

Multiple Choice

1. What is the percent by mass of CdSO_4 in 1.0 molal aqueous solution?

- A) 17.25 B) 20.36 C) 24.36 D) 32.44
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2. The energy unit J is:

- A) $\text{kg}\cdot\text{m}^{-1}\cdot\text{s}^{-2}$ B) $\text{kg}\cdot\text{m}^{-2}\cdot\text{s}^{-2}$
C) $\text{kg}\cdot\text{m}\cdot\text{s}^{-2}$ D) $\text{kg}\cdot\text{m}^2\cdot\text{s}^{-2}$
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3. How many molecules are in 8.0 g of ozone (O_3)?

- A) 1.0×10^{23} B) 1.2×10^{23}
C) 1.4×10^{23} D) 1.6×10^{23}
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4. Calculate the percent by mass of copper (Cu) in the mineral chalcopyrite (CuFeS_2).

- A) 25.48 B) 28.75 C) 34.62 D) 39.56
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5. The ascorbic acid is composed of 40.92% C, 4.58% H and 54.50% O, by mass. Determine its empirical formula?

- A) $\text{C}_2\text{H}_5\text{O}_2$ B) $\text{C}_3\text{H}_4\text{O}_3$ C) $\text{C}_2\text{H}_6\text{O}$ D) CH_2O
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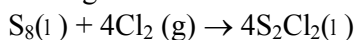
6. How many grams of water could be made of 3.0 mol of H_2 and 3.0 mol of O_2 ? (Help: you need to write and balance the reaction equation).

- A) 108 B) 81 C) 54 D) 6
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7. How many grams of sulfur are contained in 6.0 g of $\text{Fe}_2(\text{SO}_4)_3$?

- A) 2.46 B) 2.12 C) 1.87 D) 1.44
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8. What is the theoretical yield of disulfide chloride S_2Cl_2 in grams when 4.06 g of S_8 are heated with 6.24 g of Cl_2 according to.

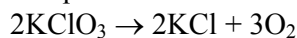


- A) 7.45 B) 8.55 C) 9.37 D) 6.85
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9. The root-mean-square speed of a gas molecule at 25°C is 515 m/s. This gas is most likely:

- A) Cl_2 B) O_2 C) N_2 D) CO_2
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10. What mass of KClO_3 (in grams) must be decomposed to produce 126 L of O_2 at 133°C and 0.88 atm? The balanced reaction equation is:



- A) 272 B) 320 C) 385 D) 408
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11. A sample of carbon monoxide (CO) gas was collected in a 2.0 L flask by displacing water at 28°C and 810 mmHg. Calculate the number of CO molecules in the flask. (The vapor pressure of water at 28°C is 28.3 mmHg).

A) 3.4×10^{22} B) 4.0×10^{22}
C) 4.3×10^{22} D) 5.0×10^{22}

12. The molar mass of a certain gas whose density is 9.2 g/L at 36°C and 2.88 atm (in g/mol) is:

A) 72.0 B) 81.0 C) 92.0 D) 44.0

13. A sample of N₂ gas has a volume of 32.4 L at 20°C and 740 torr. The gas was heated to 120°C while its pressure was reduced to 620 torr. Calculate the final volume of N₂ in L.

A) 70.3 B) 65.8 C) 60.7 D) 51.9

14. Deviations from the ideal gas law are greater at:

A) Low temperatures and low pressures
B) Low temperatures and high pressures
C) High temperatures and high pressures
D) High temperatures and low pressures

15. A mixture of 1.27 mol CO₂, 3.04 mol N₂ and 1.5 mol Ar has a total pressure of 2.0 atm. What is the partial pressure of Ar in mmHg unit?

A) 332 B) 361 C) 392 D) 428

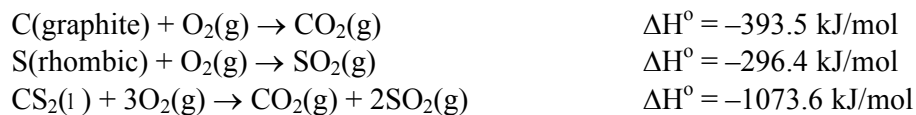
16. The constant "a" that appears in the Van der Waals equation for the "real gas" corrects for:

A) The attractive forces between gas molecules
B) The average speed of the gas molecules
C) The volume occupied by the gas molecules
D) None of the above

17. A stainless steel ball having a mass of 30.0 g at 180°C is placed in 120 g of water at 20°C. If the specific heat of steel ball is 0.474 J/g °C and that of water is 4.184 J/g °C. Calculate the final temperature of water in °C. (Assume that no heat is lost to the surroundings).

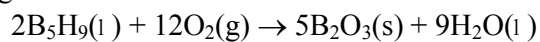
A) 27.5 B) 26.2 C) 24.4 D) 23.6

18. Calculate ΔH_f° of carbon disulfide CS₂(l) given that:



A) -90.4 B) +92.6 C) -85.7 D) +87.3

19. Giving the following combustion reaction:



Calculate the kilojoules of heat released when 100 g of B_5H_9 are completely reacted with enough oxygen, knowing that $\Delta H_f^\circ \text{B}_5\text{H}_9 = 73.2 \text{ kJ/mol}$, and $\Delta H_f^\circ \text{B}_2\text{O}_3 = -1263.6 \text{ kJ/mol}$ and $\Delta H_f^\circ \text{H}_2\text{O} = -285.8$

- A) -7158 B) -7986 C) -8487 D) -9036
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20. Which one of the following reactions occurring at 25°C does the symbol $\Delta H_f^\circ [\text{H}_2\text{SO}_4(\text{l})]$ refer to:

- A) $\text{H}_2(\text{g}) + \text{S}(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{H}_2\text{SO}_4(\text{l})$
B) $\text{H}_2(\text{g}) + \text{S}(\text{s}) + 2\text{O}_2(\text{g}) \rightarrow \text{H}_2\text{SO}_4(\text{l})$
C) $\text{H}_2(\text{g}) + \text{S}(\text{g}) + 4\text{O}(\text{g}) \rightarrow \text{H}_2\text{SO}_4(\text{l})$
D) $\text{H}_2(\text{g}) + \text{S}(\text{s}) + 4\text{O}(\text{g}) \rightarrow \text{H}_2\text{SO}_4(\text{l})$
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