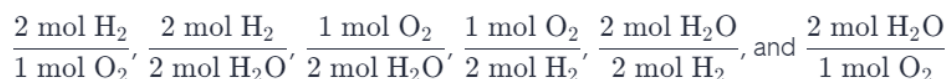
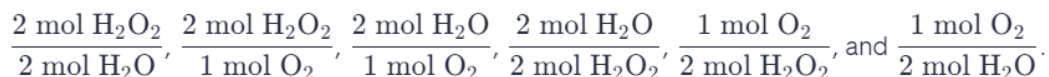


4.7-4.57, 4.59

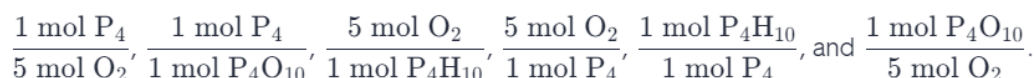
PART A:



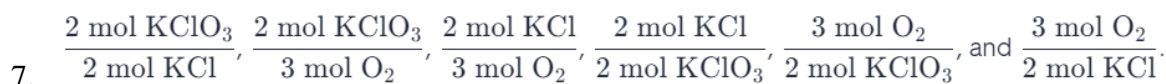
PART B:



PART C:



PART D:



PART B: 25 molecule S_8



10. (A) 11 mol O_2 ; (B) 3.8 mol O_2 ; (C) 3.8 mol O_2 ; (D) 3.8 mol O_2 ; (E) 15 mol O_2

11. 11.3 mol O_2

12. 453 mol H_2

13. (A) 13 mol CS_2 ; (B) 3.6 mol SO_2 ; (C) 4.9 mol NO_2 ; (D) 2.6×10^{-3} mol H_2O



PART B: 1.400 mol O_2



15. (A) 3.6 g C_2H_6 ; (B) 3.67 g S_2Cl_2 ; (C) 2.5 mg HCl ; (D) 12 kg B_2O_3

16. 12.7 g Cl_2 ; 0.179 mol FeCl_2 ; 22.7 g FeCl_2

17. 3.2 g Cl_2

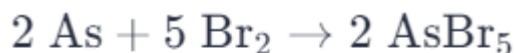
18. C_2H_6

19. 0.883 metric ton C; 5.48 metric ton Fe

20. 99.4 g O_2

21. 0.91 kg N₂

22. 7.3 mol O₂



23. 24 mol Br₂

24. 0 mol CaO remains; 0.193 mol NH₄Cl remains; 3.99 mol NH₃ is produced; 2.00 mol H₂O is produced; 2.00 mol CaCl₂ is produced

25. Yes

26. 1.40 kg Fe

27. 5.88 g SO₂

28. 26.6 kg NO

29. 791 g Al₂(SO₄)₃

30. 3.15 g NO

31. 3.3 kg HNO₃

32. 190. mL H₂O

33. C is the excess reactant; 11.5 g C remains

34. Theoretical yield is the hypothetical maximum amount of product that can be obtained in a chemical reaction under ideal conditions.

35. The temperature of the reaction, the possibility of side reactions, the reaction itself not proceeding to completion, and further reaction of the product to form something else are events that happen in chemical reactions that lead to percentage yields of less than 100%.

36. Percentage yields greater than 100% are common occurrences when solvent molecules have not been evaporated completely from a solution.

37. Reaction 1: 36.6% yield; reaction 2: 1.3% yield; reaction 3: 34% yield; reaction 4: 103% yield

38. 13 mg

39. 88% yield

40. 941 g Fe

41. 1.5×10^2 g S

42. 18% yield

43. 66.5% yield

44. 84.4% yield

45. 79% yield

46. 36.8% yield

PART A: 6.0×10^3 kg SiO₂ and 3.6×10^3 kg SiO₂

PART B: 0.78 $\frac{\text{metric ton coal}}{\text{metric ton sand}}$

47.

48. 1.1×10^4 kg Ca₅(PO₄)₃F

49. 0.302 g H₂



50. 114 mL HCl
51. An indicator is a dye added to a titration that shows when a reaction is complete.
52. 44.6 mL HCl
53. 22.9 mL NaOH
54. 0.126 M HNO₃
55. 3.61 g N₂H₄
56. 1.3×10^3
57. (A) 7.62×10^{-3} M H₂SO₄; (B) 50.1 g CuFeS₂; (C) 2.2%
- 58.
59. 2.27 g H₂