



CHEMISTRY

BOOKS - JMD CHEMISTRY (PUNJABI ENGLISH)

SOLUTIONS

Example

1. Which of the following 0.1M aqueous solution will have lowest freezing point?

A. Potassium sulphate

B. Sodium chloride

C. Urea

D. Glucose

Answer: A



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2. Molarity is expressed in gram/litre

A. litre/mol

B. litre/mol

C. mol/litre

D. mol/kg.

Answer: D



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3. Isotonic solutions are the solutions having the same

- A. surface tension
- B. vapour pressure
- C. osmotic pressure
- D. viscosity

Answer: C



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4. At high altitude ,the boiling point of water decreases because

- A. the atmospheric pressure is high
- B. the temperature is low
- C. the atmospheric pressure is low
- D. the temperature is high

Answer: C



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5. Which is not a colligative property?

A. ΔT_b

B. ΔT_f

C. K_b

D. π

Answer: C



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6. Colligative property among the following is

A. Osmotic pressure

B. Boiling point

C. Vapour pressure

D. Viscosity

Answer: A



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7. The boiling point of a solvent containing non volatile solute :

- A. is depressed
- B. is elevated
- C. does not change
- D. None of the above

Answer: B



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8. In countries nearer to polar region , the roads are sprinkled with $CaCl_2$. This is

- A. To minimum the effect of snow on roads
- B. To minimise pollution
- C. To minimise the accumulation of dust on the road
- D. To minimise the wear and tear of the roads.

Answer: A



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9. The molarity of pure water (density of water = 1 gml^{-1})

A. 55.55M

B. 50M

C. 60M

D. 5M

Answer: A



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10. Which of the following is a colligative property?

A. Molar mass

B. Osmotic pressure

C. Viscosity

D. Optical activity

Answer: B



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11. Blood cells do not shrink in blood because blood is :

A. Hypotonic

B. Isotonic

C. Equimolar

D. Hypertonic.

Answer: B



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12. A pressure cooker reduces cooking time because :

A. heat is more evenly distributed

B. the high pressure tenderises the food

C. the boiling point of water inside the cooker is elevated

D. the boiling point of water inside the cooker is depressed.

Answer: C



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13. which of the following mode of expressing the concentration is independent of temperature? Molality, Normality, Formality, Molarity

A. Molarity

B. Molality

C. Formality

D. Normality

Answer: B



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14. Which of the following is not a colligative property?

Elevation in Boiling point Depression in freezing point

Optical activity Relative lowering of vapour pressure

A. Depressing in freezing point

B. Elevation in boiling point

C. Optical activity

D. Relative lowering in vapour pressure.

Answer: C



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15. Colligative property of dilute solutions depends on :

- A. the nature of solute
- B. the nature of solvent
- C. the number of particles of solute
- D. the number of particles of solvent.

Answer: C



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16. The boiling point of a solvent containing non volatile solute :

- A. is depressed
- B. is elevated

C. does not change

D. None of the above

Answer: B



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17. Freezing point of a solvent containing a non volatile solute

A. is depressed

B. is elevated

C. does not change

D. None of the above

Answer: A

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18. Which of the following is a colligative property?

- A. Elevation in freezing point
- B. Elevation in boiling point
- C. Depression in boiling point
- D. All of the above.

Answer: B

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19. Isotonic solutions have

- A. same boiling point
- B. same vapour pressure
- C. same melting point
- D. same osmotic pressure.

Answer: D



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20. Colligative property among the following is

- A. Osmotic pressure

B. same vapour pressure

C. same melting point

D. viscosity

Answer: A

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21. The non ideal solution showing positive deviation :

A. have $\Delta V(\text{mixing}) = +ve$

B. have $\Delta H(\text{mixing}) = -ve$

C. from minimum boiling azeotropes

D. have $\Delta V(\text{mixing}) = -ve$

Answer: A



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22. When a sugar solution is slowly frozen, the first solid which separate out is:

A. 1.ice

B. 2.sugar

C. 3.solid solution of sugar and ice

D. 4.a compound formed from sugar and water
(hydrated sugar)

Answer: A

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23. The two solutions A and B are separated by semipermeable membrane. If the solvent flows from A to B :

- A. A is more concentrated than B
- B. A is less concentrated than B
- C. Both A and B are of same concentration
- D. Both A and B get diluted.

Answer: B

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24. Which of the following solution has highest boiling point ?

A. 0.01 m glucose

B. 0.01 m K_2SO_4

C. 0.01 m KNO_3

D. 0.01 m urea

Answer: B

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25. 0.01 M aqueous glucose solution is more concentrated than 0.01 M aqueous glucose solution.



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26. At the same constant temperature, more the external pressure, more is the solubility of a gas in water.



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27. At the same external pressure, more the temperature lesser is the solubility of a gas in water.



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28. Molarity of a solution does not change with temperature.



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29. There is no effect of temperature on the mole fraction of a solution .



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30. Lowering of vapour pressure on dissolving a non-volatile solute in a liquid is a colligative property.



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31. Rate of osmosis increases with increase in temperature.



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32. How will you show that depression in freezing point is a colligative property?



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33. Units of ebullioscopic constant are $K\text{kgmol}^{-1}$.



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34. for an aqueous solution of $\text{K}_4[\text{Fe}(\text{CN})_6]$, the value of van't Hoff factor, i is 5(approx).



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35. Define molality and molarity . Why is molality preferred over molarity?

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36. Define

Mole fraction

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37. Define

Mass percentage

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38. Define

Parts per million

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39. State Henry's law and mention its some important applications.

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40. State and explain :

Raoult's law for volatile solute.



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41. State and explain :

Raoult's law for non-volatile solute.



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42. Mixture of chloroform and acetone shown a negative deviation from Raoult's Law. Explain.



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43. What are Azeotropes ?



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44. Write differences between ideal and non-ideal solutions.

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45. What are colligative properties ? Name four such properties.

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46. Show that relative lowering in vapour pressure is a colligative property.

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47. How will you calculate the molecular mass of a solute with the help of relative lowering in vapour pressure of a solution of a non volatile solute?

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48. Define boiling point and find out expression for the molecular mass of non -volatile solute from the elevation of boiling point.

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49. Define molar elevation constant.

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50. How will you show that elevation in boiling point is a colligative property?

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51. How will you show that depression in freezing point is a colligative property?

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52. How will you show that depression in freezing point is a colligative property?

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53. Why is it advised to add ethylene glycol to water in a car radiator while driving in a hill station.

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54. Sodium chloride solution freezes at lower temperature than water but boils at higher temperature than water . Explain.

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55. What is Osmotic pressure?

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56. Show that osmotic pressure is a colligative property?

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57. Why determination of osmotic pressure is preferred for finding molecular mass of macro-molecules?

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58. Differentiate between diffusion and osmosis.



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59. What are isotonic, hypertonic and hypotonic solutions.



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60. Derive the relationship to find the condition for isotonic solutions.



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61. Why do you get sometimes abnormal molecular mass of substances by using colligative properties of the solution? State the factors with examples which produces abnormality in the result.

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62. Define van't Hoff factor . What is its importance? How does it account for abnormal molecular masses?

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63. calculate the mass of urea (NH_2CONH_2) required in making 2.5kg of 0.25 mole aqueous solution.



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64. Mole fraction of the solute in 1 molal aqueous solution is



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65. Concentrated nitric acid used in the laboratory is 68% nitric acid by mass in aqueous solution . What should be the molarity of such a sample of the acid if the density of the solution is 1.504g mL^{-1} ?



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66. A solution of glucose in water is labelled as 10 percent w/w . What would be the molality and mole fraction of each component in the solution? If the density of the solution is 1.2g mL^{-1} , then what shall be the molarity of the solution?

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67. An antifreeze solution is prepared from, 222.6g of ethylene glycol, $C_2H_4(OH)_2$ and 200g of water. Calculate the molality of the solution . If the density of the solution is 1.072g mL^{-1} , then what shall be the molarity of the solution?

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68. Calculate the molarity of a solution containing 5g of NaOH in 450mL solution.

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69. A solution is 25% water, 25% ethanol and 50% acetic acid by mass. Calculate the mole fraction of each component.

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70. A sugar syrup of weight 214.2g contains 34.2g of sugar ($C_{12}H_{22}O_{11}$). Calculate (i) Molality and (ii) Mole

fraction of sugar in syrup.

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71. Calculate mole fraction of ethanol and water in a sample of rectified spirit which contains 92% ethanol by mass.

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72. 2.82g of glucose (Molar mass: 180g mol^{-1}) are dissolved in 30g of water . Calculate mole fraction of glucose and water.

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73. Commercially available HCl contains 38% HCl by mass. Calculate molarity of solution if the density is 1.19 g/ml.

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74. Commercially available sample of sulphuric acid is 15% H_2SO_4 by weight (density= $1.10g\ mL^{-1}$). Calculate the molarity of the solution.

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75. 2.82g of glucose are dissolved in 30g of water. Calculate the molality of the solution.

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76. Heptane and octane form ideal solution . At 373K , the vapour pressure of the two liquid components are 105.2k Pa and 46.8k Pa respectively. What will be th vapour pressure of a mixture of 26.0g of heptane and 35.0g of octane?

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77. Calculate the mass of a non-volatile solute (molar mass 40g mol^{-1}) which should be dissolved in 114g octane to reduce its vapour pressure to 80%.

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78. The vapour pressure of pure bronze at a certain temperature is 262atm. At the same temperature the V.P. of a solution containing 2.0g of non-volatile solid in 100g bronze is 256atm . What is the molecular mass of the solid?



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79. 18g of glucose , $C_6H_{12}O_6$ (Molar mass= $180g\ mol^{-1}$) is dissolved in 1000g (1kg) of water in a sauce pan . At what temperature will water boil at 1.013 bar? K_b for water is $0.52K\ kg\ mol^{-1}$. Water boils at 373.15K at 1.013bar pressure.



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80. 10g of non-volatile solute when dissolved in 100g of benzene raises its boiling point by 1° C. What is the molecular mass of the solute. (k_b for benzene = $2.53 \text{ K kg mol}^{-1}$)



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81. Molal elevation constant for benzene is 2.53 K/m . A solution of some organic substance in benzene boils at 0.126° C higher than benzene. What is the molality of the solution?



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82. in a cold climate water gets frozen causing damage to the radiator of a car . Ethylene glycol is used as an antifreezing agent . Calculate the amount of ethylene glycol to be added to 4kg of water to prevent it from freezing at -6°C . (K_f for water 1.85K m^{-1}).



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83. 45g of ethylene glycol ($\text{C}_2\text{H}_6\text{O}_2$) is mixed with 600g of water. Calculate

The freezing point depression



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84. 45g of ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate

The freezing point depression

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85. 1.00g of a non-electrolyte solute dissolved in 50g of benzene lowered the freezing point of benzene by 0.40K.

The freezing point depression constant of benzene is $5.12K \text{ mol}^{-1}$. Find the molar mass of the solute.

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86. 45g of ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate

The freezing point depression

A.

B.

C.

D.

Answer:



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87. Addition of 0.643g of a compound to 43.95g of benzene lowers the freezing point from 5.51°C to 5.03°C . If K_f for benzene is 5.12K kg mol^{-1} , calculate the molar mass of the compound.

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88. 200 cm^3 of an aqueous solution of a protein contains 1.26g of the protein. The osmotic pressure of such a solution at 300K is found to be 2.7×10^{-3} bar. Calculate the molar mass of the protein ($R=0.083\text{ L bar mol}^{-1}\text{K}^{-1}$)

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89. Calculate the molar concentration of urea solution if it exerts an osmotic pressure of 2.45 atmosphere at 300K . (R=0.0821L atm $mol^{-1}K^{-1}$)

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90. Out of 1 M urea and 1M KCl solution, which has higher freezing point?

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91. 2g of benzoic acid (C_6H_5COOH) is dissolved in 25g of benzene show depression in freezing point equal to 1.62K. Molar depression constant for benzene, $K_f=4.9K$

kgmol^{-1} . What is percentage association of acid if it forms a dimer in solution?

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92. Colligative property among the following is

- A. Osmotic pressure
- B. Boiling point
- C. Vapour pressure
- D. Viscosity

Answer: A

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93. The boiling point of a solvent containing non volatile solute :

- A. is depressed
- B. is elevated
- C. does not change
- D. None of the above

Answer: B



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94. In countries nearer to polar region , the roads are sprinkled with $CaCl_2$. This is

A. TO MENIMISE THE EFFECT OF SNOW ON ROADS

B. To minimise the pollution

C. To minimise the accumulation of dust on the road

D. To minimise the wear and tear of the road

Answer: A



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95. The molarity of pure water (density of water= 1gml^{-1})

A. 18

B. 5.56

C. 55.6

D. 100

Answer: C



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96. Which of the following bonds is the strongest?

$F - F, Cl - Cl, I - I, Br - Br.$

A. $F - F$

B. $Cl - Cl$

C. $I - I$

D. $Br - Br$

Answer: B



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97. Which metal has lowest melting point? Cs Hg Mn Cu

A. *Cs*

B. *Hg*

C. *Mn*

D. *Cu*

Answer: B



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98. The oxidation number of cobalt in $K[Co(CO)_4]$ is

A. 1

B. -1

C. 3

D. -3

Answer: B



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99. Vitamine B_{12} contains

A. Fe

B. Co

C. Zn

D. *Ca*

Answer: B



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100. Commercial alcohol is made unfit for drinking by adding

A. Methyl alcohol

B. Antimony oxide and acetic acid

C. Morphine and adipic acid

D. Snake poison and malonic acid

Answer: A



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101. Write HVZ reaction.

- A. α -halo acid
- B. β -halo acid
- C. α, β - unsaturated acid
- D. None of the above

Answer: A



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102. $C - 6H_5CH=CH - CHO$ is

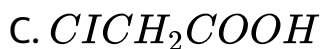
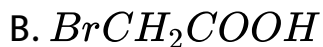
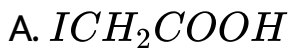
- A. Benzaldehyde
- B. Salicyldehyde
- C. Cinnamaldehyde
- D. None of the above

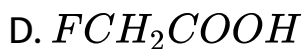
Answer: C



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103. Which is most acidic?



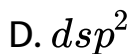
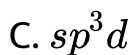
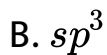
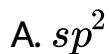


Answer: D



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104. What is the nature of hybridisation of N in the compound in NH_3



Answer: B

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105. Which is most basic? Benzylamine, aniline, Acetanilide, p-Nitroaniline.

A. Benzylamine

B. aniline

C. Acetanilide

D. p-Nitroaniline

Answer: A

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106. Vitamin B_1 is called

A. Ascorbic acid

B. Thiamine

C. Pyridoxine

D. Riboflavin

Answer: B



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107. which metal is present in vitamin B_{12} or cyanocobalamin?

A. *fe*

B. *Co*

C. *Mg*

D. *Pt*

Answer: B



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108. The amount of silver (at. mass=108) deposited from a solution of silver nitrate, when a current of 9650 coulombs was passed is:

A. 10.8gm

B. 0.108gm

C. 1.08gm

D. 1.08×10^3 gm

Answer: A



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109. Read the following passage and answer the questions.

When colloidal solutions are viewed under a powerful ultramicroscope, the colloidal particles appear to be in a state of continuous zig-zag motion all over the field of view. This motion was first observed by the British

botanist, Robert Brown, and is known as Brownian movement.

This motion is independent of the nature of the colloid but depends on the size of the particles and viscosity of the solution. Smaller the size and lesser the viscosity, faster is the motion.

The Brownian movement has been explained to be due to the unbalanced bombardment of the particles by the molecules of the dispersion medium. The Brownian movement has a stirring effect which does not permit the particles to settle and thus, is responsible for the stability of sols.

What is Brownian movement ?



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What is the effect of viscosity of dispersion medium on Brownian movement ?



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111. Read the following passage and answer the questions.

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What is the effect of particle size on Brownian movement ?



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112. Read the following passage and answer the questions.

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What is the cause of Brownian movement ?



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113. Read the following passage and answer the questions.

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What is the role of Brownian movement in the stability of sols ?



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114. Nitration of aniline gives a mixture of o- and p-nitroanilines.

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115. Dichloromethane is also known as methylene chloride.

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116. Benzaldehyde can be prepared by the hydrolysis of benzal chloride.

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117. Pyridinium chlorochromate (PCC) is a selective oxidising agent to oxidise a 1° alcohol to corresponding aldehyde.

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118. Write chemical name of Vitamin C.

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119. Commercially available sample of sulphuric acid is 15% H_2SO_4 by weight (density= $1.10g\ mL^{-1}$). Calculate the molarity of the solution.

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120. Calculate the osmotic pressure in pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 1,85,000 in 450 mL of water at 37°C .

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121. Define molality and molarity . Why is molality preferred over molarity?

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122. Calculate the half life period of a first order reaction whose specific rate constant is $5.5 \times 10^{-14} \text{ s}$

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123. A first order reaction takes 40 min for 30% completion. Calculate $t_{\frac{1}{2}}$.

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124. Write two differences between a primary cell and a secondary cell.

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125. H_2S is a gas but H_2O is liquid at room temperature.

Explain.

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126. Why is H_2S less acidic than H_2Te ?

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127. SF_6 is known but SCl_6 is not known. Explain.

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128. Why do transition metals form complexes ?

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129. Explain :Transition elements exhibit variable oxidation states.

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130. Explain the bonding in co-ordination compounds in terms of Werner's theory.

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131. Write down the formulae of hexaammineplatinum(IV) chloride

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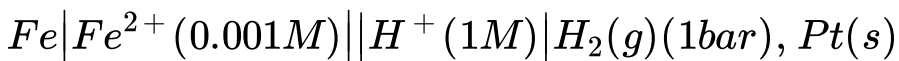
132. Write down the formulae of potassium hexacyanoferrate(III).

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133. What is the difference between rate of a reaction and rate constant?

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134. Calculate the emf of the following cell at 298k :



(given $E^\circ_{cell} = +0.44V$)



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135. Why do alcohols have higher boiling points than halo-alkanes of the same molecular mass ?



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136. Discuss the reaction and mechanism of acidic dehydration of ethyl alcohol to prepare ethene.



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137. The rate constant for a first order reaction becomes six times when the temperature is raised from 350 K to 400 K. Calculate activation energy for the reaction.

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138. Calculate two third life of a first order reaction having $k = 5.48 \times 10^{-14} \text{ s}^{-1}$.

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139. Explain that SO_2 can act as an oxidising agent as well as a reducing agent, but SO_3 can act as an oxidising

agent only.

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140. Draw the structure of major monohaloproducts of the reaction:



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141. Draw the structure of major monohaloproducts of the reaction:



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142. Draw the structure of major monohaloproducts of the reaction:



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143. Draw the structure of major monohaloproducts of the reaction:



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144. Draw the structure of major monohaloproducts of the reaction:



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145. Write Fittig reaction.

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146. Write the following reactions :

Friedel Craft alkylation.

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147. Haloarene is ortho and para directing Explain.

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148. What are d-Block elements ? Write their general electronic configuration.

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149. What are transition elements ? Which of the d block elements are not regarded as transition elements and why ?

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150. Give general characteristics of transition elements and why are they called transition elements ?

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151. Transition metals form number of interstitial compounds. Explain.

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152. Ionisation energy of 5d-elements is more than 3d- and 4d-elements. Why ?

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153. Out of Fe^{2+} and Fe^{3+} which is more paramagnetic and why ?

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154. Give the general electronic configuration of d-block elements.

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155. Colligative property of dilute solutions depends on :

- A. The nature of solute
- B. The nature of solvent

C. the number of particle of solute

D. the number of particle of solvent

Answer: C



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156. The boiling point of a solvent containing non volatile solute :

A. is depressed

B. is elevated

C. does not change

D. None of the above

Answer: B



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157. Freezing point of a solvent containing a non volatile solute

- A. is depressed
- B. is elevated
- C. does not change
- D. None of the above

Answer: A



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158. The vapour pressure of an aqueous solution of glucose is 750 mm of mercury at $100^{\circ}C$. Mole fraction of solute will be

A. 0.103

B. 0.013

C. 0.025

D. 0.45

Answer: A



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159. Sea divers go deep in the sea water with a mixture of which of the following gases?

- A. O_2 and He
- B. O_2 and Ar
- C. O_2 and CO_2
- D. CO_2 and Ar

Answer: A



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160. Which of the following is not a d-block element?

A. Hg

B. Po

C. Ni

D. W

Answer: B



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161. Write the IUPAC name of $K_2[Ni(CN)_4]$.

A. potassium tetracyanonickelate(II)

B. potassium tetracyanonickelate(III)

C. potassium tetracyanonickelate(0)

D. None of the above

Answer: A



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162. Reaction used for the preparation of ethers is

A. Reimer-Tieman reaction

B. Williamson's synthesis

C. Wurtz reaction

D. Cannizzaro reaction.

Answer: B



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163. Iodoform test is not given by :

A. 2-Pentanone

B. 3-Pentanone

C. ethanol

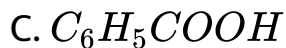
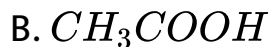
D. Ethanal

Answer: B



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164. In the following, strongest acid is



Answer: C



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165. Write Gatterman Koch reaction

A. Aliphatic aldehyde

B. Aromatic ketone

C. Aliphatic ketone

D. Aromatic aldehyde

Answer: D



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166. Which of the following is most acidic?

A. 

B. 

C. 

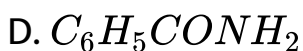
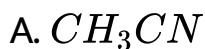
D. 

Answer: A



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167. Which among the following compound will give offensive compound when heated with chloroform and alcoholic potassium hydroxide ?



Answer: C



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168. The pK_b value of NH_3 as compared to CH_3NH_2 is

A. more

B. less

C. equal

D. None of the above

Answer: A

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169. Write one disease caused by deficiency of vitamin-D and one source of vitamin-D.

A. Beri-Beri

B. Rickets

C. Scurvy

D. None of the above

Answer: C



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170. Starch is a mixture of amylopectin and

A. pyran

B. amylase

C. lactose

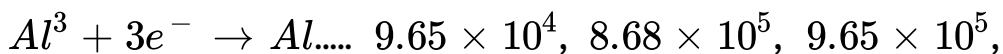
D. D-ribose

Answer: B



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171. Numbers of coulombs required to deposit 90 gm of aluminium, when the electrode fraction is,



6.95.

A. 9.65×10^4

B. 8.68×10^5

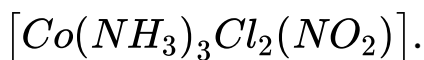
C. 9.65×10^5

D. 6.95

Answer: C

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172. Write the I.U.P.A.C. name of the



- A. triamminedichloridonitrito-N-cobalt(III)
- B. dichlorotriamminenitrito-N-cobalt(III)
- C. dichlorotriamminenitrito-N-cobalt(II)
- D. None of these.

Answer: A

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173. Read the following passage and answer the questions.

Ultrafiltration is the process of separating the colloidal particles from the solvent and soluble solutes present in the colloidal solution by specially prepared filters, which are permeable to all substances except the colloidal particles. Colloidal particles can pass through ordinary filter paper because the pores are too large. However, the pores of filter paper can be reduced in size by impregnating with collodion solution to stop the flow of colloidal particles. The usual collodion is a 4% solution of nitrocellulose in a mixture of alcohol and ether. An ultra-filter paper may be prepared by soaking the filter paper in a collodion solution, hardening by formaldehyde and

then finally drying it. Thus, by using ultra-filter paper, the colloidal particles are separated from rest of the materials. Ultrafiltration is a slow process. To speed up the process, pressure or suction is applied. The colloidal particles left on the ultra-filter paper are then stirred with fresh dispersion medium (solvent) to get a pure colloidal solution.

What is ultrafiltration ?



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Why ordinary filter paper can not be used for ultrafiltration ?



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What is collodion ?



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How can you speed up the process of ultrafiltration ?



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177. Read the following passage and answer the questions.

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with fresh dispersion medium (solvent) to get a pure colloidal solution.

How can you convert an ordinary filter paper into an ultrafilter paper ?

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178. Aniline is less basic than ammonia

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179. T/F Carbonyl chloride is also known as phosphine

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180. Aldehydes are more reactive than Ketones. Explain.

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181. Dehydration of ethanol with conc. H_2SO_4 at 413 K gives ethane

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182. Vitamin C is soluble in water

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183. 45g of ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate

The freezing point depression



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184. 45g of ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate

The freezing point depression



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185. 18g of glucose , $C_6H_{12}O_6$ (Molar mass= $180g\ mol^{-1}$) is dissolved in 1000g (1kg) of water in a sauce pan . At

what temperature will water boil at 1.013 bar? K_b for water is $0.52 \text{ K kg mol}^{-1}$. Water boils at 373.15K at 1.013bar pressure.

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186. Define

Mole fraction

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187. Define

Mass percentage

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188. A first order reaction has a rate constant $1.15 \times 10^{-3} \text{ s}^{-1}$. How long will 5g of this reactant take to reduce to 3 g?

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189. Time required to decompose SO_2Cl_2 to half of its initial amount is 60 minutes. If the decomposition is a first order reaction, calculate the rate constant of the reaction.

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190. Can we store copper sulphate solution in iron vessel? Give suitable explanation in support of your answer

$$[E^\circ(Cu^{2+}/Cu) = +0.34V, E^\circ(Fe^{2+}/Fe) = -0.44V]$$

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191. Why SF_6 is known but OF_6 is not known

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192. SO_3 has zero dipole moment. Why ?

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193. What are the interhalogen compounds ? Why are these more reactive than halogens ?

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194. Explain why Cu(I) is diamagnetic while Cu(II) is paramagnetic.

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195. Transition elements and their compounds are found to be good catalysts. Give examples.

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196. explain with two examples each of the following coordination entity, central atom or ion ligands, coordination numbers, coordination sphere, coordination polyhedron, oxidation number of central atom, homoleptic and heteroleptic.

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197. State and explain with two examples
Central metal atom or ion.

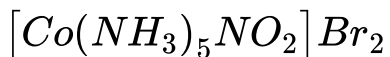
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198. Write IUPAC name of : $[Cu(H_2O)_2(NH_3)_4]SO_4$.



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199. Give IUPAC name of



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200. What is difference between order of reaction and molecularity of reaction ?



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201. The resistance of a conductivity cell containing 10^{-3} M KCl solution at $25^\circ C$ is 1500Ω . What is the cell

constant If conductivity of 10° M KCl solution at 25° C is

$$1.5 \times 10^{-4} \text{ Scm}^{-1}?$$



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202. Write short note on :

Schotten Baumann reaction



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203. Write esterification reaction.



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204. What is Coupling reaction ?

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205. Discuss the acidic dehydration of alcohols at different temperatures.

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206. Boiling point of ethanol (C_2H_5OH) is higher than dimethyl ether ($CH_3—O—CH_3$). Explain.

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207. The rate of the chemical reaction doubles for an increase of 10 K in absolute temperature from 298 K. Calculate E_a .

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208. Calculate the time required for the completion of 90% of a reaction of first order kinetics, $t_{\frac{1}{2}} = 44.1$ minutes.

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209. Fluorine exhibits only - 1 oxidation state whereas other halogens exhibit positive oxidation states such as

+1, +3, +5, +7.

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210. Write short notes on

Finkelstein reaction

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211. Write down following name reaction :

Hunsdiecker reaction

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212. Explain the following reaction reaction :

Sandmeyer's reaction.

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213. Write the following reactions :

Gattermann reaction

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214. Write short notes on

Swarts reaction

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215. How will you differentiate between S_{N1} and S_{N2} reaction mechanism ?

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216. Why the treatment of alkyl chloride with silver nitrite forms nitroalkane and with potassium nitrite forms Alkyl nitrite ?

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217. Transition metals form number of interstitial compounds. Explain.

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218. Why do transition metals have high enthalpies of atomization ?

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219. In the series Sc($Z = 21$) to Zn($Z = 30$), the enthalpy of atomisation of zinc is lowest i.e., 126 kJ mol^{-1} .. Why ?

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220. A transition metal easily form alloys with other transition metals. Explain why ?





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221. The transition metals and many of their compounds show paramagnetic behaviour. Explain why ?



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222. Why Zn, Cd, Hg are soft and have low m.pt.



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223. A pressure cooker reduces cooking time because :

A. heat is more evenly distributed

B. the high pressure tenderises the food

C. the boiling point of water inside the cooker is elevated

D. the boiling point of water inside the cooker is depressed

Answer: C



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224. which of the following mode of expressing the concentration is independent of temperature?

A. Molarity

B. molality

C. formality

D. Normality

Answer: B



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225. Which of the following is not a colligative property?

A. Depression in freezing point

B. Elevation in boiling point

C. Optical activity

D. Relative lowering in vapour pressure

Answer: C

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226. An aqueous solution of 0.5 g of NaOH is dissolved in 500 cm^3 of the solution. The molarity of the solution will be :

A. 0.025M

B. 0.25M

C. 2.5M

D. None of the above

Answer: A





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227. Which is the least polarisable among all the noble gases?

A. He

B. Xe

C. Ar

D. Ne

Answer: A



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228. The number of unpaired electrons in Ni^{2+} is :

A. 0

B. 2

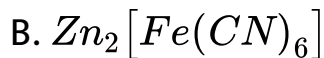
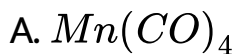
C. 4

D. 8

Answer: B

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229. In which of the following complexes, the metal ion is in zero oxidation state ?



Answer: A



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230. The oxidation number of iron in $K_4[Fe(CN)_6]$ is :

A. +1

B. 2

C. 3

D. zero

Answer: B



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231. Write the following reactions :

Phenol with zinc dust.

A. Benzene

B. Benzaldehyde

C. Benzoic acid

D. Benzophenone.

Answer: A



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232. When $CH_3CH_2CH_2COONa$ is heated with sodalime ($NaOH + CaO$), the hydrocarbon formed is

- A. Butan
- B. Propane
- C. Hexane
- D. Ethane

Answer: B



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233. P in the following reaction is

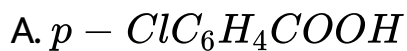


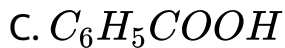
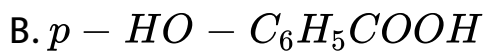
Answer: A



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234. Strongest acid is





Answer: D



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235. A strong base can extract an α -hydrogen from

A. ketone

B. alkane

C. alkene

D. amine

Answer: A

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236. Which of the following is a 3° amine ?

A. Triethylamine

B. t-butylamine

C. N-Methylaniline

D. Ethylamine

Answer: A

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237. Acid anhydride on reaction with 1° amine gives

A. amide

B. imide

C. imine

D. None of the above

Answer: A



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238. Glycogen is an example of :

A. Polysaccharide

B. Disaccharide

C. Monosaccharide

D. Protein

Answer: A



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239. Which of the following amino acids is not optically active?

A. Alanine

B. Glycine

C. Valine

D. Leucine

Answer: B



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240. The oxidation potential of two metals X and Y are $+2.37$ and $+1.66V$ respectively. In a chemical reaction:

- A. X will be replaced by Y
- B. X will replace Y
- C. X will not replace Y
- D. X and Y will not replace each other

Answer: B



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241. Read the following passage and answer the questions.

There are certain substances which behave as normal strong electrolytes at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggregated particles. Such colloids are called associated colloids and the aggregated particles are called micelles. Soaps and detergents are the examples of associated colloids. The formation of micelles takes place above certain concentration called critical micellisation concentration (CMC) and a

characteristic temperature called Kraft temperature.

In case of colloids, what does CMC stand for ?



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242. Read the following passage and answer the questions.

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Give an example of associated colloid used in our daily life ?



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What is the role of CMC in micelle formation ?



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245. Read the following passage and answer the questions.

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What is the role of Kraft temperature in micelle formation ?

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246. Acylation of $-NH_2$ group in aniline reduces its reactivity in electrophilic substitution reactions.

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247. Dichloromethane is also known as chloroform.

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248. oxidation of toluene with chromyl chloride followed by hydrolysis gives benzaldehyde.

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249. T/F Acidic character of alcohols follows the order ,
 $3^\circ > 2^\circ > 1^\circ$.

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250. T/F Chemical name of Vitamin B_6 is thiamine.

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251. The boiling point of benzene is 353.23 K. When 1.80g of a non-volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11 K. Calculate the molar mass of the solute.

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252. Calculate (a) molality (b) molarity and © mole fraction KI if the density of 20% (mass/mass) aqueous KI is 1.202g mL^{-1} .





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253. Calculate (a) molality (b) molarity and © mole fraction KI if the density of 20% (mass/mass) aqueous KI is 1.202g mL^{-1} .



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254. Mixture of chloroform and acetone shown a negative deviation from Raoult's Law. Explain.



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255. The rate constant for a first order reaction is $3.0 \times 10^{-4} \text{ min}^{-1}$. How long will it take for $\frac{1}{5^{\text{th}}}$ of the reactants to be left behind ?

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256. 60% of a first order reaction was completed in 60 minutes. When was it half completed?

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257. What do you understand by normal hydrogen reduction potential of electrode? give its structure and working.



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258. What are pseudohalogens ? Give example.



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259. Explain: Electron gain enthalpy of chlorine is more negative than fluorine.



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260. Why are halogens coloured ?



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261. Why Cr^{2+} is strongly reducing while Mn^{3+} is strongly oxidising ?



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262. Scandium ($z = 21$) is a transition element but zinc ($z = 30$) is not. Explain.



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263. Write the IUPAC name of $K_3[Fe(CN)_5NO]$.



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264. Write IUPAC name of $Na_3 [Co(NO_2)_6]$.

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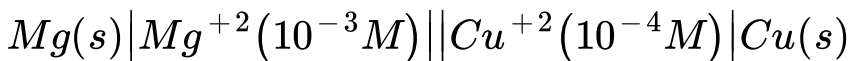
265. Write a short note on linkage isomerism.

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266. Define zero order reaction. Derive integrated rate equation for rate constant of a zero order reaction.

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267. Calculate emf and ∂G for the following cell at 298 K :



given $E_{(Mg^{+2}) / (Mg)}^{\circ} = -2.36V$ and $E_{(Cu^{+2}) / (Cu)}^{\circ} = +0.34V$

($1F=96500 \text{ C mol}^{-1}$)



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268. Ethers possess a dipole moment even if the alkyl groups in the molecule are identical. Explain.



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269. Dimethyl ether is completely soluble in water but diethyl ether is soluble in water to a small extent. Explain.

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270. Explain Williamson's synthesis.

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271. Discuss oxidation of primary, secondary and tertiary alcohols.

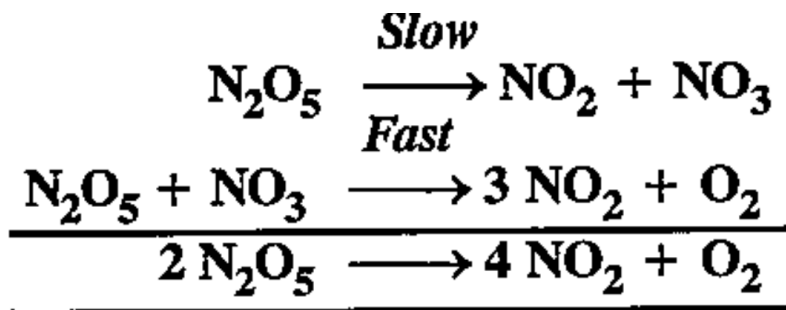
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272. Calculate two third life of a first order reaction having $k = 5.48 \times 10^{-14} \text{ s}^{-1}$.

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273. Thermal decomposition of dinitrogen penta oxide takes place by the following mechanism:

Write the rate expression and order of reaction. What is the unit of rate constant ?



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274. Draw structure of SF_6

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275. Write the following reactions :

Carbylamine reaction.

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276. Explain the following reactions:

Balz Schiemann reaction.

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277. Write short notes on

Markownikoff's rule.



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278. Why is sulphuric acid not used during the reaction of alcohols with KI ?



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279. Write equations for the preparation of 1-iodobutane from

Butan-1-ol



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280. Write equations for the preparation of 1-iodobutane

from

1-Chlorobutane



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281. Write equations for the preparation of 1-iodobutane

from

But-1-ene



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282. A hydrocarbon C_5H_{10} does not react with chlorine in dark but gives a single monochloro compound C_5H_9Cl in bright sunlight. Identify the hydrocarbon.

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283. Silver atom has completely filled d-orbitals ($4d^{10}$) in its ground state. How can you say that it is a transition element ?

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284. Zn^{2+} salts are white while Cu^{2+} salts are blue, explain why ?



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285. Which of the two is paramagnetic V(IV) or V(V) and why ?



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286. Explain :Transition elements exhibit variable oxidation states.



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287. Sc^{3+} ion is colourless while Cr^{3+} ion is coloured. Explain.



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288. Transition metals form alloys with other transition metals. Explain.



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289. Which is stronger reducing agent Cr^{2+} or Fe^{2+} and why ?



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290. Which metal in the first transition series exhibits +1 oxidation state most frequently and why ?



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291. Colligative property among the following is

A. Osmotic pressure

B. Boiling point

C. Vapour pressure

D. Viscosity

Answer: A



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292. The boiling point of a solvent containing non volatile solute :

- A. is depressed
- B. is elevated
- C. does not change
- D. None of the above

Answer: B



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293. In countries nearer to polar region , the roads are sprinkled with $CaCl_2$. This is

- A. TO MENIMISE THE EFFECT OF SNOW ON ROADS
- B. To minimise the pollution
- C. To minimise the accumulation of dust on the road
- D. To minimise the wear and tear of the road

Answer: A

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294. The molarity of pure water (density of water = 1gml^{-1})

- A. 18
- B. 5.56

C. 55.6

D. 100

Answer: C

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295. Which of the following bonds is the strongest?

$F - F, Cl - Cl, I - I, Br - Br.$

A. $F - F$

B. $Cl - Cl$

C. $I - I$

D. $Br - Br$

Answer: B

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296. Which metal has lowest melting point? Cs Hg Mn Cu

A. *Cs*

B. *Hg*

C. *Mn*

D. *Cu*

Answer: B

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297. The oxidation number of cobalt in $K[Co(CO)_4]$ is

A. 1

B. -1

C. 3

D. -3

Answer: B



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298. Vitamine B_{12} contains

A. Fe

B. *Co*

C. *Zn*

D. *Ca*

Answer: B



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299. Commercial alcohol is made unfit for drinking by adding

A. Methyl alcohol

B. Antimony oxide and acetic acid

C. Morphine and adipic acid

D. Snake poison and malonic acid

Answer: A



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300. Write HVZ reaction.

A. α -halo acid

B. β -halo acid

C. α, β - unsaturated acid

D. None of the above

Answer: A



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301. $C_6H_5CH=CH-CHO$ is

- A. Benzaldehyde
- B. Salicylaldehyde
- C. Cinnamaldehyde
- D. None of the above

Answer: C



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302. Which is most acidic?

A. ICH_2COOH

B. $BrCH_2COOH$

C. $ClCH_2COOH$

D. FCH_2COOH

Answer: D



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303. Which is most basic? Benzylamine, aniline, Acetanilide, p-Nitroaniline.

A. Benzaldehyde

B. aniline

C. Acetamide

D. p-Nitroaniline

Answer: A



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304. Vitamin B_1 is called

A. Ascorbic acid

B. Thiamine

C. Pyridoxine

D. Riboflavin

Answer: B



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305. which metal is present in vitamin B_{12} or cyanocobalamin?

A. *fe*

B. *Co*

C. *Mg*

D. *Pt*

Answer: B



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306. The amount of silver (at. mass=108) deposited from a solution of silver nitrate, when a current of 9650 coulombs was passed is:

A. 10.8gm

B. 0.108gm

C. 1.08gm

D. 1.08×10^3 gm

Answer: A



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307. Read the following passage and answer the questions.

When colloidal solutions are viewed under a powerful ultramicroscope, the colloidal particles appear to be in a state of continuous zig-zag motion all over the field of view. This motion was first observed by the British botanist, Robert Brown, and is known as Brownian movement.

This motion is independent of the nature of the colloid but depends on the size of the particles and viscosity of the solution. Smaller the size and lesser the viscosity, faster is the motion.

The Brownian movement has been explained to be due to the unbalanced bombardment of the particles by the molecules of the dispersion medium. The Brownian

movement has a stirring effect which does not permit the particles to settle and thus, is responsible for the stability of sols.

What is Brownian movement ?



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What is the effect of viscosity of dispersion medium on Brownian movement ?



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309. Read the following passage and answer the questions.

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What is the effect of particle size on Brownian movement ?



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What is the cause of Brownian movement ?



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311. Read the following passage and answer the questions.

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movement has a stirring effect which does not permit the particles to settle and thus, is responsible for the stability of sols.

What is the role of Brownian movement in the stability of sols ?

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312. Nitration of aniline gives a mixture of o- and p-nitroanilines.

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313. Dichloromethane is also known as methylene chloride.



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314. Benzaldehyde can be prepared by the hydrolysis of benzal chloride.



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315. Pyridinium chlorochromate (PCC) is a selective oxidising agent to oxidise a 1° alcohol to corresponding aldehyde.



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316. Write chemical name of Vitamin C.



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317. Commercially available sample of sulphuric acid is 15% H_2SO_4 by weight (density= 1.10g mL^{-1}) . Calculate the molarity of the solution.



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318. Calculate the osmotic pressure in pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 1,85,000 in 450 mL of water at 37°C .



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319. Define molality and molarity . Why is molality preferred over molarity?

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320. Calculate the half life period of a first order reaction whose specific rate constant is $5.5 \times 10^{-14} \text{ s}$

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321. A first order reaction takes 40 min for 30% completion. Calculate $t_{\frac{1}{2}}$.

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322. Write two differences between a primary cell and a secondary cell.

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323. H_2S is a gas but H_2O is liquid at room temperature.

Explain.

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324. Why is H_2S less acidic than H_2Te ?

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325. SF_6 is known but SCl_6 is not known. Explain.

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326. Transition metals form large number of complex compounds. Explain.

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327. Explain : Transition elements exhibit variable oxidation states.

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328. Explain the bonding in co-ordination compounds in terms of Werner's theory.

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329. Write down the formulae of hexaammineplatinum(IV) chloride

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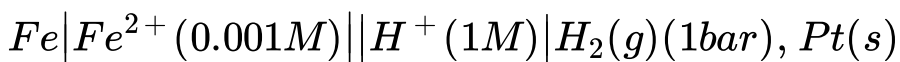
330. Write down the formulae of potassium hexacyanoferrate(III).

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331. What is the difference between instantaneous rate of a reaction and avg rate of reaction?

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332. Calculate the emf of the following cell at 298k :



(given $E^\circ_{cell} = +0.44V$)

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333. Why do alcohols have higher boiling points than halo-alkanes of the same molecular mass ?

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334. Discuss the reaction and mechanism of acidic dehydration of ethyl alcohol to prepare ethene.

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335. The rate constant for a first order reaction becomes six times when the temperature is raised from 350 K to 400 K. Calculate activation energy for the reaction.

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336. Calculate two third life of a first order reaction having $k = 5.48 \times 10^{-14} \text{ s}^{-1}$.

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337. Explain that SO_2 can act as an oxidising agent as well as a reducing agent, but SO_3 can act as an oxidising agent only.

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338. Draw the structure of major monohaloproducts of the reaction:





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339. Draw the structure of major monohaloproducts of the reaction: when bromo propane react with NaI



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340. Draw the structure of major monohaloproducts of the reaction: when cyclo hexene reacts with bromine molecule



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341. Draw the structure of major monohaloproducts of the reaction: when 1-methyl cyclohexene reacts with HI

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342. Draw the structure of major monohaloproducts of the reaction: when 1-bromo-3-chloro cyclo butane reacts with Mg in dry ether and acetone /H₃O⁺

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343. Write Fittig reaction.

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344. Write the following reactions :

Friedel Craft alkylation.

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345. Halogen group is ortho, para directing. Explain.

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346. What are d-Block elements ? Write their general electronic configuration.

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347. What are transition elements ? Which of the d block elements are not regarded as transition elements and why ?

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348. Give general characteristics of transition elements and why are they called transition elements ?

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349. Transition metals form number of interstitial compounds. Explain.

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350. Ionisation energy of 5d-elements is more than 3d- and 4d-elements. Why ?

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351. Out of Fe^{2+} and Fe^{3+} which is more paramagnetic and why ?

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352. Give the general electronic configuration of d-block elements.

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353. Colligative property of dilute solutions depends on :

- A. The nature of solute
- B. The nature of solvent
- C. the number of particle of solute
- D. the number of particle of solvent

Answer: C



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354. The boiling point of a solvent containing non volatile solute :

- A. is depressed
- B. is elevated
- C. does not change
- D. None of the above

Answer: B

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355. Freezing point of a solvent containing a non volatile solute

- A. is depressed
- B. is elevated

C. does not change

D. None of the above

Answer: A



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356. The vapour pressure of an aqueous solution of glucose is 750 mm of mercury at $100^{\circ}C$. Mole fraction of solute will be

A. 0.103

B. 0.013

C. 0.025

D. 0.45

Answer: A



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357. Sea divers go deep in the sea water with a mixture of which of the following gases?

A. O_2 and He

B. O_2 and Ar

C. O_2 and CO_2

D. CO_2 and Ar

Answer: A



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358. Which of the following is not a d-block element?

A. Hg

B. Po

C. Ni

D. W

Answer: B



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359. Write the IUPAC name of $K_2[Ni(CN)_4]$.

- A. potassium tetracyanonickelate(II)
- B. potassium tetracyanonickelate(III)
- C. potassium tetracyanonickelate(0)
- D. None of the above

Answer: A

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360. Reaction used for the preparation of ethers is

- A. Reimer-Tieman reaction
- B. Williamson's synthesis
- C. Wurtz reaction

D. Cannizzaro reaction.

Answer: B



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361. Iodoform test is not given by :

A. 2-Pentanone

B. 3-Pentanone

C. ethanol

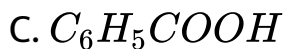
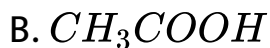
D. Ethanal

Answer: B



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362. In the following, strongest acid is



Answer: C



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363. What type of organic compounds are prepared by Gatterman-Koch reaction ?

A. Aliphatic aldehyde

B. Aromatic ketone

C. Aliphatic ketone

D. Aromatic aldehyde

Answer: D

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364. Which of the following is most acidic?

A. 

B. 

C. 

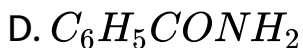
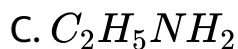
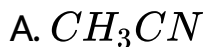
D. 

Answer: A



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365. Which among the following compound will give offensive compound when heated with chloroform and alcoholic potassium hydroxide ?



Answer: C

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366. The pK_b value of NH_3 as compared to CH_3NH_2 is

- A. more
- B. less
- C. equal
- D. None of the above

Answer: A

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367. Write two sources of vitamin C and disease caused by its deficiency.

A. Beri-Beri

B. Rickets

C. Scurvy

D. None of the above

Answer: C



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368. Starch is a mixture of amylopectin and

A. pyran

B. amylose

C. lactose

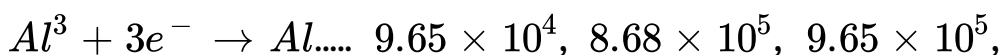
D. D-ribose

Answer: B



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369. Numbers of coulombs required to deposit 90 gm of aluminium, when the electrode fraction is,



6.95.

A. 9.65×10^4

B. 8.68×10^5

C. 9.65×10^5

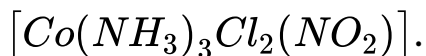
D. 6. .95

Answer: C



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370. Write the I.U.P.A.C. name of the



A. triamminedichloridonitrito-N-cobalt(III)

B. dichlorotriamminenitrito-N-cobalt(III)

C. dichlorotriamminenitrito-N-cobalt(II)

D. None of these.

Answer: A



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371. Read the following passage and answer the questions.

Ultrafiltration is the process of separating the colloidal particles from the solvent and soluble solutes present in the colloidal solution by specially prepared filters, which are permeable to all substances except the colloidal particles. Colloidal particles can pass through ordinary filter paper because the pores are too large. However, the pores of filter paper can be reduced in size by impregnating with collodion solution to stop the flow of colloidal particles. The usual collodion is a 4% solution of

nitrocellulose in a mixture of alcohol and ether. An ultra-filter paper may be prepared by soaking the filter paper in a collodion solution, hardening by formaldehyde and then finally drying it. Thus, by using ultra-filter paper, the colloidal particles are separated from rest of the materials. Ultrafiltration is a slow process. To speed up the process, pressure or suction is applied. The colloidal particles left on the ultra-filter paper are then stirred with fresh dispersion medium (solvent) to get a pure colloidal solution.

What is ultrafiltration ?



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colloidal particles are separated from rest of the materials. Ultrafiltration is a slow process. To speed up the process, pressure or suction is applied. The colloidal particles left on the ultra-filter paper are then stirred with fresh dispersion medium (solvent) to get a pure colloidal solution.

Why ordinary filter paper can not be used for ultrafiltration ?



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What is collodion ?



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How can you speed up the process of ultrafiltration ?



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How can you convert an ordinary filter paper into an ultrafilter paper ?

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376. Aniline is less basic than ammonia

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377. T/F Carbonyl chloride is also known as phosphine

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378. Aldehydes are more reactive than Ketones. Explain.

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379. Dehydration of ethanol with conc. H_2SO_4 at 413 K gives ethane

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380. Vitamin C is soluble in water

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381. 45g of ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate

The freezing point depression

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382. 45g of ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate

The freezing point depression

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383. 18g of glucose , $C_6H_{12}O_6$ (Molar mass= $180g\ mol^{-1}$) is dissolved in 1000g (1kg) of water in a sauce pan . At what temperature will water boil at 1.013 bar? K_b for water is $0.52K\ kg\ mol^{-1}$. Water boils at 373.15K at 1.013bar pressure.

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384. Define

Mole fraction

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385. Define

Mass percentage



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386. A first order reaction has a rate constant $1.15 \times 10^{-3} \text{ s}^{-1}$. How long will 5g of this reactant take to reduce to 3 g?



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387. Time required to decompose SO_2Cl_2 to half of its initial amount is 60 minutes. If the decomposition is a

first order reaction, calculate the rate constant of the reaction.

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388. Can we store copper sulphate solution in iron vessel? Give suitable explanation in support of your answer

$$[E^\circ(\text{Cu}^{2+} / \text{Cu}) = +0.34\text{V}, E^\circ(\text{Fe}^{2+} / \text{Fe}) = -0.44\text{V}]$$

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389. OF_6 does not exist but SF_6 , exists. Why?

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390. SO_3 has zero dipole moment. Why ?



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391. What are the interhalogen compounds ? Why are these more reactive than halogens ?



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392. Explain why Cu(I) is diamagnetic while Cu(II) is paramagnetic.



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393. Transition elements and their compounds are found to be good catalysts. Give examples.

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394. State and explain with two examples

Co-ordination entity

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395. State and explain with two examples

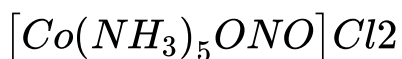
Central metal atom or ion.

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396. Write IUPAC name of : $[Cu(H_2O)_2(NH_3)_4]SO_4$.

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397. Give IUPAC name of



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398. What is difference between order of reaction and molecularity of reaction ?

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399. The resistance of a conductivity cell containing 10^{-3} M KCl solution at 25°C is $1500\ \Omega$. What is the cell constant if conductivity of 10° M KCl solution at 25°C is $1.5 \times 10^{-4}\ \text{Scm}^{-1}$?

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400. Write short note on :

Schotten Baumann reaction

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401. Write esterification reaction.

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402. What is Coupling reaction ?

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403. Discuss the acidic dehydration of alcohols at different temperatures.

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404. The Boiling Point of ethers are lower than isomeric alcohols why ?

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405. The rate of the chemical reaction doubles for an increase of 10 K in absolute temperature from 298 K. Calculate E_a .



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406. Calculate the time required for the completion of 90% of a reaction of first order kinetics, $t_{\frac{1}{2}} = 44.1$ minutes.



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407. Fluorine exhibits only - 1 oxidation state whereas other halogens exhibit positive oxidation states such as

+1, +3, +5, +7.



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408. Write short notes on

Finkelstein reaction



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409. Write down following name reaction :

Hunsdiecker reaction



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410. Explain the following reaction reaction :

Sandmeyer's reaction.



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411. Write the following reactions :

Gattermann reaction



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412. Write short notes on

Swarts reaction



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413. How will you differentiate between S_{N1} and S_{N2} reaction mechanism ?

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414. Why the treatment of alkyl chloride with silver nitrite forms nitroalkane and with potassium nitrite forms Alkyl nitrite ?

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415. Transition metals form number of interstitial compounds. Explain.

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416. Why do transition metals have high enthalpies of atomization ?

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417. In the series Sc($Z = 21$) to Zn($Z = 30$), the enthalpy of atomisation of zinc is lowest i.e., 126 kJ mol^{-1} .. Why ?

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418. Why transition elements form a number of alloys ?

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419. The transition metals and many of their compounds show paramagnetic behaviour. Explain why ?

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420. Why Zn, Cd, Hg are soft and have low m.pt.

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421. A pressure cooker reduces cooking time because :

A. heat is more evenly distributed

B. the high pressure tenderises the food

C. the boiling point of water inside the cooker is elevated

D. the boiling point of water inside the cooker is depressed

Answer: C



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422. which of the following mode of expressing the concentration is independent of temperature?

A. Molarity

B. molality

C. formality

D. Normality

Answer: B



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423. Which is not a colligative property?

A. Depression in freezing point

B. Elevation in boiling point

C. Optical activity

D. Relative lowering in vapour pressure

Answer: C



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424. An aqueous solution of 0.5 g of NaOH is dissolved in 500 cm^3 of the solution. The molarity of the solution will be :

A. 0.025M

B. 0.25M

C. 2.5M

D. None of the above

Answer: A



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425. Which is the least polarisable among all the noble gases?

A. He

B. Xe

C. Ar

D. Ne

Answer: A



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426. The number of unpaired electrons in Ni^{3+} . is

A. 3

B. 2

C. 4

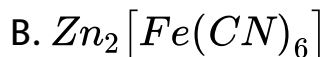
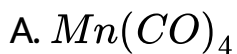
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Answer: B



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427. In which of the following complexes, the metal ion is in zero oxidation state ?





Answer: A



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428. The oxidation number of iron in $K_4[Fe(CN)_6]$ is :

A. +1

B. 2

C. 3

D. zero

Answer: B



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429. Phenol upon distillation with zinc dust gives :

- A. Benzene
- B. Benzaldehyde
- C. Benzoic acid
- D. Benzophenone.

Answer: A



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430. When $CH_3CH_2CH_2COONa$ is heated with sodalime ($NaOH + CaO$), the hydrocarbon formed is

- A. Butan
- B. Propane
- C. Hexane
- D. Ethane

Answer: B



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431. P is Molecular formula of aldehyde is

A. RCH_2OH

B. RCH_3

C. $RCHO$

D. ROR

Answer: A



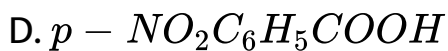
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432. Strongest acid is

A. $p - ClC_6H_4COOH$

B. $p - HO - C_6H_5COOH$

C. C_6H_5COOH



Answer: D



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433. A strong base can extract an α -hydrogen from

A. ketone

B. alkane

C. alkene

D. amine

Answer: A



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434. Which of the following is a 3° amine ?

A. Triethylamine

B. t-butylamine

C. N-Methylaniline

D. Ethylamine

Answer: A



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435. Acid anhydride on reaction with 1° amine gives

A. amide

B. imide

C. imine

D. None of the above

Answer: A



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436. Glycogen is an example of :

A. Polysaccharide

B. Disaccharide

C. Monosaccharide

D. Protein

Answer: A



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437. Which of the following amino acids is not optically active?

A. Alanine

B. Glycine

C. Valine

D. Leucine

Answer: B



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438. The oxidation potential of two metals X and Y are $+2.37$ and $+1.66V$ respectively. In a chemical reaction:

- A. X will be replaced by Y
- B. X will replace Y
- C. X will not replace Y
- D. X and Y will not replace each other

Answer: B



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439. Read the given passage and answer the following questions

There are certain substances which behave as normal strong electrolytes at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggregated particles. Such colloids are called associated colloids and the aggregated particles are called micelles. Soaps and detergents are the examples of associated colloids. The formation of micelles takes place above certain concentration called critical micellization concentration (CMC) and a characteristic temperature called Kraft temperature.

Which type of colloids form micelles?



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440. Read the following passage and answer the questions.

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Give an example of associated colloid used in our daily life ?



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There are certain substances which behave as normal strong electrolytes at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggregated particles. Such colloids are called associated colloids and the aggregated particles are called micelles. Soaps and detergents are the examples of associated colloids. The formation of micelles takes place above certain concentration called critical micellisation concentration (CMC) and a

characteristic temperature called Kraft temperature.

In case of colloids, what does CMC stand for ?



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There are certain substances which behave as normal strong electrolytes at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggregated particles. Such colloids are called associated colloids and the aggregated particles are called micelles. Soaps and detergents are the examples of associated colloids. The formation of micelles takes place above certain concentration called

critical micellisation concentration (CMC) and a characteristic temperature called Kraft temperature.

What is the role of CMC in micelle formation ?



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443. Read the following passage and answer the questions.

There are certain substances which behave as normal strong electrolytes at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggregated particles. Such colloids are called associated colloids and the aggregated particles are called micelles. Soaps and detergents are the examples of associated colloids. The formation of

micelles takes place above certain concentration called critical micellisation concentration (CMC) and a characteristic temperature called Kraft temperature.

What is the role of Kraft temperature in micelle formation ?

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444. Acylation of $-NH_2$ group in aniline reduces its reactivity in electrophilic substitution reactions.

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445. Dichloromethane is also known as chloroform.

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446. oxidation of toluene with chromyl chloride followed by hydrolysis gives benzaldehyde.

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447. T/F Acidic character of alcohols follows the order ,
 $3^\circ > 2^\circ > 1^\circ$.

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448. T/F Chemical name of Vitamin B_6 is thiamine.

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449. The boiling point of benzene is 353.23 K. When 1.80g of a non-volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11 K. Calculate the molar mass of the solute.

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450. Calculate (a) molality (b) molarity and © mole fraction KI if the density of 20% (mass/mass) aqueous KI is 1.202g mL^{-1} .

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451. Calculate (a) molality (b) molarity and © mole fraction KI if the density of 20% (mass/mass) aqueous KI is 1.202g mL^{-1} .

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452. Mixture of chloroform and acetone shown a negative deviation from Raoult's Law. Explain.

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453. The rate constant for a first order reaction is $3.0 \times 10^{-4} \text{ min}^{-1}$. How long will it take for $\frac{1}{5^{\text{th}}}$ of the reactants to be left behind ?



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454. 60% of a first order reaction was completed in 60 minutes. When was it half completed?



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455. What do you mean by normal hydrogen electrode ?
Give its structure and working ?



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456. What are pseudohalogens ? Give example.



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457. Explain: Electron gain enthalpy of chlorine is more negative than fluorine.

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458. Why are halogens coloured ?

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459. Why Cr^{2+} is strongly reducing while Mn^{3+} is strongly oxidising ?

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460. Scandium ($z = 21$) is a transition element but zinc ($z = 30$) is not. Explain.

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461. Write the IUPAC name of $K_3[Fe(CN)_5NO]$.

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462. Write IUPAC name of $Na_3[Co(NO_2)_6]$.

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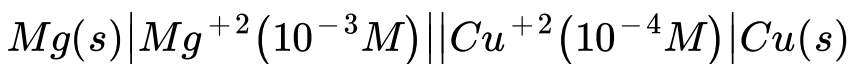
463. Write a short note on linkage isomerism.

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464. Define zero order reaction. Derive integrated rate equation for rate constant of a zero order reaction.

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465. Calculate emf and ΔG for the following cell at 298 K :



given $E_{(Mg^{+2}) / (Mg)}^{\circ} = -2.36V$ and $E_{(Cu^{+2}) / (Cu)}^{\circ} = +0.34V$

($1F = 96500 \text{ C mol}^{-1}$)

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466. Ethers possess a dipole moment even if the alkyl groups in the molecule are identical. Explain.



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467. Explain why lower ethers are highly soluble in water?



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468. Explain Williamson's synthesis.



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469. Discuss oxidation of primary, secondary and tertiary alcohols.

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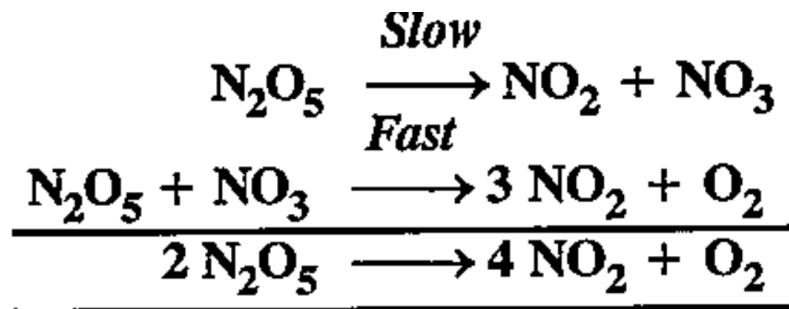
470. Calculate two third life of a first order reaction having $k = 5.48 \times 10^{-14} \text{ s}^{-1}$.

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471. Thermal decomposition of dinitrogen penta oxide takes place by the following mechanism:

Write the rate expression and order of reaction. What is

the unit of rate constant ?



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472. Discuss the structure of SF_6 , on the basis of hybridisation.

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473. Write the following reactions :

Carbylamine reaction.

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474. Explain the following reaction reaction :

Schiemann reaction.

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475. Write short notes on

Markownikoff's rule.

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476. Why is sulphuric acid not used during the reaction of alcohols with KI ?



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477. Write equations for the preparation of 1-iodobutane

from

Butan-1-ol



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478. Write equations for the preparation of 1-iodobutane

from

1-Chlorobutane



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479. Write equations for the preparation of 1-iodobutane from
But-1-ene

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480. A hydrocarbon C_5H_{10} does not react with chlorine in dark but gives a single monochloro compound C_5H_9Cl in bright sunlight. Identify the hydrocarbon.

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481. Silver atom has completely filled d-orbitals ($4d^{10}$) in its ground state. How can you say that it is a transition

element ?

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482. Zn salts are white, Ni^{++} salts are blue explain

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483. Which of the two is paramagnetic V(IV) or V(V)
and why ?

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484. Explain :Transition elements exhibit variable oxidation states.

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485. Sc^{3+} ion is colourless while Cr^{3+} ion is coloured.

Explain.

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486. Transition metals form alloys with other transition metals. Explain.

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487. Which is stronger reducing agent Cr^{2+} or Fe^{2+} and why ?

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488. Which metal in the first transition series exhibits +1 oxidation state most frequently and why ?

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