



INDIAN SCHOOL AL WADI AL KABIR  
DEPARTMENT OF SCIENCE 2017 -18  
HOLIDAY ASSIGNMENT – SUMMER VACATION

**CLASS 12**

**PHYSICS**

Journal work, Project work,  
Worksheet – CHAPTER : Magnetic Effects of Current (In file format)

**CHEMISTRY**

Journal work, Project work,  
Worksheet - CHAPTER : SOLUTIONS (in file format)

**BIOLOGY**

Journal work, Project work

**DATE OF SUBMISSION : Reopening Day**

## PHYSICS

### CHAPTER : MAGNETIC EFFECT OF CURRENT

[1] An electron revolves round a proton in a H-atom at a speed of  $2.18 \times 10^6$  m/s in an orbit of radius  $0.53 \text{ \AA}$ . what magnetic field does it produce at the centre of its circular orbit?

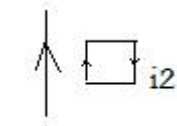
M.F at the centre of a coil of  $n$  turns =  $B = \frac{\mu_0 n I}{2r}$ . But  $I = \frac{q}{t}$  [ 12.42T]

2a t

[2] How will the magnetic field intensity at the centre of a circular coil carrying current changes, if the current through the coil is doubled and the radius of the coil is halved? Ans. 4 times

[3] A long straight wire carries a current of 2A. An electron travels with a speed of  $4 \times 10^4$  m/s parallel to the wire at a distance of 0.1m from it in the direction opposite to the electric current. what force does the M.F of the current exert on the moving electron  $F = 2.56 \times 10^{-20}$  N

[4] In the figure, the straight wire AB is fixed while the loop is free to move under the influence of the electric currents flowing in them. In which direction does the loop begin to move?



i1 attraction

[5] A straight wire of length  $\pi/2$  meter is bent into a circular shape. If the wire were to carry a current of 5A, calculate the M.F due to it before bending at a point distant 0.01 times the radius of the circle formed from it. Also Calculate the M.F at the centre of the circular loop formed, for the same value of current.

$$B = \frac{\mu_0 I N}{2r} = 1.26 \times 10^{-5} \text{ T}$$

2a

[6] If the current sensitivity of a moving coil galvanometer is increased by 20%, its resistance also increases by 1.5 times. How will the voltage sensitivity of galvanometer be affected? Increases by 80%

[7] A square coil of side 10cm consists of 20 turns and carries a current of 12A .The coil is suspended vertically and the normal to the plane of the coil makes an angle of  $30^{\circ}$  with the direction of uniform M.F of 0.8T.what is the torque?

Ans. 0.96Nm

[8] A straight wire of length  $\pi/2$  meter is bent into a circular shape. If the wire were to carry a current of 5A,calculate the M.F due to it before bending at a point distant 0.01 times the radius of the circle formed from it .Also Calculate the M.F at the centre of the circular loop formed, for the same value of current.Ans.  $1.26 \times 10^{-5}$  T

## CHEMISTRY

### CHAPTER : SOLUTIONS

1	Define the term solution. How many types of solutions are formed? Write briefly about each type with an example.
2	Define the following terms: (i) Mole fraction (ii) Molality (iii) Molarity (iv) Mass percentage
3	Concentrated nitric acid used in laboratory work 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 $1.504 \text{ g mL}^{-1}$ ?
4	A solution of glucose in water is labelled as 10% w/w, what would be the molality and mole fraction of each component in the solution? If the density of solution is $1.2 \text{ g mL}^{-1}$ , then what shall be the molarity of the solution?
5	A sample of drinking water was found to be severely contaminated with chloroform ( $\text{CHCl}_3$ ) supposed to be a carcinogen. The level of contamination was 15 ppm (by mass): (i) express this in percent by mass (ii) determine the molality of chloroform in the water sample.
6	What role does the molecular interaction play in a solution of alcohol and water?
7	State Henry's law and mention some important applications?
8	The partial pressure of ethane over a solution containing $6.56 \times 10^{-3} \text{ g}$ of ethane is 1 bar. If the solution contains $5.00 \times 10^{-2} \text{ g}$ of ethane, then what shall be the partial pressure of the gas?
9	What is meant by positive and negative deviations from Raoult's law and how is the sign of $\Delta H_{\text{mix}}$ related to positive and negative deviations from Raoult's law?

10	An aqueous solution of 2% non-volatile solute exerts a pressure of 1.004 bar at the normal boiling point of the solvent. What is the molar mass of the solute?
11	Heptane and octane form an ideal solution. At 373 K, the vapour pressures of the two liquid components are 105.2 kPa and 46.8 kPa respectively. What will be the vapour pressure of a mixture of 26.0 g of heptane and 35 g of octane?
12	A solution containing 30 g of non-volatile solute exactly in 90 g of water has a vapour pressure of 2.8 kPa at 298 K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9 kPa at 298 K. Calculate: (i) molar mass of the solute (ii) vapour pressure of water at 298 K.
13	A 5% solution (by mass) of cane sugar in water has freezing point of 271K. Calculate the freezing point of 5% glucose in water if freezing point of pure water is 273.15 K.
14	Two elements A and B form compounds having formula AB <sub>2</sub> and AB <sub>4</sub> . When dissolved in 20 g of benzene (C <sub>6</sub> H <sub>6</sub> ), 1 g of AB <sub>2</sub> lowers the freezing point by 2.3 K whereas 1.0 g of AB <sub>4</sub> lowers it by 1.3 K. The molar depression constant for benzene is 5.1 K kg mol <sup>-1</sup> . Calculate atomic masses of A and B.
15	If the density of some lake water is 1.25g mL <sup>-1</sup> and contains 92 g of Na <sup>+</sup> ions per kg of water, calculate the molality of Na <sup>+</sup> ions in the lake.
16	If the solubility product of CuS is $6 \times 10^{-16}$ , calculate the maximum molarity of CuS in aqueous solution.
17	Calculate the depression in the freezing point of water when 10 g of CH <sub>3</sub> CH <sub>2</sub> CHClCOOH is added to 250 g of water. $K_a = 1.4 \times 10^{-3}$ , $K_f = 1.86 \text{ K kg mol}^{-1}$ .
18	19.5 g of CH <sub>2</sub> FCOOH is dissolved in 500 g of water. The depression in the freezing point of water observed is 1.00 C. Calculate the van't Hoff factor and dissociation constant of fluoroacetic acid.
19	Determine the amount of CaCl <sub>2</sub> ( $i = 2.47$ ) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at 27° C.
20	Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K <sub>2</sub> SO <sub>4</sub> in 2 litre of water at 25° C, assuming that it is completely dissociated