2nd year 2nd sem 1st mid R10

MMS

1. Which of the following stainless steels cannot be hardened by heat-treatment?:->**Austenitic and ferritic**
2. The only heat-treatment that can be applied to ferritic stainless steels is ---------:->**Annealing**
3. 18-8 stainless steel consists ----------:->**18% Cr and 8% Ni**
4. In austenitic stainless steels, the total content of Nickel and Chromium will be at least ---------- % :->**23**
5. Which of the following stainless steels are non-magnetic? :->**Austenitic**
6. The corrosion resistance of stainless steels is high due to the presence of high amount of ----------:->**Cr**
7. The corrosion resistance of which of the following stainless steels will be maximum?:->**Austenitic**
8. The microstructure of 12% Chromium steels in the annealed condition consists ----------:->**Small carbide particles in a ferrite matrix**
9. The microstructure of 18%Cr, 8%Ni steel after annealing consists ---------:->**All austenitic**
10. The maximum carbon content in 304L stainless steel is about --------- %:->**0.03**
11. Cemented carbides are manufactured by ---------- technique:->**Powder metallurgy**
12. The most widely used tungsten base high speed tool steel contain tungsten of about ---------- percent:->**18**
13. In high speed tool steels, the carbon content varies between --------- % :->**0.7 to 1.0**
14. The most widely used tungsten-base tool steel is ---------:->**18-4-1**
15. The machinability and general workability of tool steels will ---------- with increase in carbon content.:->**Decrease**
16. In 18-4-1 high speed tool steels, the amount of Vanadium is --------%:->**1**
17. In 18-4-1 high speed tool steels, the amount of chromium is --------% :->**4**
18. The only alloying element which decreases hardenability is --------- :->**Co**
19. The carbon content in shock-resisting tool steels varies between ---------% :->**0.45 to 0.65**
20. The principal alloying elements in mold steels are ---------- :->**Cr and Ni**
21. Fine-grained Manganese steels are often used for ---------- :->**Gears, axles and spline shafts**
22. Which of the following element in steels has an outstanding ability to combine with sulfur?:->**Mn**
23. Which of the following steels contain Manganese of about 12% :->**Hadfield Manganese steels**
24. Hadfield manganese steel usually contain manganese of about ---------- percent:->**12**
25. Maraging steels contain carbon of about ---------- % :->**0.03**
26. Which of the following element in steels will reduce the harmful effect of hot-shortness?:->**Mn**
27. The function of manganese in manganese steels is ---------- :->**Acts as deoxidizer and reduces tendency towards hot shortness**
28. Nickel content in Nickel maraging steels will be about --------- % :->**20**
29. Due to the use of low aging temperatures, distortion will be less in -------- steels:->**Maraging**
30. Which of the following is a function of Vanadium in steels? :->**Acts as a powerful deoxidizer and inhibits grain growth**
31. Which of the following is a function of 'P' in steels?:->**Strengthens low carbon steels**
32. Which of the following is a function of silicon in steels?:->**Acts as a deoxidizer**
33. The addition of alloying elements to steels will increase ---------- :->**Strength, wear resistance and corrosion resistance**
34. Which of the following alloying elements will reduce the austenitic region in Fe-Fe_3C diagram?:->**Mo**
35. Which of the following is an austenite stabilizer? :->**Ni**
36. Which of the following alloying elements will reduce the eutectoid temperature?:->**Ni**
37. The presence of which of the following alloying element will raise the critical temperature in the Fe-Fe_3C diagram on heating? :->**Mo**
38. The presence of which of the following alloying element will lower the critical temperature line in the Fe-Fe_3C diagram on heating?:->**Ni**
39. Steels containing --------- are less susceptible to temper brittleness than other alloy steels. :->**Mo**
40. Which of the following steels are more brittle? :->**High carbon steels**
41. Which of the following steels cannot be hardened by heat-treatment?:->**Low carbon steels**
42. The amount of carbon present in high carbon steels is ---------- % :->>**0.6**

43. The amount of carbon present in medium carbon steels is ---------- % :->**0.3 to 0.6**
44. The amount of carbon present in low carbon steels is ---------- %:->**0 to 0.3**
45. When 0.2%C steel is heated just above the A1 line, pearlite will transform to -------:->**Austenite**
46. The microstructure of 0.2%C steel above A_3 line consists ----------:->**Fine-grained austenite**
47. Proper annealing temperature for hypo eutectoid steels is approximately --------:->**50F above the A_3 line line**
48. The recommended austenizing temperature for hypo eutectoid steels is about ---------- :->**50F above the upper critical temperature line**
49. The effect of addition of small amount of chromium to the cast irons is ---------- :->**Increases strength and decreases machinability**
50. Small addition of chromium to cast irons will decrease ---------- :->**Machinability**
51. Ferritic nodular iron consists ---------- in a ferritic matrix :->**Graphite spheroids**
52. The total carbon content of nodular cast iron is same as in ---------- cast iron:->**Grey**
53. Spheroidal graphite cast iron is also known as ---------- :->**Nodular cast iron**
54. The addition of Vanadium to the cast irons between 0.1 to 0.25% will ---------:->**Increase tensile strength and hardness**
55. Which of the following is a strong carbide forming element? :->**Cr**
56. Which of the following element will be added to the ladle just before casting to form nodules? :->**Mg**
57. The addition of 14 to 38% Nickel to grey irons results in -------- :->**High heat resistance and low expansivity**
58. The addition of about 4% Nickel in combination with 1.5% Chromium will improve ---------- of white cast iron :->**Abrasion resistance**
59. Most grey cast irons contain carbon between ---------- % :->**2.5 to 4**
60. Most grey cast irons are --------- :->**Hypo eutectic alloys**
61. Which of the following is an industrial application of pearlitic malleable iron?:->**Axles, camshafts and crankshafts**
62. A fully ferritic malleable iron can be converted to pearlitic malleable iron by which of the following treatments? :->**Reheating above the lower critical temperature followed by rapid cooling**
63. The purpose of malleabilization is to convert all the combined carbon in white cast iron into ----------:->**temper carbon and ferrite**
64. Which of the following is a strong graphitizer? :->**Si**
65. The graphitization process can be aided by ----------:->**Adding silicon**
66. In the malleabilization treatment, white cast iron will be heated between ----------F :->**1650 to 1750**
67. Completely white cast irons are limited in engineering applications because of their ---------:->**High brittleness**
68. Which of the following is not an application of white cast iron? :->**Springs**
69. Hyper eutectic cast irons contain carbon between ---------- % :->**4.3 to 6.67**
70. Hypo eutectic cast irons conatin carbon between ---------- % :->**2.0 to 4.3**
71. In ---------- cast irons all the carbon will be in the combined form. :->**White**
72. Cast irons contain carbon between ----------% :->**2.0 to 6.67**
73. Which of the following is used as a starting material for malleable cast iron?:->**White cast iron**
74. The micro structure of white cast iron consists of ---------- at 250X magnification:->**Pearlite and cementite**
75. The tensile strength of white cast iron is about ---------- Psi :->**20,000 to 70,000**
76. The density of white cast iron is about ---------- Kg/m^3 :->**7.7×10^3**
77. Iron carbide, a common constituent of steels is ---------- :->**An intermetallic compound**
78. According to Hume Rothery, for the formation of solid solution, the difference in atomic radii should be less than about ----------%:->**15**
79. Complete solid solubility of two elements will be attained when the elements have ---------- :->**Same type of crystal lattice structure**
80. ---------- are formed when atoms of small atomic radii fit into the spaces of the lattice structure of the larger solvent atoms.:->**Interstitial solid solution**
81. A solution in which, the atoms of the solute substitute for atoms of the solvent in the lattice structure of the solvent is known as ----------:->**Substitutional solid solution**
82. The minor part of the solution is known as ----------:->**Solute**

83. In Hume Rothery rules for extensive solid solubility, the atomic diameter of the solute and the solvent atoms should not differ by more than ---------- %:->**15**
84. According to Hume Rothery, which of the following factors favor the formation of solid solution? :->**Elements with size difference less than 15%**
85. The maximum solubility of carbon in α -iron is ---------- percent at 1333F:->**0.025**
86. For ASTM grain size number n=3, the number of grains per square inch at 100X magnification are --------:->**4**
87. For ASTM grain size number n=2, the number of grains per square inch at 100X magnification are ---------- :->**2**
88. The number of grains per square inch at 100X magnification is given by -------:->$N = 2^{n-1}$
89. Which of the following method is used for the measurement of grain size? :->**Comparison, intercept and planimetric methods**
90. The number of grains per square inch at 100X magnification is 256. The ASTM grain size number is ---------- :->**9**
91. The number of grains per square inch at 100X magnification is 16. The ASTM grain size number is ---------- :->**5**
92. The length of the line in millimeters divided by the average number of grains intersected by it gives--------:->**Grain diameter**
93. For measuring the size of non-equiaxed grains, which of the following methods is preferred?:->**Heyn's intercept method**
94. If the equivalent number of whole grains at a magnification of 200X was 62, and Jafferies multiplier is 8.0, the number of grains per square millimeter is equal to ---------:->**496**
95. If the equivalent number of whole grains is 75, at a magnification of 100X and Jafferies multiplier is 2, the number of grains per square millimeter is equal to ---------:->**150**
96. With increasing cold work ::->**Tensile strength increases and electrical conductivity decreases**
97. As compared to the nucleation rate maximum, the growth rate maximum will be at -------:->**A higher temperature**
98. The recrystallization temperature decreases with ---------:->**decreasing cold working temperature**
99. The process of nucleation and growth of new strain free crystals, which replace all the deformed crystals of the worked materials is called ----------:->**Recrystallization**
100. Grain growth occur in the temperature range----- :->**0.4 - 1.0Tm**
101. Which of the treatment results in fine grain size? :->**Increasing nucleation rate**
102. Which of the following method is used for the measurement of grain size? :->**Comparison, intercept and planimetric methods**
103. The free energy decrease during recrystallization comes mainly from ------- :->**Lower energy of the new crystal structure**
104. The recrystallization rate increases with: :->**Decreasing initial grain size**
105. If the interfacial energy increases by 10%, the homogeneous nucleation barrier for a spherical particle increases by ----------% :->**133**
106. The heat of fusion of metals will be in the range of ---------- KJ/mole:->**10-15**
107. The crystal structure of Aluminum is -------- :->**FCC**
108. The crystal structure of Nickel is ---------:->**FCC**
109. The crystal structure of gold is -------- :->**FCC**
110. The crystal structure of silver is --------:->**FCC**
111. The main technique employed for determining the crystal structure is ----------:->**X-ray diffraction**
112. Hydrogen bonds are stronger than -------- :->**Vander waals bonds**
113. The crystal structure of which of the following metal is BCC? :->**Molybdenum**
114. The crystal structure of which of the following metal is HCP? :->**Cadmium**
115. If the Fe-Fe bond length is 2.48A^0, the radius of the iron atom is ---------A^0:->**1.24**
116. Thermal expansion of materials arises from ------:->**Asymmetry of potential energy curve**
117. The fraction of eutectoid ferrite in 0.2%C steel is -------- :->**0.22**
118. The fraction of proeutectoid ferrite in 0.2%C steel is -------- :->**0.75**
119. The fraction of proeutectoid cementite in 1.0%C steel is ---------- :->**0.034**
120. The fraction of proeutectoid cementite in 1.4%C steel is ---------- :->**0.10**

121. The fraction of pearlite in a slowly cooled 0.6% C steel is ---------- :->**0.75**
122. The fraction of proeutectoid ferrite in a slowly cooled 0.6%C steel is ----------:->**0.25**
123. If the fraction of liquid with 57%B, which is in equilibrium with solid of 82%B is 0.7, the overall composition is ----------:->**64.5%B**
124. If alpha of 82% B and liquid of 57% B are in equilibrium in an alloy of 73%B, the fraction of liquid is ---------- :->**0.36**
125. In a binary sustem of A and B, if a liquid of 35%A (65%B) is coexisting with a solid of 75%A (25%B), for an overall composition of 40%A, the fraction of the liquid is given by --------:->**0.875**
126. In the eutectic phase diagram of Ag-Cu system, the solubility limit at 500^{0}C of copper is 3% in the Ag rich phase and of Ag is 2% in the Cu rich phase. In sterling silver (92.5% Ag - 7.5 % Cu), the percent of copper in the Ag rich phase at 500^{0}C is -------:->**3**
127. The degrees of freedom of a system of two components when the number of phases are four is ---------:->**0**
128. The phase rule for the condensed phases is given by --------- :->**F = C-P+1**
129. The degrees of freedom of a system of two components when the number of phases is two is ----------:->**2**
130. The degrees of freedom when ice, water and water vapor coexist in equilibrium is -------:->**0**
131. Physically distinct, chemically homogeneous and mechanically separable region of the system is known as ----------:->**Phase**
132. Gibbs phase rule is given by::->**F = C-P+2**
133. The maximum number of phases in equilibrium in a system corresponds to F = ----------:->**0**
134. In a single component system, the maximum number of phases that can co-exist in equilibrium is ---------- :->**3**
135. At atmospheric pressure, a material of unknown composition shows four phases in equilibrium at 987K. The minimum number of components in the system is ------:->**3**
136. The degrees of freedom, when FCC and BCC iron coexist in equilibrium are -------:->**1**
137. An isothermal reversible reaction in which a solid phase reacts with a second solid phase to produce a third solid phase on cooling is known as -------- reaction :->**Peritectoid**
138. Solid 1 + Solid 2 = Solid 3. Represents ---------- reaction :->**Peritectoid**
139. Alloys to the right of the eutectoid composition are known as ---------- alloys:->**hypereutectoid**
140. Alloys to the left of the eutectoid composition are known as ---------- alloys :->**hypoeutectoid**
141. Which of the following represents eutectoid reaction? :->**Solid 1 = Solid 2 + Solid 3**
142. Which of the following is a solid state reaction? :->**peritectoid**
143. Solid 1 = Solid 2 + Solid 3. Represents ---------- reaction :->**eutectoid**
144. Which of the following is a solid state reaction? :-> **Eutectoid**
145. Which of the following is not a solid state reaction?:->**Monotectic**
146. Which of the following represents peritectoid reaction?:->**Solid 1 + Solid 2 = Solid 3**
147. Which of the following is true? :->**Allotropy is a reversible phenomenon**
148. The number of allotropic forms exhibited by iron is --------- :->**3**
149. The crystal structure of γ -iron is ----------:->**fcc**
150. The crystal structure of δ iron is ----------:->**bcc**
151. Which of the following is true? :->**Allotropy is a reversible phenomenon**
152. The reversible phenomenon by which certain metals exist in more than one crystal structure is known as -------- :->**Allotropy**
153. For pure iron the allotropic change from δ -iron to α -iron occurs at ----------^{0}C :->**910**
154. For pure iron, the allotropic change from δ -iron to γ -iron occurs at ----------^{0}C :->**1400**
155. The γ -solid solution is formed by ---------- reaction in Fe-Ni equilibrium diagram :->**Peritectic**
156. Which of the following metals does not exhibit allotropic property? :->**Nickel**
157. Which of the following metals exhibit allotropic property? :->**Iron, tin and manganese**
158. In Fe-Fe3C equilibrium diagram peritectic reaction occurs at ----------^{0}C :->**1493**
159. Which of the following shows peritectic reaction?:->**Liquid + Solid = New Solid**
160. Which of the following is true? :->**In a peritectic system, a liquid and a solid react isothermally to form a new solid on cooling**

161. In ---------- reaction, a liquid and a solid react isothermally to form a new solid on cooling.:->**Peritectic**
162. When one phase changes into another phase isothermally and without any change in chemical composition, it is said to be ---------- change:->**congruent phase change**
163. The phase diagram of which of the following alloy system shows peritectic reaction? :->**Ag - Pt**
164. Liquid + Solid = New solid . Represents ---------- reaction :->**Peritectic**
165. Magnesium and Tin form an intermediate phase with formula ---------- :->Mg_2Sn
166. The phase diagram of Ag - Pt alloy system consists ---------- reaction :->**Peritectic**
167. Silver-Platinum alloy system shows the formation of a terminal solid solution by ---------- reaction :->**peritectic**

168. In copper - nickel alloy : :->**there is no eutectic point**
169. Alloys to the right of the eutectic composition are known as ---------- alloys:->**hyper eutectic**
170. Alloys to the left of the eutectic composition are known as ---------- alloys :-> **hypo eutectic**
171. Solidification of eutectic alloy occurs at ---------- temperature :->**constant**
172. The change of a liquid of a particular composition into two solids at constant temperature is known as ---------- reaction:->**eutectic**
173. As the eutectic composition is approached from the plastic-phase side, the strength of the alloy will ---------- :->**increase**
174. Liquid = solid A + solid B represents ---------- reaction:->**eutectic**
175. Two metals completely soluble in the liquid state and completely insoluble in the solid state yield ---------- system :->**Eutectic**
176. The eutectic temperature of lead-tin binary alloy is ----------^{0}C :->**183**
177. Beyond the eutectic point, the strength of the alloy will decrease, due to ---------- :->**increase in size and amount of proeutectic brittle phase**
178. Which of the following metals are completely soluble in liquid and solid states? :->**copper, nickel**
179. Coring occurs due to ---------- :->**non-equilibrium cooling**
180. In the phase diagram of two metals completely soluble in liquid and solid states, the area above the liquidus line consists of ----------:->**homogeneous liquid solution**
181. In equilibrium diagrams the line obtained by connecting the points showing the end of solidification is called ---------- :->**Solidus line**
182. In equilibrium diagrams the line obtained by connecting the points showing the beginning of solidification is called ---------- :-> **Liquidus line**
183. The cooling curve for pure metals shows a horizontal line because ---------- :-> **the beginning and end of solidification takes place at constant temperature**
184. The rate of diffusion of one metal in another is specified by the diffusion coefficient, and its value doubles for every ----------^{0} C rise in temperature:->**20**
185. Two metals completely soluble in liquid and solid states yield ---------- alloy system:->**Isomorphous**
186. The relative amounts of two phases in equilibrium at any specified temperature in a two phase region can be determined by -------- rule:->**Lever**
187. Cored structures are most common in ---------- metals:->**as-cast**
188. Binary phase diagrams are plots between ----------:->**temperature and composition**
189. Soldering lead is a ---------- component system :->**two**
190. Thermodynamically, the system is in equilibrium means, the free energy of the system will be ------- :->**minimum**

191. In order to specify completely the state of a system in equilibrium, the number of independent variables necessary to specify are -------- :->**three**
192. Phase diagrams are plotted with ---------- as the ordinate and --------- as the abscissa :->**Temperature, alloy composition in weight percentage**
193. X-ray diffraction method indicates the appearance of a new phase by ---------:->**either change in lattice dimenson or the appearance of a new crystal structure**
194. In order to specify completely the state of a system in equilibrium, the independent variables necessary to specify are --------:->**temperature, pressure and composition**
195. Which of the following experimental methods will be used for the construction of equilibrium diagrams?:->**X-ray diffraction**

196. Zone refining will be more efficient if the ratio of impurity in the solid to that in the liquid is ---------- :->**0.01**
197. The maximum solubility of carbon in austenite is ---------- :->**2.08**