2.4 MOLE CONCEPT

Basics

1. What is the atomic mass of carbon?
   a. 6 amu b. 12 g c. 12 kg d. 12 amu
2. Co represents
   a. One atom of cobalt
   b. One molecule of carbon monoxide
   c. Both a and b
   d. None of these
3. 2 H represents:
   a. One molecule of hydrogen b. Two atoms of hydrogen c. Both d. None
4. The number of moles of atoms in 1 mole of $Ca_3(PO_4)_2$ is
   a. 1 b. 2 c. 3 d. 13
5. If the volume of a gas is compressed to half, how many moles of gas will remain in the vessel?
   a. Little more than half b. Double c. Half d. Same
6. A mole is
   a) Unit of the quantity of matter c. Amount of particle
   b) Total Mass of the particle d. Volume of particle
7. A mole of Neon contains 6.02×10^{23} _____.
   a. formula units b. atoms c. molecules d. ions
8. The number of particles in 1 mole is
   a. 6.11×10^{-23} b. 6.023×10^{-23} c. 6.023×10^{23} d. 6.67×10^{-11}
9. What is the volume in litres of 1 mole of a gas at STP?
   a. 6.023×10^{-23} b. 6.023×10^{23} c. 22.4 d. 1

Gram atoms and gram molecules

10. The masses of 1 gram atom of each of Na and P are, respectively
    (a) 23 g and 32 grams (c) 32 g and 23g b) 1 g and 1g (d) 23 g and 31 grams
11. How many gram molecules are there in 28 grams of CO_2?
    a) 2.167 b) 1.000 c) 2.333 d) 0.636
12. Which of the following is a correct match:

I.	2 gram atoms of H	A. 36 grams	
II.	3 gram atoms of C	B. 53 grams	
III.	0.5 gram molecules of Na_2CO_3	C. 1 gram	
IV.	5 gram molecules of oxygen	D. 2 grams	

a. I-A, II-D, IV-C, III-B *c. A-II, D-I, B-III*
b. I-C, II-A, III-B d. III-B, I-D, IV-C, II-A

13. Which of the following is the correct match

i.	*5 gram atoms of H*	*A. 32 g*	
ii.	*1 gram atoms of S*	*B. 12 g*	
iii.	*16 moles of H_2*	*C. 5 g*	

a. i=A, ii=C, iii=B *c. A=ii, B=iii, C=i*
b. i=C, ii=B, iii=A *d. i=C, ii=A, iii= A*

Mass and Moles

14. What is the mass of 4 moles of H_2SO_4?
    a. 4 g *b. 392 g* *c. 196g* *d. 98 g*
15. What is the mass in grams of 2 moles of NaCl?
    a) 57 g b) 117g c) 58.5g d) 106g
16. The mass of 0.1 moles of CH_4 is
    a. 1.6 g *b. 16g* *c. 1.6g* *d. 0.1 g*
17. The number of moles of H_2SO_4 present in 4.9 g of H_2SO_4 is:
    a) 0.5 mole b) 0.1 mole c) 2 mole d) 0.05 mole
18. The number of moles in 2.0 g of sodium hydroxide is:
    a. 0.25 mole b. 5.0 mole c. 0.05 mole d. 2.5 mole
19. What is the number of moles of molecules in 90 g of water
    a. 90 *b. 6.023 x 10^{23}* *c. 1* *d. 5*
20. How many moles of hydrogen molecules are contained in 6 grams of it?
    a) 6 x 6.023 x 10^{23} c) 3x 6.023 x 10^{23} d) 6 b) 3

Volume of Gas and Moles

21. What number of moles are contained in 67.2 litres of SO_2 gas at NTP?
    a) **3** b) 192 c) 64 d) 67.2

Number of Particles and Moles

22. What is the number of moles of 12.046 x 10^{22} molecules of O_2 at NTP?
    a. 2.24 *b) 22.4* *c) 0.2* *d) 0.5*
23. The number of PH_3 molecules in 8.5g of phosphine is approximately:
    A) 1×10^{23} B) 1.5×10^{23} C) 2×10^{23} D) 2.5×10^{23}

Mass and Volume

24. 2 g of O_2 at NTP has volume:
    a. 1.4 liter b. 2.8 liter c. 8 litre d. 11.2 liter
25. The volume of 4.4g of CO_2 at STP is
    a. 2.24 litres b. 4.48 litres c. 22.4 litres d. 44.8 litres

Number of Particles and Mass

26. Which of the following has the highest number of molecules?
    a. 4 g of Hydrogen b. 16 g of Oxygen c. 44 g of CO_2 d. 64 g of SO_2
27. Which of these has the same number of atoms as 6 g of carbon?
    a. 1 g of H b. 16g of O c. 19 g of F d. 20g of Ca
28. The absolute mass of an atom of sodium is
    a. 23 amu *b. 23 grams* *c. 3.82 x 10^{-23} g* *d. 1.82 x 10^{-23} grams*
29. The mass of 1 atom of Hydrogen is
    a) 1.008 g b) 1.008 c)1.008/N_A g d) 2.016 amu
30. Which has the highest mass?
    a. 50 g of Fe b. 5 moles of N_2 c. 0.1 g atom of Ag d. 10^{23} atom of carbon

31. Which contains the greatest no. of molecules?
    a. 1 mole of carbon dioxide b. 4 g of hydrogen
    c. 33.6 litre of oxygen at STP d. 6 g of helium

Putting all the concepts together

32. Which of the following contains the smallest no. of CO_2 molecules?
    a. 0.1 mole b. 11.2 litre at NTP c. 22 g d. 22.4×10^3 ml at NTP
33. Which of the following represents 1 mole of a substance
    a. 1 gram of hydrogen molecules d. 16 grams of oxygen molecules
    b. 22.4 litres of H_2O at NTP c. 22.4 litres of CO_2 at NTP

Particles Inside particles

34. 4.5 moles of ethyne (C_2H_2) contains
    a. 9 g of hydrogen c. 18 g of hydrogen b. 27 g of hydrogen d. 4.5 g of Hydrogen
35. How many moles of oxygen atoms are there in 88 grams of CO_2?
    a. 2 moles b) 4 moles c) 1.5 moles d) 8 moles
36. The total number of protons in 10 g of $CaCO_3$ is
    a. 3.01×10^{24} b. 4.06×10^{24} c. 2.01×10^{24} d. 3.02×10^{24}
37. How many electrons are there in 300 g of ammonium carbonate?
    a. 9.78×10^{25} c. 6.032×10^{23} b. 7.89×10^{32} d. 13.45×10^{28}

Miscellaneous

38. 100 g of oxygen gas contains as many molecules as in
    a. 100 g of H_2 b. 1 gram of H_2 c. 100 moles of H_2 d. 6.25g of H_2
39. What mass of CO_2 has the same no. of atoms as present in 180 g of H_2O?
    *a. 44 g **c.** 440g d. 44kg c. 22.4g*
40. Assuming the density of water to be 1 gm/cc, the volume occupied by one molecule of water is
    a. 2.98×10^{-23} cc d. 2.98×10^{23} cc 6.02×10^{23} cc c. 6.02×10^{-23} cc
41. The number of water molecules in a drop of water (volume = 0.0018ml, density = 1 g/ml) at room temperature is:
    a. 6.023×10^{19} c. 1.084×10^{18} b. 4.84×10^{17} d. 6.023×10^{23}
42. If the density of water is 1 g /cc, the volume occupied by 1 molecule of water is:
    a. 2.98×10^{23} cc d. 2.98×10^{-23} cc b. 6.023×10^{-23} cc c. 6.022×10^{23} cc

Reaction Based Calculations

43. 6 gm of carbon is completely burnt in excess of oxygen. The volume of Carbon dioxide formed at STP is
    a. 5.6 l b. 8.0 l c. 11.2 l d. 16.2 l
44. The mass of oxygen required for the complete combustion of 1 mole of butane is
    a. 416 g b. 208 g c. 13 g d. 6.5 g
45. What quantity of limestone ($CaCO_3$), on heating, will give 56 kg of CaO?
    a. 10 kg b. 56 kg c. 44 kg d. 100 kg

46. In the balanced chemical equation: $Na_2CO_3 + 2\ HCl \rightarrow 2\ NaCl + H_2O + CO_2$;
    1 mole of Na_2CO_3 consumes 2 moles of HCl. How many CO_2 molecules will be produced?
    a) 6.023×10^{23} b. 6.023×10^{24} c. $2\times6.023\times10^{23}$ d. $(6.023\times10^{23})/2$
47. 12 g of Mg reacts completely with an acid to give:
    a. One mol of H_2 b. Half a mole of H_2 c. One mol of O_2 d. None of these
48. Molar mass of ammonia is:
    a. 17 g b. 17 amu c. 17 n d. none of these
49. How much volume of oxygen at STP in litres is required to burn 4 g of methane gas completely?
    a. 11.2 b. 5.6 c. 2.8 d. 8
50. 6 g of Carbon is completely burnt in a large excess of oxygen. The volume in litres of CO_2 formed at STP is:
    a. 5.6 b. 8.0 c. 11.2 d. 16.2

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