TYPES OF CONCENTRATION

Percent Concentration

1. 80% of a solution by mass contains equal mole number of water and X solid. According to this, what is the atomic weight of X?

A. 54 B. 72 C. 63 D. 36

2. 0.4 mol of solid NaOH is dissolved in water to prepare a solution that is 20% NaOH by mass.How many grams of water is used? (NaOH =40 g/mol)

A. 16 B. 32 C. 64 D. 80

3. How many grams of the salt must be added to a 200 g of 10% solution to obtain a 40% solution?

A. 50 B. 80 C. 100 D. 120

4. What is the percentage concentration of the saturated solution of a salt whose solubility is 60 g/100 g H_2O at 20°C?

A. 37.5 B. 40 C. 60 D. 62.5

5. How many cm^3 water must be added to an 8% acetic acid solution to prepare a 240 cm^3 of 2% acetic acid solution by volume?

A. 180 B. 15 C. 120 D. 90

6. How many grams of water must be evaporated from 1 kg of 5% table salt solution to make its percentage concentration equal to 20% by mass?

A. 250 B. 300 C. 500 D. 750

7. A solution has density of 1.2 g/cm^3 and contains 40 % NaCl by mass. How many grams of NaCl are there in 500 ml of this solution?

A. 120 B. 200 C. 240 D. 400

8. What is the percentage concentration of NaCl solution by mass by mixing 100 g of 25% NaCl, 60 g of 15% NaCl, 60 g of NaCl and 24 g of water?

A. 15 B. 38.5 C. 22 D. 25

9. At 50°C, when 80 grams of saturated solution is frozen to 30 °C, 15 grams salt precipitates. What is the solubility (gram/100 gram water) at 30°C?

A. 15 B. 30 C. 45 D. 20

10. What mass in kg of a 20% solution of KOH must be added to 1 kg of a 50% solution to obtain 25% solution?

A. 3 B. 5 C. 4 D. 2

11.10 mole of H_2SO_4 are used to prepare 1000 mL of 49% H_2SO_4 solution by mass. What is the density of the solution? (H_2SO_4=98)

A. 1 B. 2 C. 3 D. 4

Molarity

12. What is the volume of 0,4M solution prepared by using 14.8 gram Ca(OH)2? ($Ca(OH)_2$ = 74)

A.500 B. 100 C. 200 D.400

13. What is the molarity of 50 ml Ba $(NO_3)_2$ solution prepared by using 3,01x10^{23} Ba$(NO_3)_2$ molecules?

A. 0.01 B. 0.1 C. 1 D. 0.2

14. If equal volumes of 0,2 M $(NH_4)_2$ SO_4 and 0,4 M $(NH_4)_3PO_4$ solution are mixed what will be NH_4^+ concentration?

A. 1.2 B. 0.6 C. 0.8 D. 1

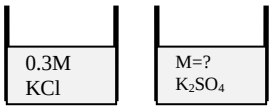
15. What is the final Na^+ concentration after mixing 200ml 2M NaCl solution with 300 ml 3M Na_2SO_4 solution?

A. 2.4 B. 2.6 C. 4.4 D. 3.6

16. What are the volumes of 0.2M and 0.8M of HCl solutions have to be mixed to give 6L and 0.6M solution?

	V_1(0.2M)	V_2 (0.8M)
A.	2	4
B.	3	3
C.	4	2
D.	5	1

17.



The solutions given above with same volumes are mixed with each other. If the concentration of K^+ ions in the resulting solution is 0.3M what is the concentration of K_2SO_4 at initial?

A. 0.1 B. 0.15 C. 0.3 D. 0.45

18. 400mL water is added to 0.3M of $Ca(NO_3)_2$ solution. If the concentration of NO_3^- is 0.2M in the resulting solution. What is the volume of $Ca(NO_3)_2$ in ml at initial?

A. 100 B. 133 C. 200 D. 266

19. 0.1 mol of each NaCl, Na_2SO_4 and Na_3PO_4 dissolved in water to make 1 L solution. What is the molarity of Na^{+1} ion in the solution ?
A. 0.6 B. 0.4 C. 0.3 D. 0.5

20. What should be the molarity of HCl solution , if 100 mL HCl solution is used to neutralize 14.8 g of $Ca(OH)_2$? ($Ca(OH)_2$ = 74 g/mol)
$Ca(OH)_2 + 2HCl \rightarrow CaCl_2 + 2H_2O$
A. 1 B. 2 C. 3 D. 4

21.If 500 mL solution is prepared with 17 g of $NaNO_3$ what will the molarity of the solution be? ($NaNO_3$=85 g/ mol)
A. 0.1 B. 0.2 C. 0.3 D. 0.4

22. 2M 300 ml $MgCl_2$ solution is vaporized until the volume becomes 100ml. What is the concentration of Cl ions in the final solution?
A. 3 B. 4,5 C. 6 D. 12

23. 11.4 g of $Ca(OH)_2$ and NaOH mixture can be neutralized by 0.3M of 1000 mL of HCl solution. What is the percentage concentration of NaOH by mass in the mixture? (Na: 23, O: 16, H: 1 Ca: 40)
A. 23 B. 30 C. 35 D. 53

24. A 100 mL of 10 % NH_3 solution that has a density 0.85 g/mL is diluted to 1000 mL. Which is the molarity of NH_3 in the resulting solution?(NH_3 =17)
A.0.5 B. 2.5 C. 1.5 D. 1

25. If 200 mL water is evaporated from 500mL Of 0.3 M solution, what will the molarity be?
A. 0.25 B. 0.5 C. 0.75 D. 1

26. The concentration of NO_3^{-1} ions is 0.6 M in 500 mL $Fe(NO_3)_3$ solution. For this solution,
I . The concentration of Fe^{+3} ion is 0.2M
II. 0.1 mol of $Fe(NO_3)_3$ is dissolved in water.
III. There are 0.2 mol of Fe^{+3} and 0.3 mol of NO_3^{-1} ions in it.
Which of the above statements is /are true?
A. I B. II C. I and III D. I and II

27. How many mililites of 0.1 M H_2SO_4 solution must be added to neutralize 80 g of NaOH solution that is 30% NaOH by mass? (NaOH = 40 g/mol)
$H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$
A. 300 B. 200 C. 600 D. 500

28.100 mL of 6 M HCl solution is diluted to 600 mL. What is the molar concentration of final solution?
A. 0.5 B. 1 C. 1.5 D. 2

29. In what volume ratios should 1 M and 4 M Na_2CO_3 solutions be mixed to obtain 1.5 M Na_2CO_3 solution?
A. 5/1 B. 1/5 C. 1/3 D. 3/1

30. How many ml of 3M H_2SO_4 are required to neutralize 2M 300ml NaOH solution?
A. 50 B. 100 C. 150 D. 200

31. When 20 grams of CaX_2 is used to prepare 200 mL of a solution, the molarity of X^- is found to be 1 M. What is the atomic mass of the X? (Ca: 40)
A. 20 B. 35 C. 80 D. 160

32. Equal volumes of 1 M KNO_3, 4 M $Pb(NO_3)_2$ and 6 M $Fe(NO_3)_3$ solutions are mixed. What is the molar concentration of NO_3^- in the resulting solution?
A. 9 B. 6 C. 4 D. 3

33. 200 ml H_2SO_4 is used to dissolve 10,8 gram Al. What is the molarity of [H+] ions of H_2SO_4? (AI:27)
A. 1.5 B. 3 C. 4.5 D. 6

34. 100 mL of 4M solution is diluted to 200 mL. What is the molarity of new solution?
A. 2.5 B. 0.5 C. 2 D. 1.8

35. A known volume of water is added to a 100 mL of 0.4M $Fe(NO_3)_3$ solution. If the molarity of NO_3^- ions in the resulting solution is 0.2M, what is the volume of the water added in mL?
A. 100 B. 200 C. 500 D. 400

36. 500 cm^3 of a solution is prepared by 16.4 g of $X(NO_3)_2$. If the molar concentrations of ions in the solution is 0.6 totally, what is the atomic weight of X? (N: 14, O: 16)
A. 32 B. 24 C. 40 D. 48

37. 400 cm^3 of a solution is prepared by 68.4 g of $Al_2(SO_4)_3$. What is the molar concentration of SO_4^{-2} ions in the solution? ($Al_2(SO_4)_3$:342)
A. 0.5 B. 0.8 C. 1 D. 1.2

38. 200 mL of a solution is prepared by 2.38 g of $CoCl_2.nH_2O$. If the molar concentration of Cl^- ions in the solution is 0.1M, what is n? (Co: 59, Cl: 35.5, H: 1, O: 16)
A. 1 B. 2 C. 3 D. 6

39. 500 mL of a solution is prepared by 0.04 mol of NaCl, 0.02 mol of $AlCl_3$ and $MgCl_2$. If the molar concentration of Cl^- ions in the solution is 0.24M, what is the mole number of $MgCl_2$?
A. 0.01 B. 0.02 C. 0.04 D. 0.09

40. A known volume of water is added to a 100 mL of 0.4M $Fe(NO_3)_3$ solution. If the molarity of NO_3^- ions in the resulting solution is 0.2M, what is the volume of the water added in mL?
A. 100 B. 200 C. 300 D. 400

41. A 300 mL of water is added to a 200 mL of $BaCl_2$ solution. If the molarity of Cl^- ions in the resulting solution is 0.04M, what is the molarity of $BaCl_2$ solution at initial?
A. 0.03 B. 0.05 C. 0.06 D. 0.07

42. What is the molarity of K^+ ions, if the 200 mL of 0.5M KCl and the 300 mL of 0.5M K_2SO_4 solutions are mixed ?
A. 0.5 B. 0.6 C. 0.75 D. 0.8

43. A 200 mL of NH_3 solution is prepared by the reaction of 2.8 g of N_2 with excess H_2. What is the molarity of NH_3 prepared? (N: 14)
A. 0.2 B. 0.4 C. 0.5 D. 1

44. Which one gives the molar concentration of pure alcohol with a density of 0.8 g/cm^3 ? (C_2H_5OH:46)
A. 800 B. 46 C. 0.8x46 D. 1x0.8

45. To calculate the molarity of X solution;
I. Percentage concentration of X in the solution,
II. Atomic weigt of X,
III. Density of the solution
Which one(s) is(are) must be given above?
A. I only B. II only
C. III only D. I and II

46. Which 0.4M KCl and 0.6M K_2SO_4 solutions are mixed, the concentration of K^+ion is 0.6 M and the volume is 400ml . What is the initial volume of K_2SO_4 solution?
A.50 B.100 C.150 D.200

47. How many ions are there in a 500 mL of 0.5M NaCl solution?
A. $1.5x10^{23}$ B. $3.01x10^{23}$
C. $6.02x10^{23}$ D. $1.2x10^{24}$

48. The concentration of Br ion of 200ml solution is 2M by using 80 gram XBr_2 salt. What is the atomic mass of X ? (Br : 80)
A. 10 B. 20 C. 40 D. 160

49. A 500 mL of NaOH solution is used to dissolve 5.4 g Al . What is the molarity of NaOH solution used ? (Al : 27)
A. 0.6 B. 1.2 C. 2.4 D. 3

50. In order to dissolve 3.6 gram of Mg. How many ml of H_2SO_4 of which the concentration of H^+ ion is 2M must be used? (Mg:24)
A. 150 B. 75 C. 50 D. 300

51. To neutralize a 200 mL of 0.4M H_2SO_4 solution, 64 g NaOH are used. What is the percentage concentration of NaOH solution ?
A. 80 B. 10 C. 20 D. 30

52. How many mL of pure water must be added to 100 mL of 0.6 M H_2SO_4 solution to make a solution in which the molarity of H^+ ion is 0.6M ?
A. 100 B. 150 C. 200 D. 300

53. How many mL of H_2SO_4 solution in which the molarity of H^+ ion is 3M must be added to excess Al to produce 33.6 L H_2 at STP ?
A. 250 B. 500 C. 750 D. 1000

54. A 40 mL of 20% NaOH solution by mass is used to neutralize 300 mL of 0.4M H_2SO_4 solution. What is the density of base solution in g/mL?
A. 1 B. 1.2 C. 2 D. 2.4

55. How many grams of Na can be dissolved in 250 mL of H_2SO_4 solution in which the molarity of H^+ ion is 2M ? (Na: 23)
A. 23 B. 11.5 C. 5.75 D. 46

56. How many grams of $CaBr_2$ would be dissolved to prepare a 300 mL of $CaBr_2$ solution in which the molarity of Br^- ion is 2M? (Ca: 40, Br: 80)
A. 60 B. 120 C. 30 D. 15

57. 2L of a solution is prepared by same moles of $Al(NO_3)_3$ and $Mg(NO_3)_2$. If NO^-_3 ion concentration of the solution is 3.5M, what would be the mole number of $Al(NO_3)_3$?
A. 0.7 B. 1.5 C. 2 D. 2.8

58. How many moles of H_2 gas is produced, when 13 g of Zn reacted with a 100 mL of 2M HCl solution?
(Zn: 65)
A. 0.2 B. 0.1 C. 0.4 D. 0.3