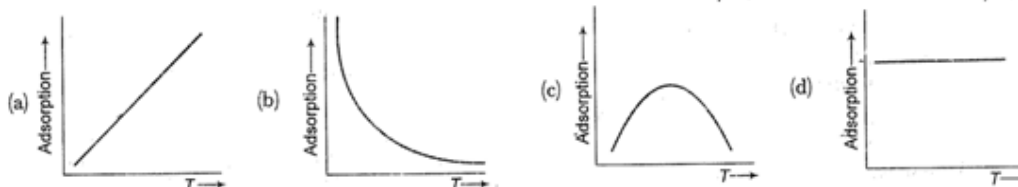
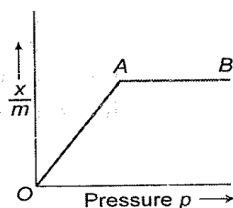


1. Electro-osmosis is observed when
 - (a) dispersion medium begins to move in an electric field
 - (b) dispersed phase begins to move in an electric field
 - (c) Both (a) and (b)
 - (d) None of the above
2. Potential difference of the electrical double layer formed in a colloidal sol is called
 - (a) EMF
 - (b) Zeta potential
 - (c) Brownian potential
 - (d) Nernst potential
3. Following is the variation of physical adsorption with temperature

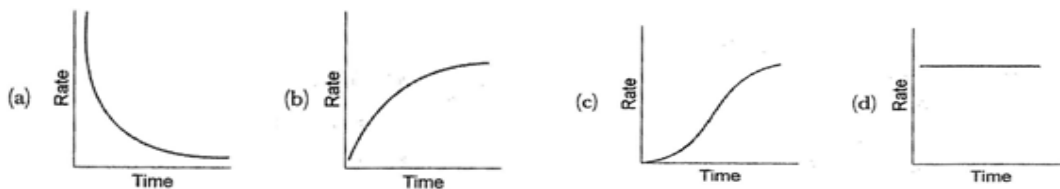


4. SnO_2 is taken in basic medium and current is passed. Colloidal sol migrates towards
 - (a) anode (+ve plate)
 - (b) cathode (-ve plate)
 - (c) Both (a) and (b)
 - (d) None of these
5. Fixed parts of a colloidal sol of AgI are respectively $[\text{AgI}] \text{Ag}^+$ and $[\text{AgI}] \text{I}^-$ in presence of
 - (a) KI and AgNO_3
 - (b) KI and KI
 - (c) AgI and KI
 - (d) AgNO_3 and KI
6. Select correct statement(s).
 - (a) Residual force-field on a surface is responsible for adsorption.
 - (b) Rate of adsorption is very rapid in-the-beginning but decreases until equilibrium is attained.
 - (c) Desorption and adsorption are two opposite terms.
 - (d) All of the above are correct statements.
7. Which gas is adsorbed to maximum extent on the given surface?
 - (a) NH_3
 - (b) H_2
 - (c) N_2
 - (d) O_2
8. The Langmuir adsorption isotherm is deduced using the assumption
 - (a) the adsorbed molecules interact with each other
 - (b) The adsorption takes place in multilayers
 - (c) The adsorption sites are equivalent in their ability to adsorb the particles.
 - (d) The heat of adsorption varies with coverage.
9. Adsorption is
 - (a) an exothermic process hence increase in temperature decreases adsorption in cases where van der Waals' forces exist between adsorbate and adsorbent
 - (b) an endothermic process hence increase in temperature increases adsorption
 - (c) an exothermic process hence increase in temperature increases adsorption
 - (d) None of the above
10. Lake test of aluminium ion is based on adsorption of blue litmus on
 - (a) solid surface of Al
 - (b) solid surface of Al
 - (c) solid surface of Al_2O_3
 - (d) solid surface of AlCl_3
11. A plot of $\log x/m$ versus $\log p$ for the adsorption of a gas on a solid gives a straight line with slope equal to
 - (a) n
 - (b) $\frac{1}{n}$
 - (c) $\log k$
 - (d) $-\log k$
12. In the following isotherm



- (a) $\frac{x}{m} \propto p^0$ when point A is reached
- (b) desorption may start along AB
- (c) $\frac{x}{m} \propto p^{1/n}$ along OA
- (d) All of the above

13. Which pair is correctly matched?
 (a) $[\text{Fe}(\text{OH})_3] : \text{Fe}^{3+}$ (b) $[\text{As}_2\text{S}_3] : \text{As}^{3+}$
 (c) $[\text{SnO}_2] : \text{SnO}_3^{2-}$ in acidic medium (d) $[\text{AgI}] : \Gamma$ in excess of AgNO_3
14. Zeta potential or electrokinetic potential is dependent on
 (a) viscosity (b) dielectric constant
 (c) velocity of the colloidal particles when an electric field is applied
 (d) All of the above
15. Colloidal sulphur particles are negatively charged with $\text{S}_2 \text{O}_3^{2-}$ and other ions on the surface of sulphur. Hence, most effective electrolyte in coagulating colloidal sulphur is
 (a) NaCl (b) MgCl_2 (c) AlCl_3 (d) Na_2SO_4
16. Aluminium hydroxide forms a positively charged sol. Which of the following ionic substances should be most effective in coagulating the sol?
 (a) NaCl (b) $\text{Fe}_2(\text{SO}_4)_3$ (c) CaCl_2 (d) K_3PO_4
17. $[\text{AgI}] \Gamma$ colloidal sol can be coagulated by the addition of a suitable cation. 1 mol of $[\text{AgI}] \Gamma$ requires mol of AgNO_3 , $\text{Pb}(\text{NO}_3)_2$ and $\text{Fe}(\text{NO}_3)_3$ as
 (a) 1, 1, 1 (c) 1, 2, 3 (c) $1, \frac{1}{2}, \frac{1}{3}$ (d) 6, 3, 2
18. Flocculation value of a coagulating electrolyte is expressed in
 (a) millimol L^{-1} (b) mol L^{-1} (c) mg K^{-1} (d) microgram mL^{-1}
19. In Freundlich Adsorption isotherm, the value of $\frac{1}{n}$ is
 (a) 1 in case of physical adsorption (b) 1 in case of chemisorption
 (c) between 0 and 1 in all cases (d) between 2 and 4 in all cases
20. In Langmuir's model of adsorption of a gas on solid surface
 (a) the adsorption at a single site on the surface may involve multiple molecules at the same time
 (b) the mass of gas striking a given area of surface is proportional to the pressure of the gas.
 (c) the mass of gas striking a given area of surface is independent of the pressure of the gas
 (d) the rate of dissociation of adsorbed molecules from the surface does not depend on the surface covered
21. A catalyst accelerate the rate of reaction by
 (a) decreasing energy of activation (b) increasing Arrhenius constant
 (c) increasing both (d) decreasing both
22. It is instructed that automobiles with catalytic converter must use unleaded gasolines because
 (a) leaded gasolines may give more fumes
 (b) surface of the catalyst is rendered ineffectively adsorption of lead
 (c) automobiles with catalytic converter cannot run leaded-gasolines
 (d) unleaded-gasoline is cheaper
23. When MnO_4^- is added to oxalic acid rate of the reaction with time (oxidation of MnO_4^- by oxalic acid) may follow graph



24. Gold number of some lyophilic sols are
 I. Casein 0.01
 II. Haemoglobin 0.03
 III. Gum arabic 0.15
 IV. Sodium oleate 0.40
 Which has maximum protective power?
 (a) I (b) II (c) III (d) IV
25. Which is not the correct matching of emulsions?
 (a) Milk : O/W (b) Cold cream : W/O
 (c) Butter : O/W (d) Vanishing cream : O/W

26. An emulsion can be diluted with H_2O (dispersion medium), then it is
(a) O/W type (b) W/O type
(c) Both (a) and (b) (d) None of these
27. Rubber plating and chrome tanning of leather are based on
(a) electro-osmosis (b) Tyndall effect
(c) electrophoresis (d) Brownian motion
28. Water carrying impurities is purified by addition of potash alum. Al^{3+} of the potash alum causes
(a) peptization of negatively charged turbidity (b) coagulation of negatively charged turbidity
(c) peptization of positively charged turbidity (d) coagulation of positively charged turbidity
29. Milk is an emulsion of fat dispersed in water. It is stabilized by
(a) casein - a lyophilic colloidal sol (b) casein - a lyophobic colloidal sol
(c) lactose - a lyophilic colloidal sol (d) lactose - a lyophobic colloidal sol
30. Which one of the following statements is wrong about adsorption?
(a) It is a selective and specific process
(b) It is a reversible process
(c) An increase in the gaseous adsorbate causes increase in adsorption. However, at high pressure, the adsorption becomes constant
(d) It is an endothermic process
31. 1 mole of $[AgI] Ag^+$ sol is coagulated by
(a) 1 mole of KI (b) 500 mL of 1 M K_2SO_4
(c) Both (a) and (b) (d) None of the above
32. Arsenic (III) sulphide forms a sol with a negative charge. Which of the following ionic substances should be most effective in coagulating the sol?
(a) KCl (b) $MgCl_2$ (c) $Al_2(SO_4)_3$ (d) Na_3PO_4
33. Aluminium hydroxide forms a positively charged sol. Which of the following ionic substances should be most effective in coagulating the sol?
(a) NaCl (b) $CaCl_2$ (c) $Fe_2(SO_4)_3$ (d) K_3PO_4
34. The colligative property of a colloidal sol compared to solution of non-electrolyte of same concentration will be
(a) same (b) higher (c) lower (d) higher or lower
35. Which of the following can act as a protective colloid?
(a) Gelatin (b) Silica gel
(c) Oil-in-water emulsion (d) All of these
36. If a freshly formed ppt. of SnO_2 is peptized by a small amount of NaOH, these colloidal particles may be represented as
(a) $[SnO_2]SnO_3^{2-} : 2Na^+$ (b) $[SnO_2]Sn^{4+} : O^{2-}$
(c) $[SnO_2]Na^+ : OH^-$ (d) $[SnO_2]Sn^{4+} : OH^-$
37. On adding $AgNO_3$ solution into KI solution, a negatively charged colloidal sol is obtained when they are in
(a) 100 mL of 0.1 M $AgNO_3$ + 100 mL of 0.1 M KI
(b) 100 mL of 0.1 M $AgNO_3$ + 100 mL of 0.2 M KI
(c) 100 mL of 0.2 M $AgNO_3$ + 100 mL of 0.1 M KI
(d) 100 mL of 0.15 M $AgNO_3$ + 100 mL of 0.15 M KI
38. Smoke has generally a blue tinge. It is due to
(a) scattering (b) coagulation (c) Brownian motion (d) electro-osmosis
39. Adsorption is the phenomenon in which a substance
(a) accumulates on the surface of the other substance
(b) goes into the body of the other substances
(c) remains close to the other substance
(d) None of the above
40. Sorption is the term used when
(a) adsorption takes place (b) absorption takes place
(c) Both (a) and (b) (d) desorption takes place
41. Amount of gas adsorbed per gram of adsorbent increases with pressure, but after a certain limit is reached, adsorption becomes constant. It is where
(a) multilayers are formed (b) desorption takes place
(c) temperature is increased (d) absorption also starts

42. Softening of hard water is done using sodium aluminium silicate (zeolite). This causes
(a) adsorption of Ca^{2+} and Mg^{2+} ions of hard water replacing Na^+ ions
(b) adsorption of Ca^{2+} and Mg^{2+} of hard water replacing Al^{3+} ions
(c) Both (a) and (b) (d) None of the above
43. In 'lake-test' of Al^{3+} ion, there is formation of coloured floating-lake. It is due to
(a) adsorption of litmus by $\text{Al}(\text{OH})_4^-$ (b) adsorption of litmus by $\text{Al}(\text{OH})_3$
(c) adsorption of litmus by H_2O (d) None of the above
44. Compared to common colloidal sols micelles have
(a) higher colligative properties (b) lower colligative properties
(c) same colligative properties (d) None of the above
45. Which is not the correct statement for a catalyst?
(a) It does not alter E_a
(b) The surface of a catalyst adsorbs reactants
(c) Catalyst may form intermediates with the reactants
(d) Action of enzyme catalyst is always specific
46. The ability of the catalyst to direct the reaction to yield particular product is called
(a) reactivity (b) selectivity
(c) activity (d) fugacity
47. Which of the following is an example of zeolite?
(a) ZSM-5 (b) AgNO_3 (c) $\text{Mg}(\text{OH})_3$ (d) $\text{Co}(\text{OH})_3$
48. Colloidal solutions of gold prepared by different methods are of different colours because of
(a) different diameters of colloidal gold particles (b) variable valency of gold
(c) different concentration of gold particles (d) impurities produced by different methods
49. Bleeding is stopped by the application of ferric chloride. This is because
(a) the blood starts flowing in opposite direction
(b) the blood reacts and forms a solid, which seals the blood vessel
(c) the blood is coagulated and thus the blood vessel is sealed
(d) the ferric chloride seals the blood vessel
50. Lyophilic colloids are stable due to
(a) small size of the particle (b) large size of the particle
(c) layer of dispersion medium on the particle (d) charge on the particle
51. The physical adsorption of gases on the solid surface is due to
(a) covalent bond (b) hydrogen bond (c) ionic bond (d) van der Waals' forces
52. Among the electrolytes Na_2SO_4 , CaCl_2 , $\text{Al}_2(\text{SO}_4)_3$ and NH_4Cl , the most effective coagulating agent for Sb_2S_3 sol is
(a) Na_2SO_4 (b) CaCl_2 (c) $\text{Al}_2(\text{SO}_4)_3$ (d) NH_4Cl
53. Among the following, the surfactant that will form micelles in aqueous solution at the lowest molar concentration at ambient conditions is
(a) $\text{CH}_3(\text{CH}_2)_{15}\text{N}^+(\text{CH}_3)_3\text{Br}^-$ (b) $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3\text{Na}^+$
(c) $\text{CH}_3(\text{CH}_2)_6\text{COO}^-\text{Na}^+$ (d) $\text{CH}_3(\text{CH}_2)_{11}\text{N}^+(\text{CH}_3)_3\text{Br}^-$
54. Which of the following statements is incorrect regarding physisorption?
(a) It occurs because of van der Waals' forces
(b) More easily liquefiable gases are adsorbed readily
(c) Under high pressure it results into multi molecular layer on adsorbent surface
(d) Enthalpy of adsorption ($\Delta H_{\text{adsorption}}$) is low and positive
55. Gold numbers of protective colloids A, B, C and D are 0.50, 0.01, 0.10 and 0.005, respectively. The correct order of their protective powers is
(a) $\text{D} < \text{A} < \text{C} < \text{B}$ (b) $\text{C} < \text{B} < \text{D} < \text{A}$
(c) $\text{A} < \text{C} < \text{B} < \text{D}$ (d) $\text{B} < \text{D} < \text{A} < \text{C}$
56. In Langmuir's model of adsorption of a gas on a solid surface
(a) the rate of dissociation of adsorbed molecules from the surface does not depend on the surface covered
(b) the adsorption at a single site on the surface may involve multiple molecules at the same time
(c) the mass of gas striking a given area of surface is proportional to the pressure of the gas
(d) the mass of gas striking a given area of surface is independent of the pressure of the gas

57. $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \xrightleftharpoons{\text{V}_2\text{O}_5} \text{SO}_3$ is an example for
 (a) neutralization reaction (b) homogeneous catalysis
 (c) heterogeneous catalysis (d) irreversible reaction
58. When a sulphur sol is evaporated sulphur is obtained. On mixing with water sulphur sol is not formed. The sol is
 (a) lyophilic (b) reversible
 (c) hydrophobic (d) hydrophilic
59. The physical states of dispersing phase and dispersion medium in colloid like pesticide spray respectively, are
 (a) gas, liquid (b) solid, gas
 (c) liquid, solid (d) liquid, gas
60. In an electrical field, the particles of a colloidal system move towards cathode. The coagulation of the same sol is studied using K_2SO_4 (I), $\text{Na}_3\text{PO}_4\text{K}_4$ (II), $\text{K}_4[\text{Fe}(\text{CN})_6]$ (III) and NaCl (IV). Their coagulating power should be
 (a) (I) > (II) > (III) > (IV) (b) (III) > (II) > (I) > (IV)
 (c) (III) > (I) > (II) > (IV) (d) (IV) > (III) > (I) > (II)
61. Which of the following ions can cause coagulation of proteins?
 (a) Ag^+ (b) Na^+ (c) Mg^{2+} (d) Ca^{2+}
62. In Brownian movement or motion the paths of the particles are:
 (a) linear (b) zig-zag (c) uncertain (d) curved
63. Which is used for ending charge on colloidal solutions?
 (a) Electrons (b) Electrolysis
 (c) Positively charged ions (d) Compounds
64. Cloud or fog is a colloidal system in which the dispersed phase and the dispersion medium are:
 (a) gas, liquid (b) liquid, gas
 (c) liquid, liquid (d) solid, solid
65. The electrolyte which has the least effect in the coagulation of $\text{Fe}(\text{OH})_3$ sol is:
 (a) potassium carbonate (b) sodium sulphate
 (c) potassium ferrocyanide (d) potassium iodide
66. Gold number was given by:
 (a) Ostwald (b) Zsigmondy
 (c) William and Chang (d) Langmuir
67. The diameter of colloidal particle ranges from:
 (a) 10^{-9} m to 10^{-6} m (b) 10^{-9} m to 10^{-12} m
 (c) 10^3 m to 10^{-3} m (d) 10^{-3} m to 10^{-6} m
68. The Tyndall effect is not observed in:
 (a) suspensions (b) emulsions
 (c) colloidal solutions (d) true solutions
69. Dialysis can separate which of the following in addition to the glucose from human blood?
 (a) Fructose (b) Starch
 (c) Proteins (d) Sucrose
70. Smoke has generally blue tinge. It is due to:
 (a) scattering (b) coagulation
 (c) Brownian motion (d) electrophoresis
71. On adding AgNO_3 solution to KI solution, a negatively charged colloidal sol will be formed in which of the following conditions?
 (a) 100 mL of 0.1 M AgNO_3 + 100 mL of 0.1 M KI
 (b) 100 mL of 0.1 M AgNO_3 + 50 mL of 0.2 M KI
 (c) 100 mL of 0.2 M AgNO_3 + 100 mL of 0.1 M KI
 (d) 100 mL of 0.1 M AgNO_3 + 100 mL of 0.15 M KI
72. Peptization of SnO_2 by NaOH gives:
 (a) $[\text{SnO}_2]\text{SnO}_3^{2-} : 2\text{Na}^+$
 (b) $[\text{SnO}_2]\text{Sn}^{4+} : \text{O}^{2-}$
 (c) $[\text{SnO}_2]\text{Na}^+ : \text{OH}^-$
 (d) $[\text{SnO}_2]\text{Sn}^{4+} : \text{OH}^-$
73. Alum helps in purifying water by:
 (a) forming Si complex with clay particles
 (b) sulphate part which combines with the dirt and remove it

- (c) aluminium which coagulates the mud particles
(d) making the mud water soluble
74. Surface tension of lyophilic sols is:
(a) lower than that of H_2O (b) equal to that of H_2O
(c) more than that of H_2O (d) none of these
75. Which one of the following is correctly matched?
(a) Emulsion-curd (b) Foam-mist
(c) Aerosol-smoke (d) Solid sol-cake
76. When H_2S gas is passed through nitric acid, the product is:
(a) rhombic sulphur (b) prismatic sulphur
(c) amorphous sulphur (d) monoclinic sulphur
77. Tyndall effect is shown by:
(a) precipitate (b) sol
(c) plasma (d) solution
78. On addition of one mL of 10% NaCl solution to 10 mL gold sol in presence of 0.25 gm of starch, the coagulation is just prevented, starch has gold number:
(a) 0.25 (b) 0.025 (c) 2.5 (d) none of these
79. Which of the following forms cationic micelles above certain concentration?
(a) Sodium dodecyl sulphate (b) Sodium acetate
(c) Urea (d) Cetyltrimethyl ammonium bromide
80. The smog is essentially caused by the presence of:
(a) O, and O_3 (b) O_2 and N_2
(c) oxides of sulphur and nitrogen (d) O_3 and N_2
81. Which one of the following is most effective in causing the coagulation of an As_2S_3 sol?
(a) KCl (b) $AlCl_3$
(c) $MgSO_4$ (d) $K_3[Fe(CN)_6]$
82. The fresh precipitate can be transformed in colloidal solution by:
(a) peptization (b) coagulation
(c) diffusion (d) none of these
83. Potassium stearate is obtained by the saponification of an oil or a fat. It has formula $CH_3-(CH_2)_{16}-COO^- K^+$. The molecule has a lyophobic end (CH_3^-) and a lyophilic end $COO^- K^+$. Potassium stearate is an example for:
(a) lyophobic colloid (b) lyophilic colloid
(c) multimolecular colloid (d) macromolecular colloid
(e) associated colloid or micelle
84. Which one of the following forms micelles in aqueous solution above certain concentration?
(a) Dodecyl trimethyl ammonium chloride (b) Glucose
(c) Urea (d) Pyridinium chloride
85. Muddy water can be purified through coagulation using:
(a) common salt (b) alums
(c) sand (d) lime
86. The disperse phase in colloidal iron(III) hydroxide and colloidal gold is positively and negatively charged respectively. Which of the following is not correct?
(a) Magnesium chloride solution coagulates the gold sol more readily than iron(III) hydroxide sol.
(b) Sodium sulphate solution causes coagulation in both sols.
(c) Mixing of the sols has no effect.
(d) Coagulation in both sols can be brought about by electrophoresis.
87. An emulsifier is a substance which:
(a) stabilises the emulsion (b) homogenizes the emulsion
(c) coagulates the emulsion (d) accelerates the dispersion of liquid in liquid
88. Gold number is associated with:
(a) electrophoresis (b) purple of cassius
(c) protective colloid (d) amount of pure gold
89. Which one of the following is a false statement?
(a) Cell fluid is an example of sol. (b) Butter is an example of gel.
(c) Hair cream is an example of emulsion. (d) Whipped cream is an example of foam.

- (e) Cheese is an example of emulsion.
90. The presence of electric charge on colloidal particles is indicated by the property, called:
(a) dialysis (b) solubility
(c) electrophoresis (d) osmosis
91. Which of the following properties are characteristic of lyophobic sols?
1. Low viscosity,
2. High viscosity,
3. Reversibility and
4. Coagulation by electrolytes at low concentration
Select the correct answer using the codes given below:
(a) 2, 3 and 4 (b) 2 and 3 only
(c) 1 and 4 only (d) 1 and 3 only
92. In an electrical field, the particles of a colloidal system move towards cathode. The coagulation of the same sol is studied using K_2SO_4 (I), Na_3PO_4 (II), $K_4[Fe(CN)_6]$ (III) and $NaCl$ (IV). Their coagulating power should be :
(a) (I) > (II) > (III) > (IV) (b) (III) > (II) > (I) > (IV)
(c) (III) > (I) > (II) > (IV) (d) (IV) > (III) > (I) > (II)
(e) (IV) > (I) > (II) > (III)
93. Cetyl trimethyl ammonium chloride is which type of detergent ?
(a) Cationic (b) Anionic
(c) Biosoft (d) Non-ionic
94. The effective ion used in clarification of water is:
(a) Al^{3+} (b) Ca^{2+} (c) SO_4^{2-} (d) PO_4^{3-}
95. The number of moles of lead nitrate 2 mole of colloidal $[AgI]^-$ is :
(a) 2 (b) 1 (c) $\frac{1}{2}$ (d) $\frac{2}{3}$ (e) $\frac{5}{2}$
96. Among the electrolytes Na_2SO_4 , $CaCl_2$, $Al_2(SO_4)_3$ and NH_4Cl , the most effective coagulating agent for Sb_2S_3 sol is:
(a) Na_2SO_4 (b) $CaCl_2$
(c) $Al_2(SO_4)_3$ (d) NH_4Cl
97. A micelle formed during the cleansing action of soap is :
(a) a discrete particle of soap (b) aggregated particles of soap and dirt
(c) a discrete particle of dust (d) an aggregated particle of dust and water
98. The dispersed phase and dispersion medium in soap lather are respectively :
(a) gas and liquid (b) liquid and gas
(c) solid and gas (d) solid and liquid
99. Which one of the following is correctly matched?
(a) Emulsion—Smoke (b) Gel—Butter
(c) Sol—Whipped cream (d) Aerosol—Hair cream
(e) Foam—Mist
100. Coagulation is not done by :
(a) persistant dialysis (b) boiling
(c) electrophoresis (d) peptisation
101. The coagulating power of electrolytes having ions Na^+ , Al^{3+} and Ba^{2+} for arsenic sulphide sol increases in the order :
(a) $Ba^{2+} < Na^+ < Al^{3+}$ (b) $Al^{3+} < Na^+ < Ba^{2+}$
(c) $Al^{3+} < Ba^{2+} < Na^+$ (d) $Na^+ < Ba^{2+} < Al^{3+}$

Answer Key

1.		21.		41.		61.		81.	
2.		22.		42.		62.		82.	
3.		23.		43.		63.		83.	
4.		24.		44.		64.		84.	
5.		25.		45.		65.		85.	
6.		26.		46.		66.		86.	
7.		27.		47.		67.		87.	
8.		28.		48.		68.		88.	
9.		29.		49.		69.		89.	
10.		30.		50.		70.		90.	
11.		31.		51.		71.		91.	
12.		32.		52.		72.		92.	
13.		33.		53.		73.		93.	
14.		34.		54.		74.		94.	
15.		35.		55.		75.		95.	
16.		36.		56.		76.		96.	
17.		37.		57.		77.		97.	
18.		38.		58.		78.		98.	
19.		39.		59.		79.		99.	
20.		40.		60.		80.		100.	

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