16. A sugar syrup of weight $214.2\,g$ contains $34.2\,g$ of sugar $\left(C_{12}H_{22}O_{11}\right)$. Calculate (i) molal concentration and (ii) mole fraction of sugar in syrup. **(1988)**

17. Calculate the molality of $1.0\,L$ solution of 93% H_2SO_4, (weight/volume). The density of the solution is $1.84\,g\,/\,mL$. **(1990)**

18. A solid mixture $\left(5.0\,g\right)$ consisting of lead nitrate and sodium nitrate was heated below 600°C until the weight of the residue was constant. If the loss in weight is 28.0 per cent, find the amount of lead nitrate and sodium nitrate in the mixture. ▶**(1990)**

19. The weight of 1×10^{22} molecules of $CuSO_4\cdot 5H_2O$ is _____. **(1991)**

20. $8.0575\times10^{-2}\,kg$ of Glauber's salt is dissolved in water to obtain $1\,dm^3$ of solution of density $1077.2\,kg\,m^{-3}$. Calculate the molality, molarity and mole fraction of Na_2SO_4 in solution. **(1994)**

21. A plant virus is found to consists of uniform cylindrical particles of $150\,Å$ in diameter and $5000\,Å$ long. The specific volume of the virus is $0.75\,cm^3\,/\,g$. If the virus is considered to be a single particle, find its molar mass. **(1999)**

22. The normality of $0.3\,M$ phosphorus acid (H_3PO_3) is : ▶**(1999)**

(A) 0.1   **(B)** 0.9   **(C)** 0.3   **(D)** 0.6

23. How many moles of electrons weigh $1\,kg$? ▶**(2001)**

(A) 6.023×10^{23} **(B)** $\dfrac{1}{9.108}\times10^{31}$ **(C)** $\dfrac{6.023}{9.108}\times10^{54}$ **(D)** $\dfrac{1}{9.108\times6.023}\times10^{8}$

24. An aqueous solution of $6.3\,g$ oxalic acid dihydrate is made up to 250 mL. The volume of 0.1 N NaOH required to completely neutralize 10 mL of this solution is : ▶**(2001)**

(A) 40 mL   **(B)** 20 mL   **(C)** 10 mL   **(D)** 4 mL

25. Which has maximum number of atoms? ▶**(2003)**

(A) 24 g of C (12)   **(B)** 56 g of Fe (56)   **(C)** 27 g of Al (27)   **(D)** 108 g of Ag (108)

26. Find the molarity of water. Given: $\rho = 1000\,kg\,/\,m^3$ **(2003)**

27. Dissolving 120 g of urea (MW = 60) in 1000 g of water gave a solution of density $1.15\,g\,mL^{-1}$. The molarity of solution is: ▶**(2011)**

(A) 1.78 M   **(B)** 2.00 M   **(C)** 2.05 M   **(D)** 2.22 M

28. 29.2% (w/W) HCl stock solution has density of $1.25\,g\,mL^{-1}$. The molecular weight of HCl is $36.5\,g\,mol^{-1}$. The volume (mL) of stock solution required to prepare a 200 mL solution of 0.4 M HCl is _____. **(2012)**

29. A compound H_2X with molar weight of $80\,g$ is dissolved in solvent having density of $0.4\,g\,mL^{-1}$. Assuming no change in volume upon dissolution, the molality of a 3.2 molar solution is : **(2014)**

30. The mole fraction of a solute in a solution is 0.1. At 298 K, molarity of this solution is the same as its molality. Density of this solution at 298 K is 2.0 g cm^{-3}. The ratio of the molecular weights of the solute and solvent, $\left(\dfrac{MW_{solute}}{MW_{solvent}}\right)$ is_____. **(2016)**