Exercise 2 (Going to step by step)

Comparison of gases, liquid and solids

1. In a phase change (say solid to liquid to solid) $\Delta G = \Delta H - T\Delta S$ Where

(a) ΔH is the enthalpy change associated with making or breaking the intermolecular attractions that hold solid and liquid together and ΔS. Is associated with change in disorder between the various phases

(b) ΔH is associated with change in disorder while ΔS is associated with energy change

(c) both are associated with change in disorder

(d) both are associated with change in energy

2. phase change from gas to solid is called

  (a) Sublimation
  (b) Deposition
  (c) Fusion
  (d) Vaporization

3. there are some phase changes for which ΔH

  I.   Sublimation
  II.   Deposition
  III.   Freezing
  IV.   Condensation
  V.   Fusion
  VI.   Vaporization

There are phase changes can be

  (a) I, II, III
  (b) I, II ,V ,VI
  (c) IV ,V , VI
  (d) I, V, VI

4. Randomness (disorder) increases in the order

(a) Gas→ liquid→ solid

(b) Gas →solid →liquid

(c) Solid →liquid→ gas

(d) Solid→ gas→ liquid

5. When a phase –change takes place

$(a) \Delta H_{\text{sublimation}} = - \Delta H_{\text{deposition}}$

(b) $\Delta H_{\text{sublimation}} = \Delta H_{\text{fusion}} + \Delta H_{\text{svaporisation}}$

(c) $- \Delta H_{\text{sublimation}} = \Delta H_{\text{condensation}} + \Delta H_{\text{freezing}}$

(d) All of the above are correct

6. Some of the following properties liquids arise been the molecular interaction and thermal energy

I.   Vapor pressure   II. Surface tension   III. Viscosity

They are

(a) I, II   (b) I, III

(c) II, III   (d) **I, II, III**

7. Molecular interactions between molecules is in order

(a) Solid < liquid< gas

(b) Solid < gas < liquid

(c) Gas < liquid < solid

(d) Liquid < solid < gas

8. Which is compressible fluid?

(a) Gas

(b) Liquid

(c) Solid

(d) All of these

9. Which has negligible translator motion?

(a) Gas

(b) Liquid

(c) Solid

(d) All of these

10. Select the incorrect statement

   (a) Gases are compressible fluids
   (b) The molecular interaction energy practically over the thermal energy in solid state
   (c) Molecular interactions between molecules are in steam,water and ice
   (d) Liquid is incompressible fluid

Vapor pressure

11. Select the correct statements

   (a) When evaporation takes place,colling takes place
   (b) Evaporation takes place at all temperatures, takes place only at the boiling point
   (c) Evaporation is a surface phenomenon
   **(d) All of the above**

12. Calculus – Capron equation is

   (a) $\dfrac{d\,log_{10}\,p}{dT} = \dfrac{\Delta H}{2.303\,RT^2}$

   (b) $\dfrac{d\,log_{10}\,p}{dT} = \dfrac{\Delta H}{2.303\,RT}$

   (c) $\dfrac{d\,log_{10}\,p}{dT} = -\dfrac{\Delta H}{2.303\,RT^2}$

   (d) $\dfrac{d\,log_{10}\,p}{dT} = \dfrac{\Delta H}{2.303\,RT}$

13. Boiling point of water at a place is found to be 110°C place

   (a) External pressure is less than I arm
   (b) External pressure is greater than I arm
   (c) External pressure is equal to 1 arm
   (d) Cooking takes longer time

14. Graphically variation of $log_{10}p$ with $\frac{1}{T}$ is shown

(Slope of the line) = - 2 k, latent heat of vaporizations given liquid is
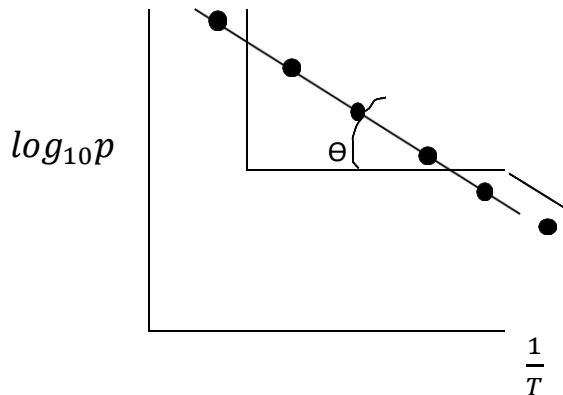
(a) 2.303 cal mol^{-1} (b) 4.606 cal mol^{-1}

(c) **9.212 cal mol^{-1}**   (d) 4.00 cal mol^{-1}

15. Clausius-clapeyron equation can also be written as

$P = Ae^{-\Delta H/RT}$

Where. A is called pre-exponential factor. If

$$log_{10}\ p(mm) = -\frac{4000\ (K)}{T} + 10$$

Then a and   (in terms of (k) respectively are

(a) 10_1-4000*2303*R
(b) 10_1 4000*2300*R
(c) **10^{10}-4000*2303*R**
(d) 10^{10} ,4000*R

Surface tension

16. Two bubbles of different radial are connected by a hole tube then

(b) Smaller bubbles gets smaller, larger gets larger
(c) **Smaller bubbles gets larger and larger gets smaller**
(d) Both get smaller
(e) Both get larger and ultimately burst

17. Downward force due to gravity when liquid (density d) is in column of radars r set-up at   height h is balanced by upward thrust due to surface tension. Hence

(a) $2\pi r \, y = r^2 \, hdg$ (b) $2\pi r \, y = hdg$

(c) $r \, y = \pi \, hdg$ (d) **$2 \, y = rhdg$**

18. When one end of the fine capillary which is open at both ends is immersed in water, water would completely fill in

It is due to

(a) Surface tension which pulls the water into the capillary
(b) The surface tension which great enough to overcome the attraction of gravity in water in fine capillary
(c) Both (a) and (b)
(d) None of the above

19. some of the following statements are correct

I.The water drop in cave is perfectly spherical
II.The shape of water drop is distorted due to action gravity
III.Soaps and detergents drastically decrease the surface tension of water
IV.As temperature increases surface tension also increased and becomes maximum at critical temperature

Select the correct statements.

(a) I,II,III,IV
(b) I,III,IV
(c) I,II,III
(d) I,III

20. Some of the following decrease surface tension of a liquid

I.Increase in temperature of the liquid
II.Mixing do detergent in the liquid
III.Decrease in temperature

These can be

(a) II,III

(b) I,II

(c) II only

(d) I only

Viscosity

21. One of the following properties increases with temperature

(a) Viscosity

(b) Surface tension

(c) Vapor pressure

(d) Density

22. Some of the following properties are transport properties

I.   Viscosity
II. Surface tension
III. Thermal conductance
IV. Diffusion

Select the correct alternate of transport properties

(a) I,II,III,IV

(b) I,III,IV

(c) I,III

(d) III,IV

Chapter 6 liquid state

23. This property increases with increase in temperature

(a) Viscosity of liquid

(b) Viscosity of gas

(c) Both (a) and (b)
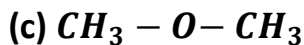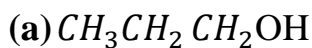
(d) None of these

24. Which is equal to 1 kg $m^{-1}s^{-1}$?

(a) 0.01 poise

(b) 0.001 poise

(c) 1 poise

(d) 10 poise

25. Effect of temperature of viscosity is given by

(a) Hole theory
(b) Arrhenius theory
(c) Adsorption theory
(d) Collision theory

Exercise 3

1. Which has maximum vapour pressure at a given temperature?

(a) $CH_3CH_2 CH_2OH$ (b) ⟨○⟩—OH

(c) $CH_3 - O - CH_3$ (d) CH_3COOH

2. Following properties decrease with increase temperature except

(a) Surface tension
(b) Viscosity
(c) Density
(d) Vapour pressure

3. At critical pemperature of aliquid , surface tension is

(a) Zero
(b) Infinite
(c) Varies liquid to liquid
(d) Cant be measured

4. Unit of viscosity is

(a) Poise dyne/cm
(b) Joule/m
(c) Joule

5. which is true statement?

(a) All liquids have concave meniscus

(b) All liquids have convex meniscus

(c) Mercury has convex and other liquids have convex meniscus

(d) Mercury has concave and other liquids have convex meniscus

6. One poise is equal to

(a) 100 centipoises

(b) 0.1 kg $m^{-1}s^{-1}$

(c) Both (a) and (b)

(d) None of the above

7. Which is not a surface phenomenon?

(a) Surface tension

(b) Viscosity

(c) Evaporation

(d) All of the above

8. Clauslus – clapeyron equation is

(a) $\frac{d \log p}{dT} = \frac{\Delta H \, vap}{2.303 \, RT^2}$

(b) $\text{Log p} = \log A - \frac{\Delta H_{vap}}{2.303 \, RT}$

(c) Both (a) and (b)

(d) None of the above

9. surface tension of water is 73 dyne cm at 20 if surface area is increased by 0.10 m work done is

(a) 7.3 erg　　　　　　　　　(b) **7.3×10 erg**

(c) 73 j　　　　　　　　　　　(d) 0.73 j

10. $H_2O \, (/)\overset{1}{\rightleftharpoons} H_2O(g)$, $\Delta H_{vap} = 10$ kcal mol^{-1}
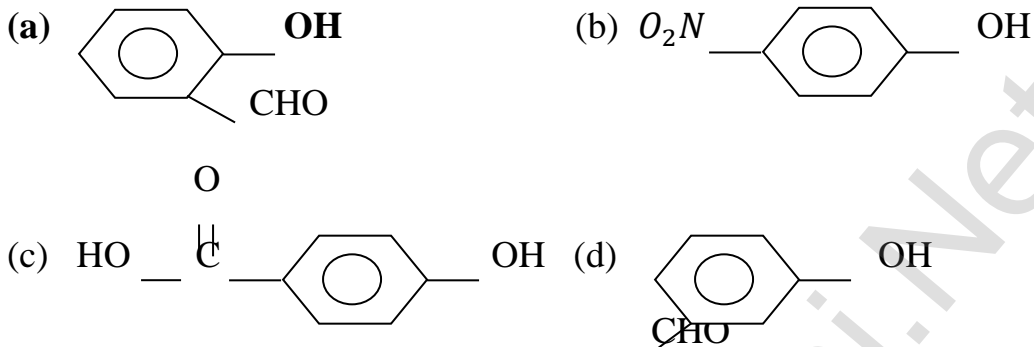
If pressure is increased

(a) Steam is liquefied

(b) B.p . of H O is elevated

(c) Both (a) and (b)

(d) None of the these

11. incompressible matter is

   (a) Liquid   (b) **Solid**

   (c) Gas   (d) All of these

12. which is the maxmim volatile?

(a)

OH
CHO

(b) O_2N

OH

(c) HO
$\overset{O}{\underset{\|}{C}}$

OH

(d)

OH
CHO

13. If surface area is increased

   (a) Evaporation increases
   (b) B.p increases
   (c) M.p increases
   (d) Surface tension increase

14. if detergent is added

   (a) Surface tension decreases
   (b) Surfaces tension increases
   (c) Surface tension can increase or decrease
   (d) No effect

15. types of forces that can be present in ethanol giving in liquid state

   (a) Dipole – dipole interaction
   (b) London forces
   (c) Hydrogen bonding
   (d) All of these

16.of these quantities, the one that we expect to be largest

     (a) Molar heat capacity of liquid
     (b) Heat of fusion
     (c) Heat of vaporization
     (d) Heat of sublimation

17.of the compounds HFCH_4 CH_3OH and N_2H_4 hydro bonding as important intermolecular force is expected in

(a)   None of these
(b)   Two of these
(c)   All but one of these
(d)   All of these

18.the intermolecular force of attraction between non-po molecules is called

(a)   H- bonding
(b)   Dispersion forces
(c)   Interionic attraction
(d)   Adhesive forces

19.evaporation and boiling differs

(a)   Evaporation is spontaneous at all temperatures while boiling is at constant temperature
(b)   Boiling is spontaneous at all temperatures when evaporation takes place at constant temperature
(c)   Both are spontaneous at all temperatures
(d)   Evaporation is exothermic while boiling is endotherr

20. if latent heat of vaporization is Lat boiling point T(K)entropy of vaporization is

(a)   LT
(b) LT^{-1}
(c) TL^{-1}
(d)   None of these

21. As heat removed from a liquid which tends to super its temperature drops below the freezing point and the rises suddenly/ what is the source of heat which causes temperature rise?

(a) **The enthalpy of fusion**

(b)   The enthalpy of vaporization

(c)   The enthalpy of sublimation

(d)   The enthalpy of edosition

22. as super cooled water freezes spontaneously temperature rises to ……..for the spontaneous equal to 0°C ΔH

$H_2O(/) \text{ at } -10\ °c \rightarrow H_2O(/)\text{at } O°c$
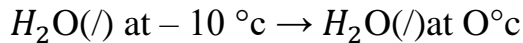
(a)enthalpy of fusion   (b) enthalpy of vaporization

(c) enthalpy of sublimatin   (d) **zero**

23.1 g of $l_2$1 is in 10 ml $CHCL_3$ when 400 ml $H_2O$is added it, concentration of I in $CHCL_3$ falls to 0.80 g partition coefficient of I in $CHCL_3$and H_2

(a) 400   (b) 200

(c) 300   (d) **160**

24. Partition coefficient of I in CCL_4 CCL and H_2O is 400. 10ml CCL_4solution containing 1 g l_2 shaken with 0.4 LH_2O l_2 extracted into water when equilibrium is attained will

(a) $\frac{1}{11}$ **g**   (b) $\frac{10}{11}$ g

(c) $\frac{1}{10}$ g   (d) $\frac{1}{9}$ g

25. benziic acid is distributed between water and been concentration of benzoic acid in two layers are:

Conc.	I	II	III
C(in H_2O)	0.1M	0.2M	0.3M
C(in benzene)	0.01M	0.04M	0.09M

Hence, benzoic acid is

(a) Monomer in both layers

(b) Dimmer in both layers

(c) Mon0omer in water and dinner in benzene

(d) Monomer in benzene and dinner in water

26. distribution coefficient of solute X between either and is 2. G of solute X is extracted either by 100 ml of it then

(a) 0.75 g of X is in 100 g water . if it is used in one of 100 ml
(b) 0.75 g of X is extracted into either if it is used in two of 50 ml each
(c) Both (a) and (b)
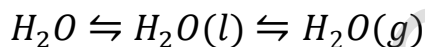(d) None of the above

27. select the correct statements

(a) E standard temperature is the temperature which the vapour pressure of the substance is 1 ball
(b) The normal boiling temperature is the temperature which the vapour pressure of the substance is the temperature
(c) Substances for which T > T_c and p > p_c are called critical fluids
(d) All the above are correct statements

28. phase rule is giben by F=C-P+2 where.F is degree freedom. C is the number of components and Pthe number phases. At triple point in the following equiluburam

$$H_2O \leftrightharpoons H_2O(l) \leftrightharpoons H_2O(g)$$

F is equal to

(a) 0   (b) 1   (c)2   (d) 3

29. number of phases in the following equilibrium is

(a) 1   (b) 2   (c) 3   (d) can t be predicted

30. select the incorrect statement

(a)   The properties of liquid crystals are inter between liquids and solids
(b)   Surface tension of a liquid is maximum at temperature
(c)   Viscosity decreases with increase in temperature
(d)   CO and   HO show the unusual properties supercritical fluids

31. in luquid gas equilibrium the pressure of vapours liquid is constant at

    (a) low temperature   (b) high temperature

    (c) **constant temperature** (d) none of these

32. the best scicntific method to test the presence of water liquid is

    (a) use of litmus paper   (b) taste

    (c) **use of anhydrous CuSO**   (d) smell

33.the nature of intermolecular forces among molecule is

    (a) Hydrogen bonding   (b) **dispersion forces**

    (c) Dipole-dipole attraction (d) ion- dipole attraction

34. distribution law cannot be applicable for a system Iis distributed in between

    (a) **water and alcohol**   (b) water and benzene

    (c) water and chloroform   (d) water and acetone

35. mixture of aniline and water can be separated by

(a) Vacuum distillation
(b) Chromatography
(c) Separating funnel
(d) Steam distillation

36.consider the following statements

I.   Density of water maximum at 277 K
II.   Density of water increases from 273 to 277 beyond this decreases as dxpansion predominal
III. Due to extensive hydrogen bonding,water has high capacity

Select the correct statements

(a) I,II   (b)I I,III
(b) I,III   (d) **I,II,III**

37. supercritical CO Sc CO is ideally suited in

(a) Food processing
(b) Production of pharmaceuticals
(c) Both (a) and (b)
(d) None of the above

38.supercritical fluid chromatography SFCuser mobile which is

(a) **supercritical CO**   (b) supercritical H O

© supetcritical NH   (d) supercritical CHC

39.select the correct statements

(a) A great advantage of Sc CO   is that where are residues once the solvent has been allowed to
(b) ScCO is being used for dry cleaning which use of carcinogenic and environementally chlorinated hydrocarbons
(c) Supercritical eater ScH O also exists
(d) All the above are correct statements

40. select the correct statements

(a) Liquid lead does not wet a solid iron surface interfacial tension between these two phases large
(b) Alloys of tin and lead are used in soldering interfacial tension between the liquid and reduced and the liquid flows over the solid
(c) Both (a) and (b)
(d) None of the above