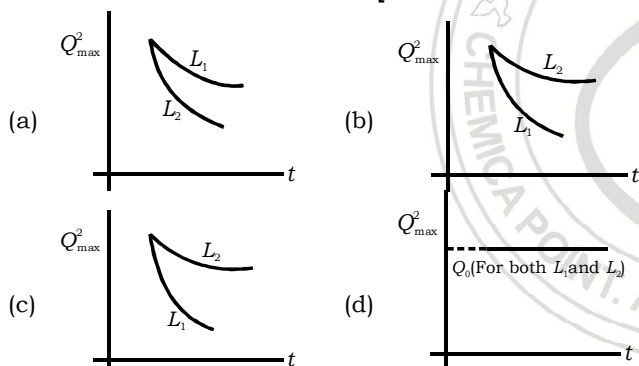


### Single Correct Answer Type

- Given that the abundance of isotopes  $^{54}\text{Fe}$ ,  $^{56}\text{Fe}$ , and  $^{57}\text{Fe}$  is 5%, 90%, and 5%, respectively. The atomic mass of Fe is \_\_\_\_\_ [IIT-JEE 2009]
  - 55.85
  - 55.95
  - 55.75
  - 55.05
- Dissolving 120 g of urea ( $M_w = 60$ ) in 1000 g of water gave a solution of density  $1.15 \text{ g mL}^{-1}$ . The molarity of solution is: [IIT-JEE 2011]
  - 1.78 M
  - 2.00 M
  - 2.05 M
  - 2.22 M
- If a student plots graphs of the square of maximum charge ( $Q_{\text{max}}^2$ ) on the capacitor with time ( $t$ ) for two different values  $L_1$  and  $L_2$  ( $L_1 > L_2$ ) of  $L$  then which of the following represents this graph correctly? (Plots are schematic and not drawn to scale)

[JEE Advanced 2015]



- The molecular formula of a commercial resin used for exchanging ions in water softening is  $\text{C}_8\text{H}_7\text{SO}_3\text{Na}$  (Mol. wt. 206). What would be the maximum uptake of  $\text{Ca}^{2+}$  ions by the resin when expressed in mole per gram resin? [JEE Advanced 2015]
  - $\frac{1}{103}$
  - $\frac{1}{206}$
  - $\frac{2}{309}$
  - $\frac{1}{412}$

### Numerical Value Type

- The value of  $n$  in the molecular formula  $\text{Be}_n\text{Al}_2\text{Si}_6\text{O}_{18}$  is \_\_\_\_\_ [IIT-JEE 2010]
- A student performs a titration with different burettes and finds titre values of 25.2 mL, 25.25 mL, and 25.0 mL. The number of significant figures in the average titre value is \_\_\_\_\_ [IIT-JEE 2010]
- Silver (atomic weight  $108 \text{ g mol}^{-1}$ ) has a density of  $10.5$

$\text{g cm}^{-3}$ . The number of silver atoms on a surface of area  $10^{-12} \text{ m}^2$  can be expressed in scientific notation as  $Y \times 10^{-x}$ , The value of  $x$  is \_\_\_\_\_. [IIT-JEE 2010]

- Among the following, what is the number of elements showing only one non-zero oxidation state? O, Cl, F, N, P, Sn, Tl, Na, Ti [IIT-JEE 2010]
- 29.2 (w/w) HCl stock solution has a density of  $1.25 \text{ g mL}^{-1}$ . The molecular weight of HCl is  $36.5 \text{ g mol}^{-1}$ . The volume (ml) of stock solution required to prepare a 200 mL solution of 0.4 M HCl is \_\_\_\_\_. [IIT-JEE 2012]
- If the value of Avogadro number is  $6.023 \times 10^{23} \text{ mol}^{-1}$  and the value of Boltzmann constant is  $1.380 \times 10^{-23} \text{ JK}^{-1}$ , then the number of significant digits in the calculated value of the universal gas constant is \_\_\_\_\_. [JEE Advanced 2014]
- A compound  $\text{H}_2\text{X}$  with molar weight of  $80 \text{ g}$  is dissolved in a solvent having density of  $0.4 \text{ g mL}^{-1}$ . Assuming no change in volume upon dissolution, the molality of a 3.2 molar solution is \_\_\_\_\_. [JEE Advanced 2014]
- 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  $2.0 \text{ g cm}^{-3}$ . The ratio of the molecular weights of the solute and solvent  $\left(\frac{MW_{\text{solute}}}{MW_{\text{solvent}}}\right)$ , is \_\_\_\_\_. [JEE Advanced 2016]
- The mole fraction of urea in an aqueous urea solution containing 900 g of water is 0.05. If the density of the solution is  $1.2 \text{ g cm}^{-3}$ , the molarity of urea solution is. Given data: Molar masses of urea and water are  $60 \text{ g mol}^{-1}$ , and  $18 \text{ g mol}^{-1}$ , respectively). [JEE Advanced 2019]

### Paragraph for Questions 10 and 11:

Reaction of  $x \text{ g}$  of Sn with HCl quantitatively produced a salt. Entire amount of the salt reacted with  $y \text{ g}$  of nitrobenzene in the presence of required amount of HCl to produce 1.29 g of an organic salt (quantitatively). (Use Molar masses (in  $\text{g mol}^{-1}$ ) of H, C, N, O, Cl and Sn as 1, 12, 14, 16, 35 and 119, respectively).

- The value of  $x$  is \_\_\_\_\_.
- The value of  $y$  is \_\_\_\_\_. [JEE Advanced 2021]

### ANSWER

#### Single Correct Answer Type.

- (b)
- (c)
- (a)
- (d)

#### Numerical Value Type

- (3)
- (3)
- (7)
- (2)
- (8)
- (4)
- (8)
- (9)
- (2.98)
- (3.57)
- (1.23)