1. The expression $K_D = \dfrac{C_1}{C_2}$ where C_1 and C_2 denote the concentration of a solute in two solvents A & B, and K_D is the constant, is called ---------

(a)   equilibrium law   (b) rate law

(c)   Nernst distribution law   (d) none of these

Answer. (c)

2.   For the study of distribution law the two solvents should be

(a)   miscible   (b) non-miscible

(c)   volatile   (d) reacting with each other

Answer. (b)

3.   While studying the distribution law

(a)   the temperature should be constant throughout

(b)   there should be no association or dissociation of the solute

(c)   the concentration of the solute in solvents

(d)   all of the above

Answer. (d)

4.   When a solute undergoes association in one of the solvent, the following expression of distribution law is applicable

(a) $K_D = \dfrac{C_1}{C_2}$ (b) $K_D = \dfrac{C_1}{C_2^2}$

(c) $K_D = \dfrac{C_1}{\sqrt[n]{C_2}}$ (d) $K_D = \dfrac{C_1}{\sqrt{C_2}}$

Answer. (c)

5.   The modified distribution law for the solute undergoing dissociation in one of the solvents is ------

(a) $K_D = \dfrac{C_1}{C_2}$ (b) $K_D = \dfrac{C_1}{C_2(1-\alpha)}$

(c) $K_D = \dfrac{C_1}{C_2(\alpha-1)}$ (d) $K_D = \dfrac{C_1}{\sqrt{C_2}}$

Answer. (b)

6.   At a constant temperature, the solubility of a gas in a liquid is proportional to the pressure of the gas above it. This law is ------

(a) Nernst's distribution law (b) Henry's law

(c) Le Chatelier's principle (d) Raoult's law

Answer. (b)

7. If a mixture of gases is in contact with a liquid, the partial pressure of the individual gas determines the mass of each gas dissolving i.e., the solubility of each gas is proportional to its

(a) total pressure (b) concentration of the liquid

(c) partial pressure (d) temperature

Answer. (c)

8. The Henry's law equation is

(a) $C = k \times P$ (b) $k = C \times P$

(c) $P = C \times k$ (d) $C = k \times \sqrt{P}$

Answer. (a)

9. The Nernst distribution law equation C1/C2 = KD applies when

(a) the molecular state of the solute is the same in both the solvents

(b) the molecular state of the solute is different in both the solute

(c) the molecular state of the solute may be the same or different in both the solute

(d) none of the above

Answer. (a)

10. Benzoic acid when shaken with mixtures of benzene and water undergoes dimerisation in benzene. The distribution law applicable here is ------

(a) $K_D = \dfrac{C_1}{C_2}$ (b) $K_D = \dfrac{C_1}{\sqrt[3]{C_2}}$

(c) $K_D = \dfrac{C_1}{\sqrt[2]{C_2}}$ (d) None of these

Answer. (c)

11. The greater the distribution ratio in favour of the organic solvent, the ------ will be the amount extracted in any one operation

(a) greater (b) lesser

(c) equal (d) none of the

Answer. (a)

12. Multiple extraction is ------- efficient as compared to single extraction

(a)   more   (b) less

(c)   the same   (d) none of these

Answer. (a)

13.   With the help of distribution law we can

(a)   determine the association or dissociation of the solute in one of the solvents

(b)   determine the solubility of solute in various solvents

(c)   reduce the formula of complex ions

(d)   all of the above

Answer. (d)

14.   The   extraction is more efficient

(a)   single   (b) double

(c)   multiple   (d) none of these

Answer. (c)

15.   The distribution law is applied in the

(a)   Haber's process for the manufacture of NH_3

(b)   Parke's process for the extraction of Ag

(c)   Contact process for the manufacture of H_2SO_4

(d)   none of the above

Answer. (b)

16.   In the first extraction, the amount of the substance left unextracted is given by the formula (K is distribution coefficient, V ml of the aqueous solution contain A gram of an organic substance)2

(a) $K_D = A \dfrac{KV}{KV+v}$ (b) $K_D = A \dfrac{K^2 V}{KV+v}$

(c) $K_D = A^2 \dfrac{KV}{KV+v}$ (d) $K_D = A \dfrac{KV}{KV+v^2}$

Answer. (a)

17.   The Nernst distribution law $K_D = C_1/C_2$ is not applicable if the solute undergoes

(a)   association in one of the solvents

(b)   dissociation is one of the solvents

(c)   association or dissociation in one of the solvents

(d)   none of the above

Answer. (c)

18.   When succinic acid or oxalic acid is shaken with ether and water it   in water.

(a)   associates to form dimer   (b) dissociates into ions

(c)   remains the same   (d) none of these

Answer. (b)

19.   When a bottle of soda-water is opened, the partial pressure of CO_2 .

(a)   decreases   (b) increases

(c)   remains the same   (d) none of these

Answer. (a)

20.   Is it possible to extract the whole of the dissolved substance by using large number of extractions?

(a)   yes   (b) no

(c)   sometimes   (d) none of these

Answer. (b)

21.   In liquid-liquid chromatography technique, the component with distribution coefficient is extracted first

(a)   lower   (b) higher

(c)   intermediate   (d) none of these

Answer. (b)

22.   The Nernst's distribution law does not hold good if

(a)   the temperature throughout the experiment is not constant

(b)   concentration of the solute in two solvents are high

(c)   there is association or dissociation of the solute in one of the solvents

(d)   all of the above

Answer. (d)

23.   The Nernst's distribution law is also known as

(a)   partition law   (b) Henry's law

(c)   Raoult's law   (d) equilibrium law

Answer. (a)

24. In the process of extraction of a substance from aqueous solution, the use of a ----- is made

(a) conical flask   (b) measuring flask

(c) burette   (d) separating funnel

Answer. (d)

25. When the solute undergoes association in one of the solvent, the Nernst distribution law as modified a ----

(a) $C_1 = \sqrt{C_2} \times K_D$ (b) $\sqrt{C_2} \times C_1 = K_D$

(c) $C_1 = C_2^2 \times K_D$ (d) $C_1 = K_D \times C_2^3$

Answer. (a)

26. The internal energy of a molecule is its

(a) rotational energy   (b) vibrational energy

(c) translational energy   (d) all of these

Answer. (d)

27. The electronic spectra are caused by

(a) the absorption of light   (b) the emission of light

(c) the absorption of high energy photons   (d) none of these

Answer. (c)

28. The rotational spectra involve

(a) a very high energy changes   (b) small energy changes

(c) no energy change   (d) none of these

Answer. (b)

29. A molecule can be excited to only the next higher rotational level by

(a) absorption of energy   (b) release of energy

(c) the electric current   (d) applying magnetic field

Answer. (a)

30. The spectra caused in the infrared region by the transition in vibrational levels in different modes of vibrations are called

(a) rotational spectra   (b) electronic spectra

(c) vibrational spectra   (d) none of these

Answer. (c)

31. The IR spectra of a compound helps in

(a) proving the identity of compounds

(b) showing the presence of certain functional groups in the molecule

(c) neither of the above

(d) both of the above

Answer. (d)

32. The electronic spectra consists of

(a) a large number of absorption bands   (b) a large number of closely packed lines

(c) a large number of peaks   (d) none of these

Answer. (b)

33. In the Raman spectrum, the middle line is called

(a) Raman line   (b) Rayleigh line

(c) functional group line   (d) none of these

Answer. (b)

34. The change in frequency by scattering (Raman Effect) occurs due to ----- of energy between the incident photon and the scattering molecule.

(a) release   (b) absorption

(c) exchange   (d) none of these

Answer. (c)

35. NMR spectroscopy is useful for determining the type and number of ------- atoms in organic molecules.

(a) hydrogen   (b) carbon

(c) halogen   (d) hetero atoms

Answer. (a)

36. The magnetic moment of a molecule is expressed in

(a) magnetic tons   (b) magnetons

(c) debye units   (d) g cm sec–1

Answer. (b)

37. The electronic spectra lies within

(a) infrared region   (b) visible or ultraviolet regions

(c) radio wave region   (d) micro waves region

37. The wave numbers are expressed in

(a) sec^{-1} (b) cm sec^{-1}

(c) cm^{-1} (d) cm2 sec^{-1}

38. The electromagnetic radiations of higher wavelengths has ------- energy.

(a) higher   (b) lower

(c) intermediate   (d) zero

39. The Raman and IR spectra can tell us whether

(a) a molecule is linear or non-linear   (b) a molecule is symmetrical or asymmetrical

(c) neither of the above   (d) both of the above

40. Define "wavenumber."

(a) 1/wavelength   (b) it is the same as wavelength

(c) wavelength x speed of light   (d) None of these

41. What does IR spectroscopy allow us to determine?

(a) the molecular formula of a compound   (b) the kinds of bonds in a compound

(c) the molecular weight of a compound   (d) the number of carbons in a compound