

A

Multiple Choice

1) The mass (in g) of 9.57×10^{22} atoms of platinum "Pt" is:

- ☐ A) 27 B) 33 C) 29 D) 29

2) The number of moles of table sugar " $C_{12}H_{22}O_{11}$ " in 2.5×10^3 g of pure table sugar are:

- ☐ A) 7.1 B) 7.7 C) 7.5 D) 7.3

3) The number of phosphorous "P" atoms in 6.15 g of the laundry water softener " $Na_5P_3O_{10}$ " are:

- ☐ A) 4.0×10^{22} B) 3.0×10^{22} C) 4.0×10^{22} D) 5.0×10^{22}

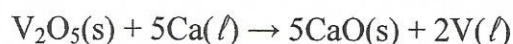
4) The percent by mass of vanadium "V" in its ore vanadinite " $Pb_5(VO_4)_3Cl$ " is:

- ☐ A) 10.79% B) 14.49% C) 13.29% D) 11.88%

5) The empirical formula of an organic compound that has the percentage composition of 40.68% C, 5.12% H and 54.2% O is:

- ☐ A) $C_3H_5O_2$ B) $C_2H_3O_2$ C) CH_2O D) $C_3H_4O_3$

6) According to:



The maximum mass (in g) of vanadium "V" metal that could be obtained by the reduction of 116.1 g of vanadium pentoxide " V_2O_5 " by an excess amount of calcium "Ca" is:

- ☐ A) 69 B) 63 C) 65 D) 67

7) Adipic acid " $H_2C_6H_8O_4$ " is used to produce nylon. It is prepared commercially by a controlled reaction between cyclohexane " C_6H_{12} " and oxygen gas " O_2 " according to:



If 370.0 g of cyclohexane are allowed to react with 370.0 g of oxygen, the theoretical yield (in g) of adipic acid is.

- ☐ A) 675.9 B) 625.4 C) 633.6 D) 642.5

8) Synthetic natural gas " CH_4 " can be made by the reaction of hydrogen gas " H_2 " with carbon monoxide gas " CO " according to:



If 150 g of H_2 gas are allowed to react with an excess amount of CO gas and 370 g of CH_4 are produced, the percentage yield of CH_4 gas is:

- ☐ A) 93% B) 87% C) 89% D) 91%

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- 9) The volume (in mL) of water required to dilute 220 mL of 1.75 M HCl to exactly 1.25 M is:
- ☐ A) 80 B) 88 C) 85 D) 83
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- 10) The molality (m) of an aqueous solution that is 18% by mass phosphoric acid " H_3PO_4 " is:
- ☐ A) 2.43 m B) 2.11 m C) 2.24 m D) 2.37 m
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- 11) The volume of a sample of an ideal gas measured at STP (at 1.0 atm and 0°C) is 5.21 L. This same sample of gas will occupy at a pressure of 490 torr and a temperature of 200°C a volume (in L) equals to:
- ☐ A) 8 B) 14 C) 12 D) 10
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- 12) The mass (in g) of oxygen gas " O_2 " that occupies 25.0 L at a pressure of 1.5 atm and a temperature of 19°C is.
- ☐ A) 50 B) 40 C) 43 D) 47
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- 13) If 5.0 g of a gas occupies 2.5 L at a pressure of 0.8 atm and a temperature of 39°C . This gas is most likely:
- ☐ A) H_2S B) Br_2 C) SO_2 D) CO_2
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- 14) 30.0 g of each of the three inert gases helium " He ", neon " Ne " and argon " Ar " are introduced together in a 50.0 L gas cylinder. The correct choice regarding the partial pressure of each of the three gases inside the cylinder is:
- ☐ A) The partial pressures of the three gases are equal.
B) The partial pressure of He gas is the greatest.
C) The partial pressure of Ne gas is the greatest.
D) The partial pressure of Ar gas is the greatest.
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- 15) Assuming ideal behavior, the average kinetic energy of molecules of samples of different gases differ only if:
- 1- The masses of the gases molecules differ.
2- The sizes of the gases molecules differ.
3- The temperatures of the gases samples differ.
4- The pressures of the gases samples differ.
- ☐ A) 3, 4 B) 1, 2 C) 2 only D) 3 only
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