, (ii) torr. (25 points)

Wed_10/11/2021                        Best wishes                        Dr Abduljabbar I. R. Rushdi

Q2/
قسم ديناصور (?)
$m = 1000\,mg$
$T = 273\,K$

$PV = nRT$

(circled) $Q_2$ $\frac{5}{25}$

Q3/ $2 \times 10^2\,KPa * 1\,atm$

$P_1 V_1 = P_2 V_2$

$P_1 * 2,48 = 2 \times 10^2 * 2,14$

$P_1 = \dfrac{2 \times 10^2 * 2,14}{2,48}$

(circled) $Q_3$ $\frac{5}{25}$