201. A solution of two liquids boils at a temperature more than the boiling point of either them. Hence, the binary solution shows

a) Negative deviation from Raoult’s law

b) Positive deviation from Raoult’s law

c) No deviation from Raoult’s law

d) Positive or negative deviation from Raoult’s law depending upon the composition

202. Vapour pressure of pure ‘A’ is 70 mm of Hg at 25<sup>∘</sup>C . It from an ideal solution with ‘B’ in which mole fraction of A is 0.8. If the vapour pressure of the solution is 84 mm of Hg at 25<sup>∘</sup>C, the vapour pressure of pure ‘B’ at 25<sup>∘</sup> C is

a) 28 mm b) 56 mm c) 70 mm d) 140 mm

203. Abnormal colligative properties are observed only when the dissolved non-volatile solute in a given dilute solution

a) Is a non-electrolyte b) Offers an intense colour

c) Associates of dissociates d) Offers no colour

204. As a result of osmosis, the volume of the concentrated solution :

a) Gradually decreases

b) Gradually increases

c) Suddenly increases

d) None of these

205. At a suitable pressure near the freezing point of ice, there exists :

a) Only ice

b) Ice and water

c) Ice and vapour

d) Ice, water and vapours, all existing side by side

206. Which of the following concentration units is independent of temperature?

a) Normality b) Molarity c) Molality d) ppm

207. In cold countries, ethylene glycol is added to water in the radiators of cars during winters. It results in :

a) Lowering in boiling point

b) Reducing viscosity

c) Reducing specific heat

d) Lowering in freezing point

208. Calculate the molal depression constant of a solvent which has freezing point 16.6℃ and latent heat of fusion 180.75 Jg<sup>-1</sup>.

a) 2.68 b) 3.86 c) 4.68 d) 2.86

209. The freezing point depression constant for water is 1.86 K kgmol<sup>-1</sup>. If 45 g of ethylene glycol is mixed with 600 g of water , the freezing point of the solution is

a) 2.2 K b) 270.95 K c) 273 K d) 275.35 K

210. The movement of solvent molecules through a semipermeable membrane is called

a) Electrolysis b) Electrophoresis c) Osmosis d) Cataphoresis

211. An aqueous solution of methanol in water has vapour pressure

a) Less than that of water b) More than that of water

c) Equal to that of water d) Equal to that of methanol

212. Which pair shows a contraction in volume on mixing along with evolution of heat?

a) CHCl<sub>3</sub>+C<sub>6</sub> H<sub>6</sub> b) H<sub>2</sub> O+HCl c) H<sub>2</sub> O+HNO<sub>3</sub> d) All of these

213. The vapour pressure of water at 20<sup>∘</sup> C is 17.5 mmHg.<br />If 18 g of glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>) is added to 178.2 g of water at 20<sup>∘</sup> C, the vapour pressure of the resulting solution will be

a) 17.675 mmHg b) 15.750 mmHg c) 16.500 mmHg d) 17.325 mmHg

214. At 80 ͦC, the vapour pressure of pure liquid 'A'is 520 mm Hg and that of pure liquid 'B' is 1000 mm Hg. If a mixture of solution 'A' and 'B' boils at 80°C and 1 atm pressure, the amount of 'A' in the mixture is : (1 atm = 760 mm Hg)

a) 50 mol per cent b) 52 mol per cent c) 34 mol per cent d) 48 mol per cent

215. Van’t Hoff factor(i):

a) Is less than one in case of dissociation

b) Is more than one in case of association

c) <img src="215\_A3.gif" >

d) <img src="215\_A4.gif" >

216. Following solutions at the same temperature will be isotonic :

a) 3.42 g of cane sugar in one litre water and 0.18 g of glucose in one litre water

b) 3.42 g of cane sugar in one litre water and 0.18 g of glucose in 0.1 litre water

c) 3.42 g of cane sugar in one litre water and 0.585 g of NaCl in one litre water

d) 3.42 g of cane sugar in one litre water and 1.17 g of NaCl in one litre water

217. The osmatic pressure of a 5% (wt./vol) solution of cane sugar at 150℃ is

a) 3.078 atm b) 4.078 atm c) 5.078 atm d) 2.45 atm

218. Ethylene glycol is used as an antifreeze in a cold climate. Mass of ethylene glycol which should be added to 4 kg of water to prevent it from freezing at -6<sup>∘</sup> C will be (K\_f for water=1.86 K kg mol<sup>-1</sup. and molar mass of ethylene glycol = 62 g mol<sup>-1</sup>

a) 804.32 g b) 204.30 g c) 400.00 g d) 304.60 g

219. Mole fraction of solute in benzene is 0.2 then find molality of solute

a) 3.2 b) 2 c) 4 d) 3.6

220. When a solute is added in two immiscible solvents, it distributes itself between two liquids so that its concentration in first liquid is c<sub>1</sub> and that in the second liquid is c<sub>2</sub>. If the solute forms a stable trimer in the first liquid, the distribution law suggests that :

a) 3c<sub>1</sub>=c<sub>2</sub>

b) <img src="220\_A2.gif" >

c) <img src="220\_A3.gif" >

d) <img src="220\_A4.gif" >

221. Which is not applicable to distribution law?

a) Parke’s process

b) Solvent extraction

c) Pattinson’s process

d) Partition chromatography

222. Which of the following is the expression of Raoult’s law?<br />.(p=vapour pressure of pure solvent, p<sub>s</sub>=vapour pressure of the solution)

a) (p - p<sub>s</sub>)/p=n/(n+N) b) (p<sub>s</sub> - p)/p=N/(N+n) c) (p-p<sub>s</sub>)/p<sub>s</sub> =N/(N-n) d) (p<sub>s</sub> - p)/p<sub>s</sub> =(N-n)/N

223. For determination of molar mass of colloids, polymers and protein, which property is used ?

a) Diffusion pressure b) Atmospheric pressure

c) Osmotic pressure d) Turgor pressure

224. 3.0 molal NaOH solution has a density of 1.110 g/mL. The molarity of the solution is

a) 3.9732 b) 2.9732 c) 1.9732 d) 0.9732

225. Sodium sulphate is soluble in water, while barium sulphate is sparingly soluble because :

a) The hydration energy of sodium sulphate is more than its lattice energy

b) The lattice energy of barium sulphate is less than the hydration energy

c) The lattice energy has no role to play in solubility

d) The hydration energy of sodium sulphate is less than its lattice energy

226. Distribution law is applicable when :

a) Temperature remains constant

b) Dilute solutions are employed

c) The two solvents are mutually insoluble

d) All are correct

227. 10 cm<sup>3</sup> of 0.1 N monobasic acid requires 15 cm<sup>3</sup> of sodium hydroxide solution whose normality is

a) 1.5 N b) 0.15 N c) 0.066 N d) 0.66 N

228. Density of a 2.05 M solution of acetic acid in water is 1.02 g/mL. The molality of the solution is

a) 1.14 mol kg<sup>-1</sup> b) 3.28 mol kg<sup>-1</sup> c) 2.28 mol kg<sup>-1</sup> d) 0.44 mol kg<sup>-1</sup>

229. x gram of water is mixed in 69 g of ethanol. Mole fraction of ethanol in the resultant solution is 0.6. What is the value of x in grams?

a) 54 b) 36 c) 180 d) 18

230. Dissolution of a solute is an exothermic process if :

a) Hydration energy > lattice energy

b) Hydration energy < lattice energy

c) Hydration energy = lattice energy

d) None of the above

231. Molarity is expressed as

a) L/mol b) Mol/L c) Mol/1000 g d) g/L

232. The amount of anhydrous Na<sub>2</sub> CO<sub>3</sub> present in 250 mL of 0.25 M solution is

a) 6.0 g b) 6.625 g c) 66.25 g d) 6.225 g

233. Which of the following compounds correspond to maximum van’thoff factor for dilute solution?

a) HCl b) MgSO<sub>4</sub> c) K<sub>2</sub> SO<sub>4</sub> d) K<sub>4</sub> FeCN <sub>4</sub>

234. Solute A is a ternary electrolyte and solute B is non-electrolyte. If 0.1 M solution of solute B produces an osmotic pressure of 2P, then 0.05 M solution of A at the same temperature will produce an osmotic pressure equal to :

a) P b) 1.5 P c) 2 P d) 3 P

235. A solution of sucrose (molar mass 342 g mol<sup>-1</sup> has been produced by dissolving 68.5 g sucrose in 1000 g water. The freezing point of the solution obtained will be : (K\_f forH<sub>2</sub> O=1.86 Kkgmol<sup>-1</sup>

a) -0.372 ͦC b) -0.520 ͦC c) + 0.372 ͦC d) -0.570 ͦC

236. A mixture of ethyl alcohol and propyl alcohol has a vapour pressure of 290 mm at 300 K. the vapour pressure of propyl alcohol is 200 mm. If the mole fraction of ethyl alcohol is 0.6, its vapour pressure (in mm) at the same temperature will be

a) 350 b) 300 c) 700 d) 360

237. How many grams of sulphuric acid is to be dissolved to prepare 200 mL aqueous solution having concentration of [H<sub>3</sub> O<sup>+</sup> ] ions 1 M at 25℃ temperature.

[H=1,O=16,S=32 g.mol<sup>-1</sup>

a) 4.9g b) 19.6g c) 9.8g d) 0.98g

238. What is the molarity of H<sub>2</sub> SO<sub>4</sub> solution if 25 mL is exactly neutralised with 32.63 mL of 0.164 M NaOH?

a) 0.107 M b) 0.126 M c) 0.214 M d) -0.428 M

239. What is the molality of ethyl alcohol (mol. wt. = 416) in aqueous solution which freezes at - 10 ͦC?.K<sub>f </sub> for water=1.86 K molality<sup>-1</sup>

a) 3.540 b) 4.567 c) 5.376 d) 6.315

240. The solubility order for the following gases is :

a) NH<sub>3</sub>>CO<sub>2</sub>>O<sub>2</sub>>H<sub>2</sub>

b) H<sub>2</sub>>O<sub>2</sub>>NH<sub>3</sub>>CO<sub>2</sub>

c) CO<sub>2</sub>>NH<sub>3</sub>>O<sub>2</sub>>N<sub>2</sub>

d) O<sub>2</sub>>H<sub>2</sub>>NH<sub>3</sub>>CO<sub>2</sub>

241. A 5.2 molal aqueous solution of methyl alcohol, CH<sub>3</sub> OH, is supplied. What is the mole fraction of methyl alcohol in the solution?

a) 1.100 b) 0.190 c) 0.086 d) 0.050

242. Equal masses of methane and oxygen are mixed in an empty container at 25℃. The fraction of the total pressure exerted by oxygen is

a) 2/3 b) 1/3×273/298 c) 1/3 d) 1/2

243. Two liquids X and Y form an ideal solution. The mixture has a vapour pressure of 400 mm at 300 K when mixed in the molar ratio of 1:1 and a vapour pressure of 350 mm when mixed in the molar ratio of 1:2 at the same temperature. The vapour pressures of the two pure liquids X and Y respectively are

a) 250 mm, 550 mm b) 350 mm, 450 mm c) 350 mm, 700 mm d) 550 mm, 250 mm

244. The van’t Hoff factor(i) for a dilute aqueous solution of Na<sub>2</sub> SO<sub>4</sub> is :

a) 1 + α b) 1- α c) 1+2α d) 1-2α

245. p<sub>A</sub> and p<sub>B</sub> are the vapour pressure of pure liquid components A and B respectively of an ideal binary solution. If xA represents the mole fraction of component A, the total pressure of the solution will be :

a) p<sub>B</sub>+x<sub>A</sub> (p<sub>B</sub>-p<sub>A</sub> b) p<sub>B</sub>\_B+x<sub>A</sub> (p<sub>A</sub>-p<sub>B</sub>) c) p<sub>A</sub> \_A+x<sub>A</sub> (p<sub>B</sub>-p<sub>A</sub> d) p<sub>A</sub>+x<sub>A</sub> (p<sub>A</sub> -p<sub>B</sub>)

246. Formation of a solution from two components can be considered as <br /> (1) pure solvent → separated solvent molecules, ∆H<sub>1</sub><br /> (2) pure solute → separated solvent molecules,∆H<sub>2</sub><br /> (3) separated solvent and solute molecules → solution,∆H<sub>3</sub><br />Solution so formed will be ideal if

a) ∆H<sub>soln </sub> =∆H<sub>1</sub>-∆H<sub>2</sub>-∆H<sub>3</sub> b) ∆H<sub>soln </sub>=∆H<sub>3</sub>-∆H<sub>1</sub>-∆H<sub>2</sub>

c) ∆H<sub>soln </sub>=∆H<sub>1</sub>+∆H<sub>2</sub>+∆H<sub>3</sub> d) ∆H<sub>soln </sub>=∆H<sub>1</sub>+∆H<sub>2</sub>-∆H<sub>3</sub>

247. Azeotropic mixture of HCl and water has

a) 48% HCl b) 22.2% HCl c) 36% HCl d) 20.2% HCl

248. What is the molarity of H<sub>2</sub> SO<sub>4</sub> solution that has a density 1.84 g/cc at 35℃ and contains 98% solute by weight?

a) 4.18 M b) 1.84 M c) 8.41 M d) 18.4 M

249. The osmotic pressure of 0.2 molar solution of urea at 27℃ (R=0.082 L atm mol<sup>-1</sup> K<sup>-1</sup>is

a) 4.92 atm b) 1 atm c) 0.2 atm d) 27 atm

250. In which ratio of volume 0.4 M HCl and 0.9 M HCl are to be mixed such that the concentration of the resultant solution becomes 0.7 M ?

a) 4 : 9 b) 2 : 3 c) 3 : 2 d) 1 : 1

251. The empirical formula of a nonelectrolyte is CH<sub>2</sub> O. A solution containing 3 g of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution. The molecular formula of the compound is

a) CH<sub>2</sub> O b) C<sub>2</sub> H<sub>4</sub> O<sub>2</sub> c) C<sub>4</sub> H<sub>8</sub> O<sub>4</sub> d) C<sub>3</sub> H<sub>6</sub> O<sub>3</sub>

252. Which of the following can be measured by the Ostwald-Walker dynamic method?

a) Relative lowering of vapour pressure b) Lowering of vapour pressure

c) Vapour pressure of the solvent d) All of the above

253. On shaking 10 mL of 0.1 molar solution of an organic compound in water with 10 mL of CCl<sub>4</sub> til equilibrium is attained, concentration of the organic compound in water would be (K=9) in molar units :

a) 0.01 b) 0.09 c) 0.001 d) 0.009

254. A solution containing 1.8 g of a compound (empirical formula CH<sub>2</sub> O) in 40 g of water is observed to freeze at -0.465<sup>∘</sup> C. The molecular formula of the compound is

(K<sub> f</sub> of water=1.86 kg K mol<sup>-1</sup>

a) C<sub>2</sub> H<sub>4</sub> O<sub>2</sub> b) C<sub>3</sub> H<sub>6</sub> O<sub>3</sub> c) C<sub>4</sub> H<sub>8</sub> O<sub>4</sub> d) C<sub>6</sub> H<sub>1</sub>2 O<sub>6</sub>

255. For dilute solution Raoult’s law states that

a) The relative lowering of vapour pressure is equal to mole fraction of solute

b) The lowering of vapour pressure is equal to the mole fraction of solute

c) The vapour pressure of the solution is equal to mole fraction of the solvent

d) The relative lowering of vapour pressure is proportional to amount of solute in solution

256. <img src="256\_Q.gif" >

a) X<sub>A</sub>=Y<sub>A</sub>

b) X<sub>A</sub>>Y<sub>A</sub>

c) X<sub>A</sub>/X<sub>B</sub> <Y<sub>A</sub>/Y<sub>B</sub>

d) X<sub>A</sub>,Y<sub>A</sub>,X<sub>B</sub> and Y<sub>B</sub> cannot be corelated

257. The normality of 2.3 M H<sub>2</sub> SO<sub>4</sub> solution is

a) 4.6 N b) 5.6 N c) 6.6 N d) 7.6 N

258. The molecular weight of NaCl determined by studying freezing point depression of its 0.5% aqueous solution is 30. The apparent degree of dissociation of NaCl is

a) 0.60 b) 0.50 c) 0.30 d) 0.95

259. A 5 molar solution of H<sub>2</sub> SO<sub>4</sub> is diluted from 1 L to 10 L. What is the normality of the solution?

a) 0.25 N b) 1 N c) 2 N d) 7 N

260. 100 mL of water and 50 mL ether mixture is shaken with succinic acid. At equilibrium ether layer contains 0.127 g and water layer contains 1.843 g of succinic acid. The partition coefficient of succinic acid in favour of water is :

a) 7.26 b) 10 c) 2 d) 4.5

261. The lubricating action of an oil is more if it possess :

a) High vapour pressure

b) Low vapour pressure

c) High surface tension

d) High density

262. Maximum lowering of vapour pressure is observed in the case of

a) 0.1 M glucose b) 0.1 M Bacl<sub>2</sub> c) 0.1 M MgSO<sub>4</sub> d) 0.1 NaCl

263. The solubility of a gas in liquid at a temperature is directly proportional to its :

a) Density b) Melting point c) Boiling point d) Pressure

264. A solution of sucrose (Molar mass = 342 g/mol) is prepared by dissolving 68.4 g of it per litre of solution, what is its osmotic pressure (R=0.082 L atmK<sup>-1</sup>mol<sup>-1</sup> at 273 K?

a) 3.92 atm b) 4.48 atm c) 5.92 atm d) 29.4 atm

265. Which of the following concentration factors is affected by change in temperature?

a) Molarity b) Molality c) Mole fraction d) Weight fraction

266. Which of the following mixture does not show positive deviation from the Raoult’s law?

a) Benzene + acetone b) Acetone + ethanol

c) Acetone + chloroform d) Water + ethanol

267. The ratio of vapour pressure over solution phase on mixing two immiscible liquids is equal to :

a) Ratio of their weights in mixture

b) Ratio of their mol. weights

c) Ratio of their moles in liquid phase

d) Ration of their moles in vapour phase

268. The vapour pressure of benzene at 80 ͦC is lowered by 10 mm by dissolving 2g of a non-volatile substance in 78 g of benzene. The vapour pressure of pure benzene at 80 ͦC is 750 mm. The molecular weight of the substance will be :

a) 15 b) 150 c) 1500 d) 148

269. I<sub>2</sub>is added to a system of H<sub>2</sub> O and CS<sub>2</sub>. The concentration of I<sub>2</sub> in water and CS<sub>2</sub> is found to be c<sub>1</sub> and c<sub>2</sub>respectively. The ratio of c<sub>1</sub>/c<sub>2</sub> will be constant only if :

a) The solutions are dilute

b) The temperature remains constant

c) The solute neither changing the immiscibility of solvents nor itself changing in molecular state

d) All of the above

270. The boiling point of an aqueous solution of a non-volatile solute is 100.15 ͦC. What is the freezing point of an aqueous solution obtained by diluting the above solution with an equal volume of water? The values of K\_b andK\_f for water are 0.512 ͦC and 1.86 ͦC K molality<sup>-1</sup>

a) -0.544 ͦC b) -0.512 ͦC c) -0.272 ͦC d) -0.1.86 ͦC

271. A solution has an osmotic pressure of 0.821 atom at 300 K. its concentration would be :

a) 0.066 M b) 0.66 M c) 0.033 M d) 0.33 M

272. Density of a 2.05 M solution of acetic acid in water is 1.02 g/mL. The molality of the solution is

a) 9 L b) 1.8 L c) 8 L d) 0.9 L

273. On adding 1 g arsenic to 80 g benzene, the freezing point of benzene is lowered by 0.19℃ . The formula of arsenic is

a) As b) As<sub>2</sub> c) As<sub>3</sub> d) As<sub>4</sub>

274. The process of getting fresh water from sea water is known as :

a) Osmosis

b) Filtration

c) Diffusion

d) Reverse osmosis

275. The statement “the relative lowering of the vapour pressure is equal to th ratio ot moles of the solute to the total number of the moles in the solution” refers to

a) Decrease the freezing point of water in the winter and increase the boiling point of water in the summer

b) Only decrease the freezing point of water

c) Only increase the boiling point of water

d) Be used for cleaning the radiator in a car

276. X is dissolved in water. Maximum boiling point is observed when X is ….(0.1 M each)

a) CaSO<sub>4</sub> b) BaCl<sub>2</sub> c) NaCl d) Urea

277. What is molarity of K<sup>+</sup> in aqueous solution that contains 17.4 ppm of K<sub>2</sub> SO<sub>4</sub>174 g mol<sup>-1</sup>?

a) 2×10<sup>-2</sup> M b) 2×10<sup>-3</sup> M c) 4×10<sup>-4</sup> M d) 2×10<sup>-4</sup>M

278. Which of the following statement is true?

a) The relative lowering of vapour pressure of a solution is equal to the mole fraction of the solute present in the solution.

b) Passage of solute molecules towards solution side through semipermeable membrane is osmosis.

c) The boiling point of solution is always lower than the solvent.

d) The boiling point of a liquid is the temperature at which its vapour pressure becomes equal to 260 mm.

279. Calculate the molarity of 1 L solution of 93% H<sub>2</sub> SO<sub>4</sub> (weight/volume). The density of the solution is 1.84 g/mL

a) 11.05 b) 12.05 c) 13.05 d) 14.05

280. If 0.15 g of a solute dissolved in 15 g of solvent is boiled at a temperature higher by 0.216℃ than that of the pure solvent, the molecular weight of the substance is (molal elevation constant for the solvent is 2.16℃)

a) 100 b) 102 c) 104 d) 1.02

281. The vapour pressure of a liquid in a closed container depends upon

a) Amount of liquid b) Surface area of the container

c) Temperature d) None of the above

282. The vapour pressure of a solution is proportional to :

a) Mole fraction of solute

b) 1/(mole fraction of solute)

c) Mole fraction of solvent

d) None of the above

283. At 25<sup>∘</sup> C a 5% aqueous solution of glucose (molecular weight = 180 g mol<sup>-1</sup>) is isotonic with 2% aqueous solution containing an unknown solute. What is the molecular weight of the unknown solute.

a) 60 b) 80 c) 72 d) 63

284. The spontaneous movement of solute particles from a more concentrated solution to less concentrated solution is called :

a) Osmosis b) Diffusion c) Plasmolysis d) Fusion

285. How many grams of a sucrose (mol wt.=342) should be dissolved in 100 g water in order to produce a solution with a 105.0℃ difference between the freezing point and boiling temperature? (k<sub>f</sub>=1.86 C/m,k<sub>b</sub> =0.151℃)

a) 34.2 g b) 72 g c) 342 g d) 460 g

286. A solution of urea (mol. mass 56) boils at 100.18 ͦC at atmospheric pressure. If K<sub>f</sub> andK<sub>b</sub> for water are 1.86 and 0.512 K molality<sup>-1</sup> respectively, the above solution will freeze at :

a) - 6.54 ͦC b) 6.54 ͦC c) - 0.654 ͦC d) 0.654 ͦC

287. 19.85 mL of 0.1 N NaOH reacts with 20 mL of HCl solution for complete neutralization. The molarity of HCl solution is

a) 9.9 b) 0.99 c) 0.099 d) 0.0099

288. The vapour pressure will be lowest of

a) 0.1 M sugar solution b) 0.1 M KCl solution

c) 0.1 M Cu(NO<sub>3</sub> )<sub>2</sub> solution d) 0.1 M AgNO<sub>3</sub> soution

289. Which one is correct?

a) Molality changes with temperature. b) Molality does not change with temperature.

c) Molarity does not change with temperature. d) Normality does not change with temperature.

290. What is molality of a solution in which

(18 g glucose mol. wt. = 180) is dissolved in 500 g of water?

a) 1 m b) 0.5 m c) 0.2 m d) 2 m

291. Which of the following solution in water possesses the lowest vapour pressure?

a) 0.1 (N) BaCl<sub>2</sub> b) 0.1 (M)NaCl c) 0.1 (M) KCl d) None of these

292. A 5.25% solution of a substance is isotonic with a 1.5% solution of urea (molar mass =60 gmol<sup>-1</sup>) in the same solvent. If the densities of both the solutions are assumed to be equal to 1.0 g cm<sup>-3</sup>,molarmass of the substance will be

a) 90.0 g mol<sup>-1</sup> b) 115.0 g mol<sup>-1</sup> c) 105.0 g mol<sup>-1</sup> d) 210.0 g mol<sup>-1</sup>

293. Which of the following solutions will have highest boiling point

a) 0.1 M FeCl<sub>3</sub> b) 0.1 M BaCl<sub>2</sub>

c) 0.1 M NaCl d) 0.1 M urea (NH<sub>2</sub> CONH<sub>2</sub>)

294. At〖25<sup>∘</sup> C , the highest osmotic pressure is exhibited by 0.1 M solution of

a) Decinormalaluminiumsulphate

b) Decinormal barium chloride

c) Decinormal sodium chloride

d) A solution obtained by mixing equal volumes of (b) and (c) and filtering

295. Molarity of 0.2 N H<sub>2</sub> SO<sub>4</sub> is

a) 0.1 b) 0.2 c) 0.3 d) 0.4

296. The ionic strength of solution containing 0.1 mol/kg of KCl and 0.2 mol/kg of Cu SO<sub>4</sub>is

a) 0.3 b) 0.6 c) 0.9 d) 0.2

297. 25 mL of a solution of barium hydroxide on titration with 0.1 molar solution of hydrochloric acid gave a titre value of 35 mL. The molarity of barium hydroxide solution was

a) 0.07 b) 0.14 c) 0.28 d) 0.35

298. The freezing point of equimolal aqueous solution will be highest for

a) C<sub>6</sub> H<sub>5</sub> NH<sub>3</sub> Cl b) La(NO<sub>3</sub> )<sub>3</sub> c) C<sub>6</sub> H<sub>1</sub>2 O<sub>6</sub> d) Ca(NO<sub>3</sub> )<sub>2</sub>

299. The normality of a 100 mL solution of sodium hydroxide which contains 4 g of NaOH, is

a) 0.5 b) 1.0 c) 1.5 d) 2.0

300. For determination of molecular weights, Raoult’s law is applicable only to

a) Dilute solutions of electrolytes b) Concentration solution of electrolytes

c) Dilute solutions of non electrolytes d) Concentration solution of non electrolytes

301. Osmotic pressure of a solution at a given temperature

a) Increases with concentration b) Decreases with concentration

c) Remains same d) Initially increases and then decreases

302. A solution has a 1 : 4 mole ratio of pentane to hexane. The vapour pressures of pure hydrocarbons at 20 ͦC are 440 mm Hg for pentane and 120 mm Hg for hexane. The mole fraction of pentane in vapour phase would be :

a) 0.786 b) 0.549 c) 0.478 d) 0.200

303. Distribution law cannot be applied for the system in which I<sub>2</sub> is distributed between :

a) H<sub>2</sub> O and CS<sub>2</sub>

b) H<sub>2</sub> O and CCl<sub>4</sub>

c) H<sub>2</sub> O and ether

d) H<sub>2</sub> O and ethanol

304. The vapour pressure of pure liquid A is 0.80 atm. When a non-volatile B is added to A its vapour pressure drops to 0.60 atm. The mole fraction of B in the solution is

a) 0.125 b) 0.25 c) 0.5 d) 0.75

305. When a non-volatile solute is dissolved in a solvent, the relative lowering of vapour pressure is equal to

a) Mole fraction of solute

b) Mole fraction of solvent

c) Concentration of the solute in gram per litre

d) Concentration of the solute in gram per 100 mL

306. The freezing point of one modal NaCl solution assuming NaCl to be 100 % dissociated in water is (modal depression constant=1.86)

a) -2.72℃ b) -3.72℃ c) 2.72℃ d) 3.72℃

307. On mixing, heptane and octane form an ideal solution. At 373 K, the vapour pressures of the two liquid components (heptanes and octane) are 105 kPa and 45kPa respectively. Vapour pressure of the solution obtained by mixing 25 g of heptanes and 35 g of octane will be (molar mass of heptanes = 100 g mol<sup>-1</sup>and of octane = 114 g mol<sup>-1</sup>.

a) 72.0 kPa b) 36.1 kPa c) 96.2 kPa d) 144.5 kPa

308. The van’t Hoff factor of BaCl<sub>2</sub> at 0.01 M concentration is 1.98. The percentage of dissociation of BaCl<sub>2</sub> at this concentration is

a) 49 b) 69 c) 89 d) 98

309. The relative lowering of vapour pressure of an aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is

a) 0.70 b) 0.50 c) 0.60 d) 0.80

310. An aqueous solution of glucose was prepared by dissolving 18 g of glucose in 90 g of water. The relative lowering in vapour pressure is

a) 0.01 b) 0.02 c) 1 d) 20

311. In a 0.2 molal aqueous solution of a weak acid HX, the degree of ionisation is 0.3 Taking k\_f for water as 1.85, the freezing point of the solution will be nearest to

a) MeV b) Cal c) Cm/s d) Atm

312. The unit of molality is

a) mol L<sup>-1</sup> b) mol kg<sup>-1</sup> c) mol<sup>-1</sup> L<sup>-1</sup> d) mol L

313. An azeotropic solution of two liquids has boiling point lower than either when it

a) Shows a negative deviation from Raoult’s law b) Shows a positive deviation from Raoult’s law

c) Shows no deviation from Raoult’s law d) Is saturated

314. The statement, “The mass of a gas dissolved in a given mass of a solvent at any temperature is proportional to the pressure of the gas above the solvent” is

a) Henry’s law b) Law of mass action c) Dalton’s law d) None of these

315. The freezing point of water is depressed by 0.37℃ in a 0.01 mol NaCl solution. The freezing point of 0.02 molal solution of urea is depressed by

a) 0.37℃ b) 0.74℃ c) 0.185℃ d) 0℃

316. A solution of protein (extracted from crabs) was prepared by dissolving 0.75 g in 125 cm^3of an aqueous solution. At 4 ͦC an osmotic pressure rise of 2.6 mm of the solution was observed. Then molecular weight of protein is : (Assume density of solution is 1.00 g/cm^3)

a) 9.4 ×10<sup>5</sup> b) 5.4 ×10<sup>5</sup> c) 5.4 ×10<sup>10</sup> d) 9.4 ×10<sup>10</sup>

317. 2 N HCl solution will have same molar concentration as a

a) 4.0 N H<sub>2</sub> SO<sub>4</sub> b) 0.5 NH<sub>2</sub> SO<sub>4</sub> c) 1 N H<sub>2</sub> SO<sub>4</sub> d) 2 N H<sub>2</sub> SO<sub>4</sub>

318. Molarity of a given orthophosphoric acid solution is 3 M. It’s normality is

a) 9N b) 0.3 N c) 3 N d) 1 N

319. Which of the following is a colligative property?

a) Boiling point b) Freezing point c) Osmotic pressure d) Vapour pressure

320. A liquid is in equilibrium with its vapours at its boiling point. On the average the molecules in the two phases have equal :

a) Potential energy

b) Total energy

c) Kinetic energy

d) Intermolecular forces

321. You are given 100 mL of CCl<sub>4</sub> to extract iodine from 200 mL of its aqueous solution. For extracting maximum amount of iodine, which one of the following processes would you use?

a) Use all 100 mL of CCl<sub>4</sub> at one time

b) Use 50 mL of CCl<sub>4</sub> twice

c) Use 10 mL of CCl<sub>4</sub> 10 times

d) Use 25 mL of CCl<sub>4</sub> 4 times

322. Normality of 2 M sulphuric acid is

a) 2N b) 4N c) N/2 d) N/4

323. The elevation in boiling point of a solution of13.44 g of CuCl<sub>2</sub>in 1 kg of water using the following information will be (molecular weight of CuCl<sub>2</sub>=134.4 and k\_b=0.52 Km<sup>-1</sup>)

a) 0.16 b) 0.05 c) 0.1 d) 0.2

324. The degree of dissociation (α) of a weak electrolyte , A\_x B\_y is related to van’t Hoff factor (i) by the expression

a) <img src"324\_A1.gif" > b) <img src"324\_A2.gif" > c) <img src"324\_A3.gif" > d) <img src"324\_A4.gif" >

325. On adding a solute to a solvent having vapour pressure 0.80 atmvapour pressure reduces to 0.60 atm. Mole fraction of solute is

a) 0.25 b) 0.75 c) 0.50 d) 0.33

326. Generally those gases are soluble in water to a greater extent which :

a) Are easily liquefied

b) Are ionized in water

c) React with water

d) All are correct

327. Two solutions (A) containing FeCl<sub>3</sub> (aq) and (B) containing K<sub>4</sub> [Fe(CN)<sub>6</sub>] are separated by semipermeable membrane as shown below. If FeCl<sub>3</sub> on reaction with K<sub>4</sub> [Fe(CN)<sub>6</sub>], produces blue colour of Fe<sub>4</sub> [Fe(CN)<sub>6</sub>], the blue colour will be noticed in :<br /><img src="327\_Q.gif" >

a) (A)

b) (B)

c) In both (A) and (B)

d) Neither in (A) nor in (B)

328. The difference between the boiling point and freezing point of an aqueous solution containing sucrose (mol wt. = 342 gmol<sup>-1</sup>) in 100 g of water is 105.0<sup>∘</sup> C. If K<sub>f</sub> and K<sub>b</sub> of water are 1.86 and 0.51 K kg mol<sup>-1</sup> respectively, the weight of sucrose in the solution is about

a) 34.2 g b) 342 g c) 7.2 g d) 72 g

329. Pressure cooker reduces cooking time for food because

a) Boiling point of water involved in cooking is increased

b) Heat is more evenly distributed in the cooking space

c) The higher pressure inside the cooker crushes the food material

d) Cooking involves chemical changes helped by a rise in temperature

330. 9.8 g of H<sub>2</sub> SO<sub>4</sub> is present in 2 L of a solution. The molarity of the solution is

a) 0.05 M b) 0.01 M c) 0.03 M d) 0.02 M

331. At 95 ͦC, an aqueous solution of iodine containing 0.0156 g/litre is in equilibrium with a CCl<sub>4</sub> solution containing 4.412 g/litre. If the solubility of I<sub>2</sub> in water at 95 ͦC is 0.34 g/litre, then its solubility in CCl<sub>4</sub> is :

a) <img src="331\_A1.gif" >

b) <img src="331\_A2.gif" >

c) <img src="331\_A3.gif" >

d) <img src="331\_A4.gif" >

332. Calculate the normality of 250 mL aqueous solution of H<sub>2</sub> SO<sub>4</sub> having pH = 0.00.

a) 0.25 N b) 0.50 N c) 1 N d) 2 N

333. Van’thoff factor of Ca(NO<sub>3</sub> )<sub>2</sub> is

a) Benzoic acid is an organic solute

b) Benzoic acid has higher molar mass than benzene

c) Benzoic acid gets associated in benzene

d) Benzoic acid gets dissociated in benzene

334. A solution of 5 g of iodine in CS<sub>2</sub> was shaken with the same volume of water. The amount of iodine in water is : (Given K in favour of CS<sub>2</sub>=420

a) 0.119 g b) 0.0119 g c) 0.00119 g d) 1.19 g

335. From the colligative properties of solution which one is the best method for the determination of molecular weight of proteins and polymers :

a) Osmotic pressure

b) Lowering in vapour pressure

c) Lower in freezing point

d) Elevation in boiling point

336. Observe the following abbrevations

π\_obs= observed colligative property

π\_cal= theoretical colligative property assuming normal behaviour of

solute.

Van’t Hoff factors (i) is given by

a) i=π\_obs ×π\_cal b) i=π\_obs+π\_cal c) i=π\_obs-π\_cal d) i=π\_obs/π\_cal

337. The vapour pressure of two pure liquid (A) and (B) are 100 torr and 80 torr respectively. The total pressure of solution obtained by mixing 2 mole of (A) and 3 mole of (B) would be :

a) 120 torr b) 36 torr c) 88 torr d) 180 torr

338. On the basis of intermolecular forces predict the correct order of decreasing boiling points of the compounds:

a) CH<sub>3</sub> OH>H<sub>2</sub>>CH<sub>4</sub> b) CH<sub>3</sub> OH>CH<sub>4</sub>>H<sub>2</sub> c) CH<sub>4</sub>>〖CH<sub>3</sub> OH〗\_ >H<sub>2</sub> d) H<sub>2</sub>>CH<sub>4</sub>>CH<sub>3</sub> OH

339. Which has the highest freezing point at one atmosphere?

a) 0.1 M NaCl solution b) 0.1 M sugar solution c) 0.1 M BaCl<sub>2</sub>solution d) 0.1 M FeCl<sub>3</sub> solution

340. Binary liquid mixtures which exhibit positive deviations from Raoult’s law boil at…. temperature than the expected b. p.:

a) lower b) Higher c) Same d) Cannot be said

341. Which has minimum osmotic pressure?

a) 200 mL of 2 M NaCl solution b) 200 mL of 2 M glucose solution

c) 200 mL of 2 M urea solution d) All have same osmotic pressure

342. Which of the following solutions will have the highest boiling point?

a) 0.1 M BaCl<sub>2</sub> b) 0.1 M FeCl<sub>3</sub> c) 0.1 M NaCl d) 0.1 M urea

343. Solubility of solutes which dissolve with the liberation of heat decreases with :

a) Decrease in temperature

b) Increase in temperature

c) No change in temperature

d) None of the above

344. A binary liquid solution ois prepared by mixing n-heptane and ethanol. Which one of the following statements is correct regarding the behaviour of the solution?

a) The solution formed is an ideal solution

b) The solution is non-ideal, showing positive deviation from Raoult’s law

c) The solution is non-ideal, showing negative deviation from Raoult’s law

d) n-heptane shows positive deviation while ethanol show negative deviation from Raoult’s law

345. A 0.0020 m aqueous solution of an ionic compound Co(NH<sub>3</sub> )<sub>5</sub> (NO<sub>2</sub> )Cl freezes at -0.00732 ͦC. Number of moles of ions which 1 mol of ionic compound produces on being dissolved in water will be : (K\_f= +1.86°C/m)

a) 1 b) 2 c) 3 d) 4

346. Solutions A, B, C and D are respectively 0.1 M glucose, 0.05 M NaCl, 0.05 M BaCl<sub>2</sub> and 0.1 MAlCl<sub>3</sub>. Which one of the following pairs is isotonic?

a) A and B b) B and C c) A and D d) A and C

347. Colligative properties of a solution depends upon

a) Nature of both solvent and solute

b) Nature of solute only

c) Nature of solvent only

d) The relative number of solute and solvent particles

348. A solution of sucrose (molar mass=342 g/mol) is prepared by dissolving 68.4 g of it per litre of the solution, what is its osmotic pressure (R=0.082 L atm K^(-1) mol^(-1)) at 273 K?

a) 3.92 atm b) 4.48 atm c) 5.92 atm d) 29.4 atm

349. The values of observed and calculated molecular weights of silver nitrate are 92.64 and 170 respectively. The degree of dissociation of silver nitrate is :

a) 60% b) 83.5% c) 46.7% d) 60.23%

350. Saturated solution of NaCl on heating becomes :

a) Super saturated b) Unsaturated c) Remains saturated d) None of these

351. 20 g of hydrogen is present in a 5 L vessel. The molar concentration of hydrogen is

a) 1 b) 2 c) 3 d) 4

352. The molarity of pure water is

a) 55.6 b) 5.56 c) 6.55 d) 65.5

353. Assuming that sea water is a 3.50 weight per cent aqueous solution of NaCl. What is the molality of sea water?

a) 0.062 m b) 0.0062 m c) 0.62 m d) 6.2 m

354. The condition under which Nernst distribution law will not hold true is :

a) Temperature is constant

b) The molecular state of the solute is the same in both solvents

c) The solute does not cause any change in the mutual solubility of the two solvents

d) None of the above

355. An ideal solution is that which

a) Obey Raoult’s law b) Shows positive deviation from Raoult’s law

c) Shows negaitive deviation from Raoult’s law d) Has no connection with Raoult’s law

356. The relative lowering of vapour pressure of an aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is

a) 0.1 M NaCl b) 0.1 M BaCl<sub>2</sub> c) 0.1 M sucrose d) 0.1 M KCl

357. Among the following substances, the lowest vapour pressure is exerted by :

a) Water b) Mercury c) Kerosene d) Rectified spirit

358. If 5.85 g NaCl (molecular weight 58.5) is dissolved in water and the solution is made up to 0.5 L, the molarity of the solution will be

a) 0.1 b) 0.2 c) 0.3 d) 0.4

359. The sum of mole fractions of A, B and C in an aqueous solution containing 0.2 moles of each A, B and C is

a) 0.6 b) 0.2 c) 1.0 d) 1.2

360. To neutralise completely 20 mL of 0.1 M aqueous solution of phosphorous acid (H<sub>3</sub> 〖PO〗<sub>3</sub> ),the volume of 0.1 M aqueous KOH solution required is

a) 10 mL b) 20 mL c) 40 mL d) 60 mL

361. At temperature 327℃ and concentration C osmotic pressure of a solution is p, the same solutions at concentration C/2 and a temperature 427℃ shows osmotic pressure 2 atm, value of p will be

a) 12/7 b) 24/7 c) 6/5 d) 5/6

362. Molarity of a solution prepared by dissolving 75.5 g of pure KOH in 540 mL solution is

a) 1.50 M b) 2.50 M c) 3.50 M d) 5.01 M

363. The relationship between the values of osmotic pressure of 0.1 M solution of KNO<sub>3</sub> (p<sub>1</sub> )and CH<sub>3</sub> COOH(p<sub>2</sub>) is

a) p<sub>1</sub>/(p<sub>1</sub>+p<sub>2</sub> )=p<sub>2</sub>/(p<sub>1</sub>+p<sub>2</sub> ) b) p<sub>1</sub>>p<sub>2</sub> c) p<sub>2</sub>>p<sub>1</sub> d) p<sub>1</sub>=p<sub>2</sub>

364. At 40 ͦC the vapour pressures of pure liquids, benzene and toluene, are 75 torr and 22 torr respectively. At the same temperature, the partial vapour pressure of benzene in a mixture of 78 g benzene and 46 g toluene in torr assuming the ideal solution should be :

a) 50 b) 25 c) 375 d) 53.5

365. The reverse of fusion is freezing and it is :

a) Endothermic

b) Exothermic

c) Neither exothermic nor endothermic

d) May be exothermic or endothermic

366. 50 g of an acid is dissolved in one litre aqueous solution. Distribution coefficient in favour of ether is 3. Acid left in aqueous layer when solution is shaken with one litre ether :

a) 25 g b) 12.5 g c) 6.25 g d) None of these

367. When the vapour pressure of solutions of two liquids are less than those expected from ideal solutions, they are said to show :

a) Positive deviations from ideal behaviour

b) Negative deviations from ideal behaviour

c) Positive deviations for lower concentrations and negative deviations for higher concentration

d) None of the above

368. Which method cannot be used to find out the molecular weight of non-volatile solute?

a) Victor Meyer’s method

b) Osmotic pressure method

c) Cryoscopic method

d) Ebullioscopic method

369. The equilibrium in a heterogeneous system can be studied by :

a) Distribution law b) Phase rule c) Both (a) and (b) d) None of these

370. At Abu mountains water boils at 96 ͦC. What amount of NaCl be added in 1 kg water so that it boils at 100 ͦC. K\_b forH<sub>2</sub> O= 0.52 K molality^(-1)

a) 225 g b) 450 g c) 200 g d) 125 g

371. The normality of 0.3 M phosphorous acid (H<sub>3</sub> PO<sub>3</sub>) is

a) 0.2 b) 0.4 c) 0.6 d) 0.8

372. If the various terms in the below given expressions have usual meanings, the van’t Hoff factor (i) cannot be calculated by which one of the expressions?

a) <img src="372\_A1.gif" > b) <img src="372\_A2.gif" >

c) <img src="372\_A3.gif" > d) <img src="372\_A4.gif" >

373. Which of the following liquid pairs shows a positive deviation from Raoult’s law?

a) Water-hydrochloric acid b) Benzene-methanol

c) Water-nitric acid d) Acetone-chloroform

374. How much K<sub>2</sub> Cr<sub>2</sub> O<sub>7</sub> (Mol. wt. = 294.19) is required to prepare one litre of 0.1 N solution?

a) 9.8063 g b) 7.3548 g c) 3.6774 g d) 4.903 g

375. The boiling point of C<sub>6</sub> H<sub>6</sub>,CH<sub>3</sub> OH,C<sub>6</sub> H<sub>5</sub> NH<sub>2</sub> and C<sub>6</sub> H<sub>5</sub> NO<sub>2</sub> are 80() ͦC,65() ͦC,184() ͦC and 212 ͦC respectively. Which will show highest vapour pressure at room temperature?

a) C<sub>6</sub> H<sub>6</sub> b) CH<sub>3</sub> OH c) C<sub>6</sub> H<sub>5</sub> NH<sub>2</sub> d) C<sub>6</sub> H<sub>5</sub> NO<sub>2</sub>

376. In a pair of immiscible liquids, a common solute dissolves in both and the equilibrium is reached. The concentration of solute in upper layer is :

a) Same as in lower layer

b) Lower than the lower layer

c) Higher than the lower layer

d) In fixed ratio with that in the lower layer

377. Insulin (C<sub>2</sub> H<sub>1</sub>0 O<sub>5</sub> )\_n is dissolved in a suitable solvent and the osmotic pressure (π) of solutions of various concentrations C (g/cm^3) is measured at 20 ͦC. the slope of a plot of π against Cis formed to be 4.65 ×〖10〗^(-3). The molecular weight of the insulin is :

a) 4.8 ×〖10〗^5 b) 9 ×〖10〗^5 c) 3 ×〖10〗^5 d) 5.17 ×〖10〗^6

378. Volume of 0.6 M NaOH required to neutralise30 〖cm〗^3 of 0.4 M HCl is

a) 20 〖cm〗^3 b) 40 〖cm〗^3 c) 45 〖cm〗^3 d) 30 〖cm〗^3

379. The freezing point of the 0.05 molal solution of non-electrolyte in water is

a) -0.093℃ b) 1.86℃ c) 0.93℃ d) 0.093℃

380. A molar solution of NaCl has a density of1.21 g mL^(-1). The molarity of this solution is

a) 2.35 b) 1.143 c) 2.95 d) 1.356

381. Osmotic pressure of blood is 7.65 atm at 310 K. An aqueous solution of glucose that will be isotonic with blood is ……….wt./vol.

a) 5.41% b) 3.54% c) 4.53% d) 53.4%

382. A substance is completely trimerised on dissolution in a solvent. The van’t Hoff factor (i) for such change is :

a) 1 b) 2 c) 3 d) 1/3

383. A liquid is kept in a closed vessel. If a glass plate (negligible mass) with a small hole is kept on top of the liquid surface, then the vapour pressure of the liquid in the vessel is :

a) More than what would be if the glass plate were removed

b) Same as what would be if the glass plate were removed

c) Less than what would be if the glass plate were removed

d) Cannot be predicted

384. The amount of ice that will separate out on cooling a solution containing 50 g of ethylene glycol in 200 g water to - 9.3 ͦC is : (K´\_f=1.86 Kmolality^(-1))

a) 38.71 g b) 38.71 mg c) 42 g d) 42 mg

385. The number of moles of a solute in its solution is 20 and total number of moles are 80. The mole fraction of solute is

a) 0.25 b) 0.50 c) 1.00 d) 1.25

386. The order of osmotic pressure of isomolar solution of BaCl<sub>2</sub>, NaCl and sucrose is

a) BaCl<sub>2</sub>>NaCl>sucrose b) NaCl> BaCl<sub>2</sub>> sucrose

c) Sucrose>NaCl> BaCl<sub>2</sub> d) BaCl<sub>2</sub>>sucrose>NaCl

387. At STP, a container has 1 mole of Ar, 2 molesof 〖CO〗<sub>2</sub>, 3 moles of O<sub>2</sub> and 4 moles of N<sub>2</sub>. Without changing the total pressure if one mole of O<sub>2</sub> is removed, the partial pressure of O<sub>2</sub> is

a) Changed by about 16% b) Halved

c) Changed by 26% d) Unchanged

388. A solute is soluble in two immiscible liquids which are present in a mixture. The concentration of the solute in the upper layer will be :

a) Same as in the lower layer

b) Less than in the lower layer

c) More than in the lower layer

d) In fixed ratio with that in the lower layer

389. During osmosis, flow of water through a semipermeable membrane is :

a) From both sides of semipermeable membrane with unequal flow rates

b) From solution having lower concentration only

c) From solution having higher concentration only

d) From both sides of semipermeable membrane with equal flow rates

390. According to distribution law, the distribution of solute in two phases is given by the expression, <br />K=(concentration of solute in phase I)/(concnetration of solute in phase II),

the numerical Value of constant K depends upon :

a) The temperature of the system

b) The nature of solute distributed

c) The nature of two immiscible solvents used

d) All of the above

391. The experimental molecular weight of an electrolyte will always be less than its calculated value because the value of van’t Hoff factor, ‘i’ is :

a) Less than one b) Greater than one c) One d) Zero

392. The freezing point of 1% solution of lead nitrate in water will be

a) 2℃ b) 1℃ c) 0℃ d) Below 0℃

393. The osmotic pressure of a solution at 0°C is 2 atm. What will be its osmotic pressure at 273°C under similar conditions?

a) 0.5 atm b) 2 ×273 atm c) 4 atm d) 273/2 atm

394. Which of the following statements is false?

a) Two sucrose solution of same molality prepared in different solvent will have the same freezing point depression

b) Osmotic pressure (π) of a solution is given by π=MRT where M is molarity of the solution

c) The correct order of osmotic pressure for 0.01 M aqueous solution of each compound is BaCl<sub>2</sub>>KCl>CH<sub>3</sub> COOH>Sucrose

d) Raoult’s law states that the vapour pressure of a component over a solution is proportional to its mole fraction

395. When 25 g of a non-volatile solute is dissolved in 100 g of water, the vapour pressure is lowered by 2.25×〖10〗^(-1) mm. If the vapour pressure of water at 20℃ is 17.5 mm, what is the molecular weight of the solute?

a) 206 b) 302 c) 350 d) 276

396. The volume of water to be added to N/2 HCl to prepare 500 〖cm〗^3 of N/10 solution is

a) 450 〖cm〗^3 b) 100 〖cm〗^3 c) 45 〖cm〗^3 d) 400 〖cm〗^3

397. Lowering of vapour pressure is highest for

a) 0.1 M BaCl<sub>2</sub> b) 0.1 M glucose c) 0.1 M MgSO<sub>4</sub> d) Urea

398. One component of a solution follows Raoult’s law over the entire range 0≤x<sub>1</sub>≤1 . The second component must follow Raoult’s law in the range when x<sub>2</sub>is

a) Close to zero b) Close to 1 c) 0≤ x<sub>2</sub> ≤05 d) 0≤ x<sub>2</sub> ≤1

399. The mole fraction of water in 20% aqueous solution of H<sub>2</sub> O<sub>2</sub> is

a) 20/80 b) 80/20 c) 68/77 d) 77/68

400. What will be the molality of a solution having 18 g of glucose (mol.wt. = 180) dissolved in 500 g of water?

a) 1 m b) 0.5 m c) 0.2 m d) 2 m

401. The empirical formula of a non-electrolyte is 〖CH〗<sub>2</sub> O . A solution containing 6g of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution at the same temperature. The molecular formula of the compound is

a) C<sub>2</sub> H<sub>4</sub> O<sub>2</sub> b) C<sub>3</sub> H<sub>6</sub> O<sub>3</sub> c) C<sub>5</sub> H<sub>1</sub>0 O<sub>5</sub> d) C<sub>4</sub> H<sub>5</sub> O<sub>4</sub>

402. <img src="402\_Q.gif" >

a) 138, 258 b) 258, 138 c) 120, 138 d) 138, 125

403. Freezing point of an aqueous solution is -0.186 ͦC. Elevation of boiling point of same solution would be:

(K\_b=0.512 andK\_f=1.86 K molality^(-1))

a) 0.186 ͦC b) 0.0512 ͦC c) 0.092 ͦC d) 0.237 ͦC

404. What is the amount of urea dissolved per litre if its aqueous solution is isotonic with 10% cane sugar solution? (mol.wt.of urea =60)

a) 200 g/L b) 19.2 g/L c) 17.54 g/L d) 16.7 g/L

405. Distribution law holds good for the distribution of a dissolved substance between :

a) Liquid-liquid phases

b) Liquid-liquid and liquid-gas phases

c) Liquid-liquid and liquid-solid phases

d) Liquid-gas, liquid-liquid and liquid-solid phases

406. 0.004 MNa<sub>2</sub> SO<sub>4</sub> is isotonic with 0.01 M glucose.Degree of dissociation of Na<sub>2</sub> SO<sub>4</sub> is

a) 75% b) 50% c) 25% d) 85%

407. 10 g of iodine is allowed to distribute between H<sub>2</sub> Oand CCl<sub>4</sub>. If the partition coefficient is 85 in favour of CCl<sub>4</sub>, the ratio between volumes of H<sub>2</sub> O and CCl<sub>4</sub> such that 5 g of iodine will be present in aqueous layer is :

a) 1 : 85 b) 85 : 1 c) 170 : 1 d) 1 : 170

408. What happens when an egg is kept in saturated solution of NaCl after removing its hard shell in dilHCl?

a) Egg will swell b) Egg will shrink

c) Egg will remain same d) Egg will first shrink and then swell

409. Vapour pressure of chloroform (CHCl<sub>3</sub>) and dichloromethane (CH<sub>2</sub> Cl<sub>2</sub>) at 25°C are 200 mm Hg and 41.5 mm Hg respectively. Vapour pressure of the solution obtained by mixing 25.5 g of CHCl<sub>3</sub> and 40 g of CH<sub>2</sub> Cl<sub>2</sub> at the same temperature will be :

(Molecular mass of CHCl<sub>3</sub>=119.5 u and molecular mass of CH<sub>2</sub> Cl<sub>2</sub>=85 u)

a) 173.9 mm Hg

b) 615.0 mm Hg

c) 347.9 mm Hg

d) 90.952 mm Hg

410. If the elevation in boiling point of a solution of 10 g of solute (mol. wt. = 100 g of water is ∆T\_b, the ebullioscopic constant of water is

a) 10 b) 100∆T\_b c) ∆T\_b d) (∆T\_b)/10

411. A 0.001 molal solution of [Pt(NH<sub>3</sub> )<sub>4</sub> Cl<sub>4</sub>] in water has a freezing point depression of 0.0054 ͦC. If K\_f for water is 1.80, the correct formulation of the above molecule is :

a) [Pt(NH<sub>3</sub> )<sub>4</sub> Cl<sub>3</sub> ]Cl b) [Pt(NH<sub>3</sub> )<sub>4</sub> Cl<sub>2</sub> ] Cl<sub>2</sub> c) [Pt(NH<sub>3</sub> )<sub>4</sub> Cl] Cl<sub>3</sub> d) [Pt(NH<sub>3</sub> )<sub>4</sub> Cl<sub>4</sub> ]

412. The weight of H<sub>2</sub> C<sub>2</sub> O<sub>4</sub>∙2H<sub>2</sub> O required to pressure 500 mL of 0.2 N solution is

a) 63 g b) 6.3 g c) 0.63 g d) 126 g

413. Equimolar solutions of two non-electrolytes in the same solvent should have :

a) Same b.p but different f.p

b) Same f.p. but different b.p.

c) Same b. p. and same f. p.

d) Different b. p. and different f. p.

414. The vapour pressure of a solution of a non-volatile electrolyte (A) in a solvent (B) is 95% of the vapour pressure of the solvent at the same temperature. If M\_B=0.3 M\_A, where M\_B and M\_A are molecular weights of B and A respectively, the weight ratio of the solvent and solute are :

a) 0.15 b) 5.7 c) 0.2 d) 4.0

415. Y g of non-volatile organic substance of molecular mass M is dissolved in 250 g benzene. Molal elevation constant of benzene of K\_b. Elevation in its boiling point is given by :

a) <img src"415\_A1.gif" > b) <img src"415\_A2.gif" > c) <img src"415\_A3.gif" > d) <img src"415\_A4.gif" >

416. If 〖10〗^(-4) dm^3 of water is introduced into a 1.0 dm^3 flask at 300 K, how many moles of water are in the vapour phase when equilibrium is established?

(Given : Vapour pressure of H<sub>2</sub> O at 300 K is 3170 Pa ; R = 8.314 J K^(-1) mole^(-1))

a) 1.27 ×〖10〗^(-3) mol b) 5.56 ×〖10〗^(-3) mol c) 1.53 ×〖10〗^(-2) mol d) 4.46 ×〖10〗^(-2) mol

417. Two liquids X and Y form an ideal solution at 300K,vapour pressure of the solution containing 1 mol of X and 3, mol of Y is 550 mmHg. At the same temperature, if 1 mol of Y is further added to this solution, vapour pressure of the solution increases by 10 mmHg. Vapour pressure (in mmHg)of XandY in their pure states will be, respectively

a) 200 and 300 b) 300 and 400 c) 400 and 600 d) 500 and 600

418. By dissolving 5g substance in 50 g of water, the decrease in freezing point is 1.2℃. The gram molal depression is1.85℃. The molecular weight of substance is

a) 105.4 b) 118.2 c) 137.2 d) 154.2

419. Which characterises the weak intermolecular forces of attraction in a liquid?

a) High boiling point

b) High vapour pressure

c) High critical temperature

d) High heat of vaporization

420. What is the freezing point of a solution containing 8.1 g HBr in 100 g water assuming the acid to be 90% ionised?

(k\_f for wt.=1.86 K mol^(-1))

a) 0.85^∘ C b) -3.53^∘ C c) 0^∘ C d) -0.35^∘ C

421. Consider the following aqueous solutions and assume 100% ionisation in electrolytes <br />I. 0.1 m urea <br /> II. 0.04 m Al<sub>2</sub> (SO<sub>4</sub> )<sub>3</sub><br />III. 0.05 m CaCl<sub>2</sub>0.005 m NaCl <br />The correct statement regarding the above solution is

a) Freezing point will be lowest for solution I b) Freezing point will be highest for solution IV

c) Boiling point will be highest for solution IV d) Vapour pressure will be highest for solution II

422. A certain substance ‘A’ tetramerises in water to the extent of 80%. A solution of 2.5 g of A in 100 g of water lowers the freezing point by 0.3℃. The molar mass of A is

a) 31 b) 62 c) 122 d) 244

423. The average osmotic pressure of human blood is 7.8 bar at 37℃. What is the concentration of an aqueous NaCl solution that could be used in the blood steam?

a) 0.16 mol/L b) 0.31 mol/L c) 0.60 mol/L d) 0.45 mol/L

424. Which is correct representation for K=c<sub>1</sub>/c<sub>2</sub> relation?

a) The distribution coefficient K is in favour of phase I

b) The distribution coefficient K is in favour of phase II

c) The distribution coefficient is K

d) None of the above

425. The relationship between osmotic pressure at 273 K when 10 g glucose (p<sub>1</sub>), 10 g urea (p<sub>2</sub>) and 10 g sucrose (p<sub>3</sub>) are dissolved in 250 mL of water is

a) p<sub>1</sub>>p<sub>2</sub>>p<sub>3</sub> b) p<sub>3</sub>>p<sub>2</sub>>p<sub>1</sub> c) p<sub>2</sub>>p<sub>1</sub>>p<sub>3</sub> d) p<sub>2</sub>>p<sub>3</sub>>p<sub>1</sub>

426. The molarity of a solution made by mixing 50 mL of concH<sub>2</sub> SO<sub>4</sub> (36 N) with 50 mL of water is

a) 9 m b) 10 m c) 11 m d) 12 m

427. Equimolar solution in the same solvent have

a) Different boiling and different freezing points b) Same boiling and same freezing points

c) Same freezing point but different boiling point d) Same boiling point but different freezing point

428. Blood cells retain their normal shapes in solutions which are :

a) Isotonic to blood

b) Hypotonic to blood

c) Hypertonic to blood

d) Equinormal to blood

429. Volume of water needed to mix with 10 mL N HCl to get 0.1 N HCl is

a) 900 mL b) 9 mL c) 90 mL d) 100 mL

430. A 0.025 M solution of monobasic acid had a freezing point of -0.060℃. The pK\_a for the acid is

a) 1.2 b) 2 c) 2.5 d) 5.7

431. The solubility of a solid in a liquid depends on :

a) Nature of solute b) Nature of solvent c) Temperature d) All of these

432. Temperature coefficient is the variation in the :

a) Distribution coefficient for 1 ͦ rise in the temperature b) Concentration of solution for 10 ͦ rise in the temperature c) Concentration of solution for 1 ͦ rise in the temperature d) Distribution coefficient for 10 ͦ rise in the temperature

433. At low concentrations, the statements that equimolal solutions under a given set of experimental conditions have equal osmotic pressure is true for

a) Solutions of non-electrolytes only b) Solutions of electrolytes only

c) All solutions d) None of the above

434. The van’t Hoff factor(i) for a dilute solution of K<sub>3</sub> [Fe(CN)<sub>6</sub>] is :

a) 10 b) 4 c) 5 d) 0.25

435. Van’t Hoff factor of aqK<sub>2</sub> SO<sub>4</sub> at infinite dillution has value equal to

a) 1 b) 2 c) 3 d) Between 2 and 3

436. A solution containing 500 g of a protein per litre is isotonic with a solution containing 3.42 g of sucrose per litre. The molecular mass of protein is :

a) 5 b) 146 c) 34200 d) 50000

437. Two solutions of substance (non-electrolyte) are mixed in the following manner.

480 mL of 1.5 M first solution +520 mL of 1.2 M second solution.

What is the molarity of the final mixture ?

a) 2.70M b) 1.344 M c) 1.50 M d) 1.20M

438. Osmotic pressure of 0.4% urea solution is 1.60 atm and that of 3.42% cane sugar is 2.46 atm. When the above two solutions are mixed, the osmotic pressure of the resulting solution is

a) 0.82 atm b) 2.46 atm c) 1.64 atm d) 4.10 atm

439. Dissolving 120 g of urea (mol. Wt. 60) in1000 g of water gave a solution of density 1.15 g/mL. The molarity of the solution is

a) 1.78M b) 2.00M c) 2.05M d) 2.22M

440. The relative lowering of vapour pressure of an aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is

a) Vapour pressure b) Osmotic pressure c) Boiling point d) Freezing point

441. Volume of water needed to mix with 10 mL 10 N HNO<sub>3</sub> to get 0.1 N HNO<sub>3</sub> is

a) 1000 mL b) 990 mL c) 1010 mL d) 10 mL

442. Volume of 0.6 M NaOH required to neutralise30 〖cm〗^3 of 0.4 M HCl is

a) 3 : 4 b) 1 : 2 c) 1 : 4 d) 1 : 1

443. At 40 ͦC the vapour pressure in torr, of methyl alcohol-ethyl alcohol solutions is represented by the equation. P=119 X\_A+135; where X\_A is mole-fraction of methyl alcohol, then the value of lim┬(X\_A⟶1)⁡〖P\_A/X\_A 〗is :

a) 254 torr b) 135 torr c) 119 torr d) 140 torr

444. An 1% solution of KCl (I), NaCl (II), BaCl<sub>2</sub>(III) and urea (IV) have their osmotic pressure at the same temperature in the ascending order (molar masses of NaCl, KCl, BaCl<sub>2</sub> and urea are respectively 58.5, 74.5, 208.4 and 60 g mol^(-1)). Assume 100% ionisation of the electrolytes at this temperature

a) I< III< II< IV b) III< I <II< IV c) I <II <III <IV d) III< IV< I <II

445. The vant’s Hoff factor for 0.1 M Ba(NO<sub>3</sub> )<sub>2</sub> solution is 2.74. The degree of dissociation is

a) 91.3% b) 87% c) 100% d) 74%

446. The vapour pressure of water at 23℃ is 19.8 mm. 0.1 mole of glucose is dissolved in 178.2 g of water. What is the vapour pressure (in mm) of the resultant solution?

a) 19.0 b) 19.602 c) 19.402 d) 19.202

447. To form a super saturated solution of salt one must :

a) Cool slowly b) Cool rapidly c) Add some salt to cold solution d) Use a clear vessel

448. An aqueous solution of glucose is 10% in strength. The volume in which 1 g-mole of it is dissolved will be

a) 0.18 L b) 1.8 L c) 0.9 L d) 9.0 L

449. Molal depression of freezing point of water is 1.86 ͦC per 1000 g of water. 0.02 mole of urea dissolved in 100 g of water will produce a lowering of temperature of :

a) 0.186 ͦC b) 0.372 ͦC c) 1.86 ͦC d) 3.72 ͦC

450. The process of extracting a solute from its solution by an immiscible solvent can be more fruitful only if :

a) A large quantity of the solvent is used at once

b) The number of extractions is increased, using small quantities of the solvent

c) The process is carried out at a high temperature

d) Small quantities of the solution are added to the extracting solvent in several instalments

451. If a solution containing 0.072 g atm of sulphur in 100 g of a solvent (k\_f=7.0) gave a freezing point depression of 0.84℃, the molecular formula of sulphur in the solution is

a) S<sub>6</sub> b) S<sub>7</sub> c) S<sub>8</sub> d) S\_9

452. The osmotic pressure of a solution can be accurately measured in the shortest possible time by :

a) Berkeley and Hartley method

b) Morse and Frazer method

c) Pfeffer method

d) None of the above

453. A solution contains 1.2046 × 〖10〗^24 hydrochloric acid molecules in 1 〖dm〗^3 of the solution. The strength of the solution is

a) 6 N b) 2 N c) 4 N d) 8 N

454. Acetic acid on dissolution in benzene will show :

a) Two times of its normal molecular weight

b) Its normal molecular weight

c) Half of its normal molecular weight

d) None of the above

455. Who gave the phase rule?

a) Nernst

b) Willard Gibbs

c) Ostwald

d) Raoult

456. The volume of water to added to 100 〖cm〗^3 of 0.5 NH<sub>2</sub> 〖SO〗<sub>4</sub> to get decinormal concentration is

a) 400 〖cm〗^3 b) 450 〖cm〗^3 c) 500 〖cm〗^3 d) 100〖 cm〗^3

457. In which ratio of volume 0.4 M HCl and 0.9 M HCl are to be mixed such that the concentration of the resultant solution becomes 0.7 M ?

a) Air b) Brass c) Amalgam d) Benzene in water

458. In a mixture of A and B, components show negative deviation when

a) A—B interaction is stronger than A—A and B—B interaction

b) A—B interaction is weaker than A—A and B—B interaction

c) △V\_mix>0,△S\_mix>0

d) △V\_mix=0,△S\_mix>0

459. When a substance is distributed between two immiscible solvents and remains in the same state in the solvent I, while, dissociates in the solvent II. If the concentration of solute are c\_I andc\_II in phase I and II respectively then :

a) <img src="459\_A1.gif" >

b) <img src="459\_A2.gif" >

c) <img src="459\_A3.gif" >

d) <img src="459\_A4.gif" >

460. A non-ideal solution was prepared by mixing 30 mL chloroform and 50 mL acetone. The volume of mixture will be

a) >80 mL b) <80 mL c) =80 mL d) ≥80 mL

461. The values of observed and calculated molecular weights of calcium nitrate are respectively 65.6 and 164. The degree of dissociation of calcium nitrate will be :

a) 25% b) 50% c) 75% d) 60%

462. After adding a solute freezing point of solution decreases to -0.186. Calculate ∆T\_b if k\_f=1.86 andk\_b=0.512

a) 0.512 b) 0.0512 c) 1.86 d) 0.0186

463. At 27 ͦC, the osmotic pressure of a solution containing 4.0 g solute (molar mass = 246) per litre at 27°C is : (R = 0.0821 atms.mol^(-1) K)

a) 0.1 atm b) 0.4 atm c) 0.2 atm d) 0.8 atm

464. When 50 g of lactic acid was mixed with a mixture of equal volume of water and chloroform, the concentration of lactic acid in water was found to be 49.03 g litre^(-1) and in chloroform 0.97 g litre^(-1). The distribution coefficient of lactic acid in favour of water is:

a) 50.55 b) 55.55 c) 60.55 d) 45.55

465. At a constant temperature, which of the following aqueous solutions will have the maximum vapour pressure?

(Mol. wt NaCl =58.5, H<sub>2</sub> SO<sub>4</sub> =98.0 g.mol^(-1))

a) 1 molalNaCl (aq) b) 1 molar NaCl (aq)

c) 1 molalH<sub>2</sub> SO<sub>4</sub> (aq) d) 1 molar H<sub>2</sub> SO<sub>4</sub> (aq)

466. A solution containing 10 g per dm^3 of urea (mol. mass = 60) is isotonic with a 5% (wt.by vol.) solution of a non-volatile solute. The molecular mass (in g mol^(-1)) of non-volatile solute is :

a) 350 b) 200 c) 250 d) 300

467. Non- volatile solute when dissolved in water :

a) Decreases the vapour pressure of water

b) Increases the boiling point of water

c) Decreases the freezing point of water

d) All of the above

468. The solubility of I<sub>2</sub> in water increases in the presence of :

a) Alcohol b) KI c) CCl<sub>3</sub> d) NaOH

469. Normality of 2 M H<sub>2</sub> 〖SO〗<sub>4</sub> is

a) 2 N b) 4 N c) N/2 d) N/4

470. The solubility of a gas increases in a liquid with

a) Decrease in temperature b) Increases in temperature

c) Reduction of gas pressure d) Amount of liquid taken

471. The energy that favours dissolution of a solute in water is known as :

a) Hydration energy

b) Lattice energy

c) Ionization energy

d) Exothermic energy

472. Aqueous solution of 0.004 MNa<sub>2</sub> SO<sub>4</sub> and 0.01 M glucose are isotonic. The degree of dissociation of Na<sub>2</sub> SO<sub>4</sub> is :

a) 25% b) 60% c) 75% d) 85%

473. The most suitable method for the determination of molecular weight of oxyhaemoglobin, a compound of high molecular weight is :

a) Osmotic pressure method

b) Vapour pressure lowering method

c) Elevation of boiling point method

d) None of the above

474. The difference between the boiling point and freezing point of an aqueous solution containing sucrose (mol wt. = 342 gmol^(-1)) in 100 g of water is 105.0^∘ C. If K\_f andK\_bof water are 1.86 and 0.51 K kg mol^(-1) respectively, the weight of sucrose in the solution is about

a) 1 M solution of glucose b) 0.05 M solution of glucose

c) 6% solution of glucose d) 25% solution of glucose

475. In a mixture A and B components show negative deviation as :

a) ∆V\_mix= +ve

b) ∆H\_mix= -ve

c) A-B interaction is weaker than A-A and B-B interaction

d) None of the above reason in correct

476. Which statement is not correct if two immiscible liquids of mol. wt. A and B respectively are mixed in equal amount to have a mixture?

a) <img src="476\_A1.gif" >

b) <img src="476\_A2.gif" >

c) <img src="476\_A3.gif" >

d) <img src="476\_A4.gif" >

477. During depression of freezing point in a solution the following are in equilibrium :

a) Liquid solvent, solid solvent

b) Liquid solvent, solid solute

c) Liquid solute, solid solute

d) Liquid solute, solid solvent

478. The molar freezing point constant for water is 1.86℃ mol^(-1). If 342 g of cane sugar (C<sub>1</sub>2 H<sub>2</sub>2 O<sub>1</sub>1) is dissolved in 1000 g of water, the solution will freeze at

a) -1.86℃ b) -2.86℃ c) +1.86℃ d) +2.86℃

479. Two bottles A and B contains 1M and 1 m aqueous solution of sulphuric acid respectively

a) A is more concentrated than B

b) B is more concentrated than A

c) Concentration of A is equal to concentration of B

d) It is not possible to compare the concentrations

480. 18 g of glucose (C<sub>6</sub> H<sub>1</sub>2 O<sub>6</sub>) is added to 178.2g of water. the vapour pressure of water for this aqueous solution at 100℃ is

a) 759.00 torr b) 7.60 torr c) 76.00 torr d) 752.40 torr

481. Benzene and toluene form nearly ideal solutions. At 〖25〗^∘ C, the vapour pressure of benzene is 75 torr and that of toluene is 22 torr. The partial vapour pressure of benzene at 〖20〗^∘ C for a solution containing 78 g of benzene and 46 g of toluene in torr is

a) 53.5 b) 37.5 c) 25 d) 50

482. The amount of urea dissolved in 500 cc of water (K\_f=1.86℃) to produce a depression of 0.186℃ in the freezing point is

a) 9 g b) 6 g c) 3 g d) 0.3 g

483. Distribution law is a special application of ….and vice-versa.

a) Raoult’s law

b) Henry’s law

c) Dalton’s law

d) None of these

484. In a 0.2 molal aqueous solution of a weak acid HX, the degree of ionisation is 0.3 Taking k\_f for water as 1.85, the freezing point of the solution will be nearest to

a) -0.480℃ b) -0.360℃ c) -0.260℃ d) +0.480℃

485. The molality of a urea solution in which 0.0100 g of urea, [(NH<sub>2</sub> 0<sub>2</sub> CO]is added to 0.3000 〖dm〗^3 of water at STP is

a) 0.555m b) 〖5.55×10〗^(-4)m c) 33.3m d) 〖3.33×10〗^(-2)m

486. Iodine was added to a system of water andCS<sub>2</sub>. The concentration of I<sub>2</sub> in water and CS<sub>2</sub>were found to be C<sub>1</sub>/C<sub>2</sub> respectively. The ratio of C<sub>1</sub>/C<sub>2</sub> will change if :

a) More I<sub>2</sub> is added

b) More CS<sub>2</sub> is added

c) More water is added

d) Temperature is changed

487. A solution of sucrose (Molar mass = 342 g/mol) is prepared by dissolving 68.4 g of it per litre of solution, what is its osmotic pressure (R=0.082 L atmK^(-1) mol^(-1)) at 273 K?

a) 0.01 M Na<sub>2</sub> SO<sub>4</sub> b) 0.01 M KNO<sub>3</sub> c) 0.015 M urea d) 0.015 M glucose

488. At 〖25〗^∘ C, the total pressure of an ideal solution obtained by mixing 3 moles of ‘A’ and 2 moles of ‘B’, is 184 torr. What is the vapour pressure (in torr) of pure ‘B’ at the same temperature? (Vapour pressure of pure ‘A’ at 〖25〗^∘ C is 200 torr)

a) 180 b) 160 c) 16 d) 100

489. If 20 mL of 0.4 N NaOH solution completely neutralizes 40 mL of a dibasic acid, the molarity of the acid solution is

a) 0.1 M b) 0.3 M c) 0.5 M d) 0.7 M

490. 25 mL of a solution of barium hydroxide on titration with 0.1 molar solution of hydrochloric acid gave a titre value of 35 mL. The molarity of barium hydroxide solution was

a) ppm b) Mg/100 cc c) g/L d) g/100 cc

491. Which of the following solutions will have the highest boiling point ?

a) 0.1 M FeCl<sub>3</sub> b) 0.1 M BaCl<sub>2</sub> c) 0.1 M NaVl d) 0.1 M urea

492. The relative lowering of vapour pressure of a dilute aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is about

a) 0.70 b) 0.50 c) 0.90 d) 0.80

493. The vapour pressure of pure liquid is 1.2 atm. When a non-volatile substance B is mixed in A, then its vapour pressure becomes 0.6 atm. The mole fraction of B in the solution is

a) 0.15 b) 0.25 c) 0.50 d) 0.75

494. If liquids A and B form an ideal solution, the

a) Enthalpy of mixing is zero

b) Entropy of mixing is zero

c) Free energy of mixing is zero

d) Free energy as well as the entropy of mixing are each zero

495. Which has the minimum freezing point?

a) One molalNaCl aqueous solution b) One molalCaCl<sub>2</sub> aqueous solution

c) One molalKCl aqueous solution d) One molal urea aqueous solution

496. The depression in f.p. is directly proportional to :

a) Normality b) Molality c) Molarity d) None of these

497. The vapour pressure will be lowest of

a) Hypertonic solution b) Hypotonic solution

c) Isotonic solution d) None of the above

498. In countries nearer to polar region, the roads are sprinkled with CaCl<sub>2</sub>. This is

a) To minimise the wear and tear of the roads

b) To minimise the snow fall

c) To minimise pollution

d) To minimise the accumulation of dust on the road

499. What is the molarity of 0.2 N 〖Na〗<sub>2</sub> 〖CO〗<sub>3</sub>solution?

a) 0.1 M b) 0 M c) 0.4 M d) 0.2 M

500. Solubility of deliquescent substances in water is generally :

a) High b) Low c) Moderate d) Cannot be said

501. An aqueous solution is 1.0 molal in KI. Which change will cause the vapour pressure of solution to increase :

a) Addition of NaCl

b) Addition of Na<sub>2</sub> SO<sub>4</sub>

c) Addition of 1.0 molal KI

d) Addition of water

502. Which one of the following is not correct for an ideal solution?

a) It must obey Raoult’s law b) △H = 0

c) △V = 0 d) △ H = V ≠0

503. A solution containing 4 g of polyvinyl chloride in 1 litre of dioxane was found to have an osmotic pressure of 6 ×〖10〗^(-4) atm at 300 K. The molecular mass of the polymer is :

a) 3×〖10〗^3 b) 1.6×〖10〗^5 c) 5×〖10〗^4 d) 6.4×〖10〗^2

504. The normality of mixture obtained by mixing 100 mL of 0.2 M H<sub>2</sub> 〖SO〗<sub>4</sub> +

100 mL of 0.2 M NaOH is

a) 0.2 b) 0.01 c) 0.1 d) 0.3

505. For a dilute solution, Raoult’s law states that

a) The lowering of vapour pressure is equal to mole fraction of solute

b) The relative lowering of vapour pressure is equal to mole fraction of solute

c) The relative lowering of vapour pressure is proportional to the amount of solute in solution

d) The vapour pressure of the solution is equal to the mole fraction of solvent

506. 1 kg of NaOH solution contains 4 g of NaOH. The approximate concentration of the solution is

a) About 0.1 N b) Decinormal c) 0.1 molal d) 0.1 molar

507. 6 g urea is dissolved in 90 g water. The relative lowering of vapour pressure is equal to :

a) 0.0196 b) 0.06 c) 1.10 d) 0.0202

508. The molar freezing point constant for water is 1.86°C/mol. If 342 g of cane sugar (C<sub>1</sub>2 H<sub>2</sub>2 O<sub>1</sub>1) is dissolved in 1000 g of water, the solution will freeze at

a) -1.86℃ b) 1.86℃ c) -3.92℃ d) 2.42℃

509. Which is correct about Henry’s law?

a) There should not be any chemical interaction between the gas and liquid

b) The gas in contact with the liquid should behave as an ideal gas

c) The pressure applied should be high

d) All of the above

510. The mass of glucose that should be dissolved in 50 g of water in order to produce the same lowering of vapour pressure as is produced by dissolving 1 g of urea in the same quantity of water is

a) 1 g b) 3 g c) 6 g d) 18 g

511. The volume of 10 N and 4 N HCl required to make 1L of 7 N HCl are

a) 0.50 L of 10 N HCl and 0.05 L of 4 N HCl b) 0.60 L of 10 N HCl and 0.40 L of 4 N HCl

c) 0.80 L of 10 N HCl and 0.20 L of 4 N HCl d) 0.75 L of 10 N HCl and 0.25 L of 4 N HCl

512. A solution of sulphuric acid in water exhibits :

a) Negative deviations from Raoult’s law

b) Positive deviations from Raoult’s law

c) Ideal properties

d) The applicability of Henry’s law

513. The molarity of the solution obtained by dissolving 2.5g of NaCl in 100 mL of water is

a) 0.00428 moles b) 428 moles c) 0.428 moles d) 0.0428 moles

514. Which one is a colligative property?

a) Boiling point b) Vapour pressure c) Osmotic pressure d) Freezing point

515. A solution contains non-volatile solute of molecular mass M<sub>2</sub>. Which of the following can be used to calculate the molecular mass of solute in terms of osmotic pressure?

a) <img src="515\_A1.gif" >

b) <img src="515\_A2.gif" >

c) <img src="515\_A3.gif" >

d) <img src="515\_A4.gif" >