



المجموعة :

الاسم :

(Ar =40, K=39, C=12, Cl=35.5, N=14, O =16, He =4 and H=1)

Answer the following questions:

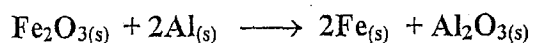
أجب عن الأسئلة الآتية:

(1): How many gm of  $\text{KClO}_3$  was decomposed in the lab to produce  $182 \text{ cm}^3$  of oxygen gas form the reaction:  $2\text{KClO}_3 \longrightarrow 2\text{KCl} + 3\text{O}_2$ . The oxygen was collected over water. Atmospheric pressure in the room at the time was 731 torr. The temperature of the water(= temp of the gas) was  $20^\circ\text{C}$ . If the vapor pressure of water at this temperature is 17.54 torr. (5)

(2): Calculate the density of an **equimolar mixture** of He and Ar at  $82^\circ\text{C}$  and 600 mm Hg? (3)

(3): Calculate the change in internal energy, ( $\Delta E$ ) and  $\Delta H$  when 28 gm of methane gas ( $\text{CH}_4$ ), are compressed isobarically at 7.749 atm. from 15 liters to 5 liters by coling the gas,? (consider methane behaves as an ideal gas during this process and the spcific heat of  $\text{CH}_4$  at constant volum  $C_v=3.36+0.0115T \text{ cal/mol. k}$ ). (6)

(4): Referring to the information in the table at 25°C:



**predict** whether the given reaction would be:

- (i) Exothermic or endothermic at 25°C.
- (ii) Natural and possible or not.
- (iii) Takes place as written at the standard state conditions at 25°C. **and indicate** the effect of

(6)

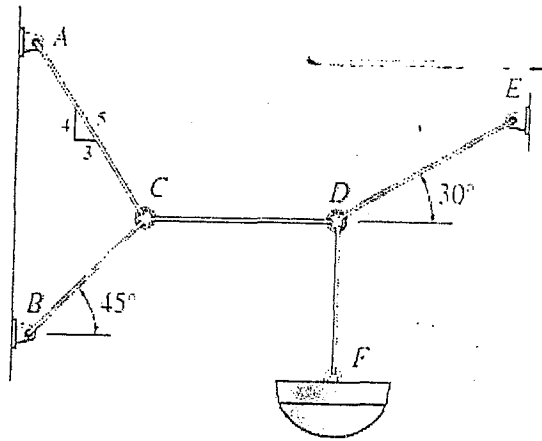
Compound	$\Delta H^\circ_f$ kcal/mole	$S^\circ$ cal/mole.deg.
Fe(s)	000.00	6.490
Al(s)	000.00	6.770
Fe <sub>2</sub> O <sub>3</sub> (s)	-196.50	21.500
Al <sub>2</sub> O <sub>3</sub> (s)	-399.092	12.185

(5): Calculate the volume of air required and the volume and composition of the flue gases at S.T.P., when 1 Kg. of oil is burned stoichiometrically, if the oil analysis is 84% carbon and 16% hydrogen by weight. (5)

(6): By applying van der Waals equation of state **predict** the pressure exerted by 15.714 gm of CO<sub>2</sub> in a closed vessel of volume 1.50 liter at 27 °C. Consider van der waals constants as:

$$a=3.592 \text{ atm liter}^2/\text{mole}^2. \quad b=0.9698 \text{ cm}^3/\text{gm} \quad (3)$$

(2) Determine the tension developed in each cord required for equilibrium of the 20-kg lamp.



(3) Find the minimum distance between point  $C(2,5,7)$  and the line that passes through the points  $A(1,2,4)$  and  $B(3,2,10)$ .