Exam 3 Solution

Indicate the number and type of ***components***, and number and type of ***phases*** in the following cases:

1- Pure ice and water is b) 1-component 2-phase

2- Ge-20wt%Si solid solution alloy – c) 2-component 1-phase

3- SiO_2 Glass containing B_2O_3 network former c- **2 components (SiO_2 and B_2O_3)**
- **1 phase (glass)**

4- Sweetened Ice Tea f) 3-component 2-phase
- 3 components (sweetener or sugar, H_2O, and Tea)
- 2 phases (solid ice and liquid with sugar and tea dissolved in it)

5- solid solution of Cu and Ni c) 2-component 1-phase

6- The Gibbs phase rule for a two component system with *variable* pressure AND *variable* temperature is given by: **F+P = 2 / P = 3-F** (P+F = 4

7- What is the degree of freedom for Pb-Sn (α-phase) solid solution alloy at 1 atm.

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

C=2, P=1, F=2-1+1=2

8- Isomorphous Phase diagram occurs in?

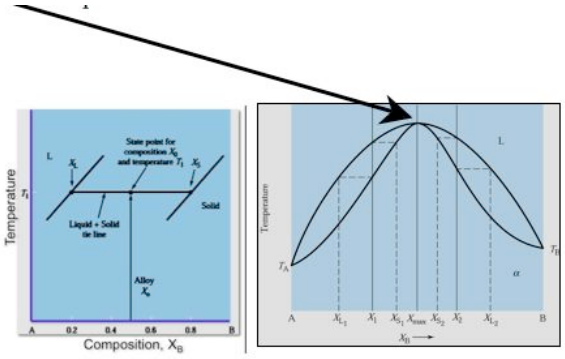
a)Substitutional Alloy b)Interstitial Alloys c)None of the above

9- 1- What does this point represent?

a) Eutectic point

b) Congruent melting

c) Eutectoid point



10- According to the lever rule, what is the fraction of liquid phase?

a) X_O-X_S / X_L-X_S

b) X_L-X_O / X_L-X_S

c) None of the above

In the following diagram

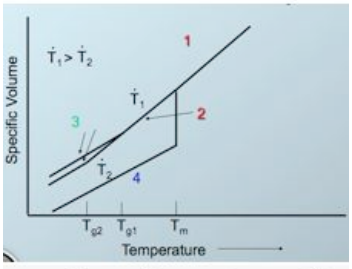
11- What does region 1 represent

a)Liquid

b)Glass

c)Crystal

d)Supercooled liquid



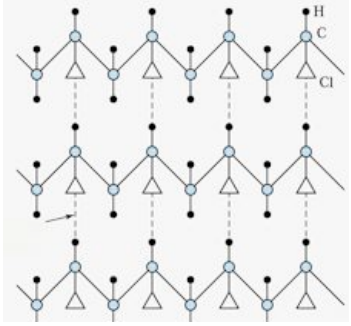
12- Region 2

a)Liquid

b)Glass

c)Crystal

d)Supercooled liquid



13- The following is an example of

a)Isotactic b)Syndiotactic e)Atactic

14- A thermoset polymer is:

a) Is a cross linked polymer

b) The polymer chains of bonded through Wan der Waals

c) None of the above

Can the following techniques can be used to detect when a glassy metal crystallizes?

15 the change in temperature

a-yes b- No

16 Use x-ray diffraction

a-Yes b- No

17 Using the changes in the density or the specific volume…

a-Yes b-No

18- Degree of Polymerization is

a) The total number of atoms in a single polymer chain

b) The number of mers linked together in a single polymer chain

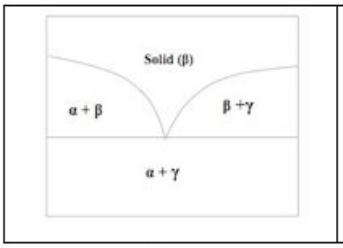
c) The weight of the repeat units

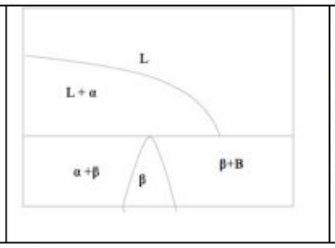
19-Polydispersity of 1 means

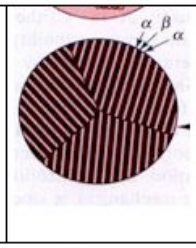
a) All Mers have the same number of atoms in a single polymer chain

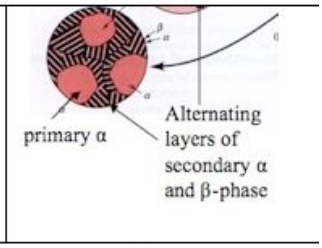
b) All molecules have the same number of mers

c) All molecules have the same molecular weight









20 21 22 23

20- The following reactions are:

a) Eutectic b) Eutectoid c) Peritectic d) Peritectoid

21- What does this Microstructure represent?

a) Eutectic b) Eutectoid c) Peritectic d) Peritectoid

22- The following Microstructures represent?

a) Eutectic b) Eutectoid c) Hypoeutectic d) Hypereutectic

23- The following Microstructures represent?

a) Eutectic b) Eutectoid c) Hypoeutectic d) Hypereutectic

24- The size of the primary α grains in problem 23 is determined from:

a- Depends on the stoichiometry

b- The lever rule applied to the composition below the Eutectic Temperature

c- The lever rule applied to the composition above the Eutectic Temperature

d- None of the above

25- What is the difference between α iron and γ iron

a- α iron has more carbon in it

b- Different stoichiometry

c- Different crystal Structure

d- None of the above