

# COMPILED HOLIDAY HOMEWORK - 12<sup>™</sup> A CHEMISTRY SOLUTIONS

### <u>1<sup>st</sup> part-</u> <u>MULTIPLE CHOICE QUESTIONS</u>

- 1. A solution of two liquids boils at a temperature more than the boiling point of either of them. Hence, the binary solution shows
- A. negative deviation from Raoult's law
- B. positive deviation from Raoult's law
- C. no deviation from Raoult's law
- D. positive or negative deviation from Raoult's law depending upon the composition

2. A 5.2 molal aqueous solution of methyl alcohol, CH<sub>3</sub>OH is supplied. What is the mole fraction of methyl alcohol in the solution?

- A. 0.050
- B. 0.100
- C. 0.190
- D. 0.086

3. The molality of a urea solution in which 0.0100 g of urea,  $[(NH_2)_2CO]$  is added to 0.3000 dm3 of water at STP is

- A.  $3.33 \times 10^{-2} \,\mathrm{m}$
- B. 0.555 m
- C.  $5.55 \times 10^{-4} \text{ m}$
- D. 33.3 m

4. 1.00 g of non-electrolyte solute (molar mass 250 g mol<sup>4</sup>) was dissolved in 51.2 g of benzene. If the freezing point depression constant, Kf of benzene is 5.12 K kg mol<sup>4</sup>, the freezing point of benzene will be lowered by

- A. 0.3 K
- B. 0.5 K

- C. 0.2 K
- D. 0.4 K
- 5. A solution of acetone in ethanol
- A. shows a positive deviation from Raoult's law
- B. behaves like a near ideal solution
- C. obeys Raoult's law
- D. shows negative deviation from Raoult's law

6. 18 g of glucose ( $C_6H_{12}O_6$ ) is added to 178.2 g of water. The vapour pressure of water for this aqueous solution at 100°C is

- A. 7.60 torr
- B. 6.00 torr
- C. 752.40 torr
- D. 759.00 torr

7. Density of a 2.05 M solution of acetic acid in water is 1.20 g/mL. The molarity of the solution is

- A. 3.28 mol kg-1
- B. 2.28 mol kg<sup>-1</sup>
- C.  $0.44 \text{ mol } \text{kg}_{1}$
- D. 2.14 mol kg.1

8. A solution has 1:4 mole ratio of pentane to hexane. The vapour pressure of pure hydrocarbons at 20°C are 400 mm Hg for pentane and 120 mm Hg for hexane. The mole fraction of pentane in the vapour phase would be

- A. 0.200
- B. 0.549
- C. 0.786
- D. 0.478

9. The vapour pressure of two liquids P and Q are 80 and 60 torr respectively. The total vapour pressure of solution obtained by mixing 3 mol of P and 2 mol of Q would be

- A. 72 torr
- B. 140 torr
- C. 68 torr
- D. 20 torr

10. A solution of urea (mol. mass = 56 g mol-1) boils at 100.18°C at the atmospheric pressure. If Kf and Kb for water are 1.86 and 0.512 K kg mol<sup>-1</sup> respectively, then the above solution will freeze at

- A. 0.654°C
- В. –0.654°С
- C. 6.54°C
- D. -6.54°C

11. pA and pB are the vapour pressure of pure liquid components, A and B, respectively of an ideal binary solution. If xA represents the mole fraction of component A, the total pressure of the solution will be

- A. pB+ xA (pB pA)
- B. pB+ xA (pA pB)
- C. pA+ xA (pB pA)
- D. pA+ xA (pA pB)

12. Dissolving 120 g of urea (mol. wt. 60) in 1000 g of water gave a solution of density 1.15 g/mL. The molarity of the solution is

- Á. 1.78 M
- B. 2.00 M
- C. 2.05 M
- D. 2.22 M

13. Two solutions of a substance (non-electrolyte) are mixed in the following manner: 480 mL of 1.5 M first solution + 520 mL of 1.2 M second solution. What is the molarity of the final mixture?

- A. 1.20 M
- B. 1.50 M
- C. 1.344 M
- D. 2.70 M

14. Equimolar solution in the same solvent have

A. same boiling point but different freezing point

- B. same freezing point but different boiling point
- C. same boiling point and same freezing point
- D. different boiling point and different freezing point

## VERY SHORT ANSWER TYPE QUESTIONS

- 1. What is expected value vant' Hoff factor for  $K_3[Fe(CN)_6]$  in dilute solution?
- 2. What are the values of  $\Delta$ Hand  $\Delta$ V for an ideal solution of two liquids?
- 3. Which has the highest freezing point? 1M Glucose or 1 M NaCl.
- 4. Why do doctors advise gargles by saline water in case of sore throat?
- 5. What are isotonic solutions?

6.10 ml of liquid A was mixed 10 ml of liquid B. The volume of the resulting solution was found to be 19.9 ml. What do you conclude?

7. Two liquids A & B boil at 155 C & 200 C respectively. Which of them has a higher vapour pressure at 80 C ?

- 8. Define Henry's law about solubility of a gas in a liquid.
- 9. Why is the cooking temperature in pressure cooker higher than in open pan?
- 10. Why does molality of a solution remain unchanged with change in temperature while its molarity changes?.

## **SHORT ANSWER TYPE QUESTIONS**

1. What is an anti-freeze? What is de-icing agent? How does it work?

2. A solution containing 7 g of a solute (molar mass210 g/mol) in 350 g of acetone raised the boiling point of acetone from 56°C to 56.3°C. Calculate the value of ebullioscopic constant for acetone.

3. Calculate molarity & molality of a 39% solution (by weight) of sulphuric acid. Its density is 1.020 g/cc. (Atomic mass H=1, S=32, O=16)

4. 1.0 g of nonvolatile solute was dissolved in 100 g of acetone (mol. Mass=58 g/mol) at 298 K. The vapour pressure of the solution was found to be 192.5 mm of Hg. Calculate the molar mass of the solute. (The vapour pressure of pure acetone at 298 K is 195mm of Hg)

5. Calculate the mass of ascorbic acid (vitamin C, C<sub>6</sub> H<sub>8</sub>O<sub>6</sub>) to be dissolved in 75 g of acetic acid to lower its melting point by 1.5 °C. (Kf = 3.9 K Kg/ mol)

6. An aqueous solution containing 1.248 g of barium chloride (molar mass=208.34g/mol) in 100 g of water boils at 100.083 °C. Calculate the degree of dissociation of barium chloride.

7. Calculate the osmotic pressure at 25 C & freezing point of 1.8 % aqueous solution of glucose ( $C_6H_{12}O_6$ ). Assume ideal behaviour of the solution, take density to be 1 g/cc Kf for water to be 1.86 K Kg/mol )

8. The vapour pressure of pure liquids A & B are 450 & 700 mm of Hg at 350 K respectively. Find out the composition of the liquid mixture if total vapour pressure is 600 mm of Hg Also find the composition of the vapour phase.

9. The vapour pressure of pure liquids A and B are 70 mm of Hg and 90 mm of Hg respectively at 25°C. The mole fraction of A in a solution of the two is 0.3. Assuming that A and B form an ideal solution, calculate the partial pressure of each component in equilibrium with the solution.

## 2<sup>nd</sup> part-

Select your project for board exam practical with all its details.

Keep your practical file ready after the vacation.

# **PHYSICS** Electric charges and field

## VERY SHORT ANSWER TYPE QUESTIONS

- 1. Define electric flux. Write its S.I unit.
- 2. Explain why two field lines never cross each other at any point?
- 3. If an electron has an initial velocity in a direction different from that of E the path of

the electron is

- a)parabola b) line c)circle d)ellipse
- 4. Charge Q is located at the center of cube. Flux through any two adjoining faces of cube

is

(a) Q/12e. (b) Q/3e. (c) Q/6e. (d) Q/4e.

### **SHORT ANSWER TYPE QUESTIONS**

6. Two metallic spherical shell has an inner radius R1 and outer R2 .A charge q is placed at the centre of the spherical cavity. What will be surface density on (i) the inner surface and (ii) the outer surface ?

7. S1 and S2 are two hollow concentric spheres enclosing charges Q and 2 Q respectively as shown in fig



- (i) What is the ratio of the electric flux through S1 and S2?
- (ii) How will the electric flux through the sphere S1

change, if a medium of dielectric constant 5 is

introduced in the space inside S1 in place of air?

8. A charge is distributed uniformly over a ring of radius 'a'. Obtain an expression for the electric intensity E at a point on the axis of the ring. Hence show that for points at large distances from the ring, it behaves like a point charge.

9. An electric field is uniform, and in the positive x direction for positive x and uniform with the same magnitude in the negative x direction for negative x. It is given that, a right circular cylinder of length 20 cm and radius 5 cm has its centre at the origin and its axis along



### **SHORT ANSWER QUESTIONS**

10. Derive an expression of electric field intensity at a point on (i) axial line (ii) equatorial axis of an electric dipole.

11. Four point-charges are placed at the corners of a square of side 2 cm as shown. Find the magnitude and direction of the electric field at centre O of the square, if  $q=0.02\mu$ C.



12. Two small identical electrical dipoles AB and CD, each of dipole moment 'p' are kept at an angle of 1200

as shown in Fig. What is the resultant dipole moment of this combination? If this system is subjected to electric field (E) directed along +X direction, what will be the magnitude and direction of the torque acting on this.



13. A hollow cylindrical box of length 1m and area of cross-section 25 cm2 is placed in a three dimensional coordinate system as shown in the figure. The electric field in the region is given by E=50x i, where E is in N/C and x is in meter. Find (i) net flux through the cylinder. (ii) charge enclosed by the cylinder.



# HINDI

# <u>ग्रीष्मावकाश हेतु गृह कार्य</u>

1-निम्नलिखित विषयों में से किसी एक विषय पर फीचर लिखिए-- योग भगाए रोग, युवाओं में बढ़ता, मानसिक तनाव ।
 2.नगर निगम अध्यक्ष को अपनी कॉलोनी के पार्क को साफ करने हेतु एक पत्र लिखिए।
 3.उपभोक्तावाद अथवा बाज़ारवाद पर एक अनुच्छेद लिखिए।
 4.खेल समाचार, राजनीतिक समाचार पर आधारित स्वरचित समाचार लिखिए।

# COMPUTER

1. Write a Python function to find the Max of three numbers.

2. Write a Python function to sum all the numbers in a list. Sample List : (8, 2, 3, 0, 7) Expected Output : 20

Write a Python function to multiply all the numbers in a list. Sample List : (8, 2, 3, -1,
7) Expected Output : -336

4. Write a Python program to reverse a string.

Sample String : "1234abcd"

Expected Output : "dcba4321"

5. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.

6. Write a Python function to check whether a number falls in a given range.

7. Write a Python function that accepts a string and calculate the number of upper case letters and lower case letters.

Sample String : 'The quick Brow Fox'

Expected Output :

No. of Upper case characters : 3

No. of Lower case Characters : 12

8. Write a Python function that takes a list and returns a new list with unique elements of the first list.

Sample List : [1,2,3,3,3,3,4,5]

Unique List : [1, 2, 3, 4, 5]

9. Write a program to calculate factorial using recursion.

10. Write a program to illustrate recursion in calculating x to the power n.

# BIOLOGY

- 1. Make a short project on Reproductive health and issues in human beings.
- 2. Collect names and addresses of well-known physicians who work in this field.

# MATHS

Multiple choice questions. Select the correct option.

1.	If $S = [S_{ij}]$ is a scalar matrix such that $S_{ii} = k$ and A is a square matrix of the same order, then AS = SA = ?			
	(a) A <sup>k</sup> (b) k+A	(c)	kA	(d) kS
2.	If matrices A and B are inverses of each other	then ,		
	(a)AB = BA (b) AB = BA = I c) AB	8 = BA = O	(d)	AB = O, BA = I
3.	If A = diag (3 , -7), then matrix A is:			
	(a) $\begin{bmatrix} 0 & 3 \\ 0 & -7 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & 3 \\ -7 & 0 \end{bmatrix}$	(c)	$\begin{bmatrix} 3 & 0 \\ 0 & -7 \end{bmatrix}$	(d) $\begin{bmatrix} 3 & 0 \\ -7 & 0 \end{bmatrix}$
4.	If A and B are square matrices of order 3, A is	non – singu	ular and AB = O, the	n B is a:
	(a) null matrix (b) singular matrix (c)	unit matrix	(d) non –singula	r matrix
5.	If A and B are symmetric matrices, Then ABA is a:			
	(a) Symmetric matrix	(b)	Skew - Symmetri	c matrix
	(c) Diagonal matrix	(d)	Scalar matrix	
6.	If A = $\begin{bmatrix} 2 & 0 & -3 \\ 4 & 3 & 1 \\ -5 & 7 & 2 \end{bmatrix}$ is expressed as a sum of sym	metric and s	skew symmetric matr	ix, then the
7.	symmetric matrix is: (a) $\begin{bmatrix} 2 & 2 & -4 \\ 2 & 3 & 4 \\ -4 & 4 & 2 \end{bmatrix}$ (b) $\begin{bmatrix} 2 & 4 & -5 \\ 0 & 3 & 7 \\ -3 & 1 & 2 \end{bmatrix}$ Out of the following matrices choose the scalar m	(c)	4 4 -8 4 6 8 -8 8 4 (d)	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$
	(a) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$	(c) [0 0	0 0 0] (d)	$\begin{bmatrix} 0\\0\\0\end{bmatrix}$
8.	Which of the given values of x and y make the foll	owing pairs	of matrices equal?	
	$\begin{bmatrix} 3x + 7 & 5 \\ y + 1 & 2 - 3y \end{bmatrix}$ and, $\begin{bmatrix} 0 & y - 2 \\ 8 & 4 \end{bmatrix}$			
	(a) $x = -\frac{7}{3}, y = 7$	(b) y =	$=7, x = -\frac{2}{3}$	
	(c) $x = -\frac{1}{3}, y =\frac{2}{5}$	(d) no	t possible to find	
9.	If $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ , $J = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} \cos\theta \\ -\sin\theta \end{bmatrix}$	$\frac{\sin\theta}{\cos\theta}$ , ther	n B equals:	
	(a) $I\cos\theta + J\sin\theta$	(b) Isi	inθ + J cosθ	
	(c) I cosθ - J sinθ	(d) -I (	cosθ + J sinθ	

- 10. The diagonal elements of a skew symmetric matrix :
  - (a) are all zeroes (b) are all equal to some scalar k (  $\neq$  0)
  - (c) Can be any number
- (d) None of the above



#### 2 MARK QUESTIONS

- 1. For what value of x, is the following matrix singular  $\begin{bmatrix} 3-2x & x+1 \\ 2 & 4 \end{bmatrix}$
- 2. A matrix A of order 3 X 3 has determinants 4. Find the value of |3A|
- 3. If A =  $\begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ , write A<sup>-1</sup> in terms of A
- If A is a square matrix of order 3 & |A| = 7, write the value of |Adj. A|
- 5. What positive value of x makes the following pair of determinants equal  $\begin{vmatrix} 2x & 3 \\ 5 & z \end{vmatrix} \ll \begin{vmatrix} 16 & 3 \\ 5 & 2 \end{vmatrix}$
- 6. If A is a square matrix of order 3 and |A| = -2, find the value of |-3A|.
- 7. If A = 2B where A and B are square matrices of order 3 × 3 and |B| = 5, what is |A|?
- 8. What is the number of all possible matrices of order 2 × 3 with each entry 0, 1 or 2.
- 9. Find the area of the triangle with vertices (0, 0), (6, 0) and (4, 3).

10. If 
$$\begin{vmatrix} 0 & x & 6 \\ -4 & z & 8 \\ y & -8 & 0 \end{vmatrix}$$
 is a skew symmetric matrix find x, y, z.

- 11. Find the area of the triangle ABC if A(3, -2) B (4, 1) C (-7, 4).
- 12. Find the equation of the line joining (2, -1) & (4, 3) using determinants.
- 13. Find x & y if 3  $\begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 6 & 5 \\ 2 & 1 \end{bmatrix}$
- 14. Find the value of x such that the points (0, 2), (1, x) and (3, 1) are collinear.

#### **3 MARKS QUESTIONS (LONG QUESTIONS)**

15. Express A as the sum of the symmetric & skew symmetric matrix if

i) 
$$A = \begin{bmatrix} 5 & 1 \\ 2 & -1 \end{bmatrix}$$
 ii)  $A = \begin{bmatrix} 1 & 2 & 5 \\ -1 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$ 

16. Area of a triangle with vertices (k, 0), (1, 1) and (0, 3) is 5 unit. Find the value (s) of k.

17. Use matrix method to solve the following system of equations :

#### 4 MARKS QUESTIONS (VERY LONG QUESTIONS)

Solve the following using matrix method

18. x + y + z = 6, y + 3z = 1, x - 2y + z = 019. 2x + 3y + 3z = 5, x - 2y + z = -4, 3x - y - 2z = 320. z + 2y + 5z = 10, x - y - z = -2, 2x + 3y - z = -11

21. If A =  $\begin{bmatrix} 1 & -2 & 0 \\ 2 & 1 & 3 \\ 0 & -2 & 1 \end{bmatrix}$  & B =  $\begin{bmatrix} 7 & 2 & -6 \\ -2 & 1 & -3 \\ -4 & 2 & 5 \end{bmatrix}$ 

find AB and hence solve the system of equations

x - 2y = 10, 2x + y + 3z = 8, -2y + z = 7

- 22. Three friends A, B, & C visited a supermarket for purchasing fresh fruits. A purchased 1 kg apples, 3 kg grapes & 4 kg orange & paid Rs. 800. B purchased 2 kg apples, 1 kg grapes & 2 kg oranges and paid Rs. 500. C paid Rs 700 for 5 kg apples, 1 kg grapes, 1 kg oranges. Find the cost of each fruit per kg using matrix method. Why are fruits good for health?
- 23. The sum of three numbers is 2. If we subtract the second number from twice the first number, we get 3. By adding double the second number and the third number we get 0. Represent it algebraically and find the numbers using matrix method.
- 24. A school wants to award his students for the values of honesty, regularity and hard work with a total award of Rs. 6,000. 3 times the award money for the hard work added to that given for honesty amounts to Rs. 11,000. The award money given for honesty and hard work together is double the one given for regularity.Represent this situation algebraically and find the award

Money for each value using matrix method.

#### Activity-

- Draw the graphs of different types of functions.
- To demonstrate whether the given relation is a function or not.

- To demonstrate the function which is not one-one but onto.
- To demonstrate a function which is one-one but not onto.

