

PASSAGE

Three students reacted Xe and F₂ in different experiments under different conditions. All obtained compounds having the general formula XeF_n.

XeF_n on reaction with H₂ gave Xe gas and HF acid. HF thus produced can be determined by titration with NaOH. Following is the table giving details.

	Xe	Volume of 2M NaOH used for HF
Student 1	224 ml at STP	30 ml
Student 2	1.31 g Xe	20 ml
Student 3	3.015×10^{21} atoms	10 ml

- Q.1** What formula of XeF_n obtained by student 2 :
(A) XeF₂ (B) XeF₄ (C) XeF₆ (D) None
- Q.2** Which student obtained compound XeF_n having highest % of F among all students-
(A) Student 1 (B) Student 2
(C) Student 3 (D) All have the same
- Q.3** What is the highest value of 'n' in XeF_n in all experiments-
(A) n = 2 (B) n = 3 (C) n = 6 (D) n = 8
- Q.4** If instead of NaOH Ba(OH)₂ is used as a base what volume of 1M base strength student 2 would have used-
(A) 20 ml (B) 40 ml
(C) 60 ml (D) Cannot be calculated
- Q.5** What is the value 'n' if student 2 weighs 9.03×10^{20} molecules of XeF_n have a mass of 0.311 g
(A) 2 (B) 4 (C) 6 (D) 8
- Q.6** Compound has 15% C, 42% H, 30% N. Which of the following is correct-
(A) From above data both molecular formula and empirical formula can be calculated.
(B) From above data only molecular weight can be calculated.
(C) Compound should have an empirical formula C_xH_yN_z.
(D) A student claims he has two compounds 'X' and 'Y' which satisfy above data.

NEXT QUESTIONS ARE NOT BASED ON ANY PASSAGE

- Q.7** An organic compound that has the empirical formula CHO has a relative atomic mass of 145 amu. Its molecular formula is-
(A) C₂H₂O₂ (B) C₃H₃O₃
(C) C₄H₄O₄ (D) C₅H₅O₅
(E) C₆H₆O₆

- Q.8** There is a series of nitrogen oxides with the general formula N_xO_y. What is the empirical formula of one that contains 36.85% nitrogen?
(A) N₂O (B) NO
(C) NO₂ (D) N₂O₃ (E) N₂O₅
- Q.9** Fumaric acid, which occurs in many plants, contains, by mass, 41.4% carbon, 3.47% hydrogen and 55.1% oxygen. A 0.050 mol sample of this compound weighs 5.80 g. The molecular formula of this compound is (3.63, 3.64, 3.93)
(A) CHO (B) C₃H₃O
(C) C₃H₃O₃ (D) C₄H₄O₄ (E) C₆H₆O₆
- Q.10** An oxide of lead contains 90.65% Pb by weight. Determine its empirical formula (AW of Pb is 207.2)
(A) Pb₃O₄ (B) PbO₂
(C) Pb₂O₃ (D) PbO
(E) None of the above
- Q.11** An unknown hydrocarbon compound, C_xH_y, is analyzed by burning it in oxygen gas and quantitatively trapping the resultant CO₂. If 15.3 mg of the compound produces 42.1 mg of CO₂ calculate the percent C in the sample-
(A) 66.5% (B) 75.2%
(C) 84.5% (D) 27.2%
- Q.12** One of the intermediates in the setting of cement is the formation of hydrated aluminosulfates such as the mineral ettringite, Ca_xAl₂(OH)₁₂(SO₄)₃·26H₂O. Considering that this is a neutral compound overall, determine the value of x in the preceding formula-
(A) 2 (B) 3 (C) 5 (D) 6
- Q.13** Examine the condensed structural formulas or molecular formulas shown below :
Acetic acid (in vinegar), CH₃COOH
Ethylene glycol (in antifreeze), HOCH₂CH₂OH
2-Propanol (in rubbing alcohol), CH₃CHOHCH₃
Vitamin C, C₆H₈O₆
In which of these is the empirical formula the same as the molecular formula ?
(A) CH₃COOH (B) HOCH₂CH₂OH
(C) CH₃CHOHCH₃ (D) C₆H₈O₆
- Q.14** The characteristic odor of pineapple is due to ethyl butyrate, a compound containing carbon, hydrogen, and oxygen. Combustion of 2.78 mg of ethyl butyrate produces 6.32 mg of CO₂ and 2.58 mg of H₂O. What is the empirical formula of the compound ?
(A) CH₂OP (B) C₂H₂O
(C) C₂H₅O₂ (D) C₃H₆O

CHEMISTRY IIT JEE (CLASS TEST - 1) ANSWER KEY

Name : Roll No. :

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