SOLUTIONS

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Sr. #	Questions	A	B	C	D
1 (a) (2016) (2016) (2019)	Mist is an example of solution: دُھند کس سلوشن کی مثال ہے؟	Liquid in gas گیس میں مائع	Gas in liquid مائع میں گیس	Solid in gas گیس میں ٹھوس	Gas in solid ٹھوس میں گیس
2 (b)	Which one of the following is a liquid in solid solution? ان میں سے کون سا سلوشن ٹھوس میں مائع ہے	Sugar in water پانی میں شوگر	Butter مکھن	Opal اوپل	Fog کہر
3 (b)	Concentration is ratio of: کنسنٹریشن کس کی نسبت ہے:	Solvent to solute سولوینٹ سے سولیوٹ کی	Solute to solution سولیوٹ سے سلوشن کی	Solvent to solution سولوینٹ سے سلوشن کی	Both a and b a اور b دونوں
4 (d) (2015)	Which of the following solution contains more water? ان میں سے کس سلوشن میں پانی زیادہ ہے؟	2M	1M	0.5M	0.25M
5 (d)	A 5 percent (W/W)sugar solution means that: 5% شوگر سلوشن سے مراد ہے کہ	5 g of sugar is dissolved in 90 g of water 90 گرام پانی میں 5 گرام شوگر حل کی گئی ہے	5 g of sugar is dissolved in 100 g of water 100 گرام پانی میں 5 گرام شوگر حل کی گئی ہے	5 g of sugar is dissolved in 105 g of water 105 گرام پانی میں 5 گرام شوگر حل کی گئی ہے	5 g of sugar is dissolved in 95 g of water 95 گرام پانی میں 5 گرام شوگر حل کی گئی ہے
6 (b)	If the solute-solute forces are strong enough than those of solute –solvent forces. The solute: اگر سولیوٹ-سولیوٹ فورسز، سولیوٹ-سولوینٹ سے زیادہ مضبوط ہوں تو سولیوٹ:	Dissolved readily بلا تامل حل ہو جاتا ہے	Does not dissolve حل نہیں ہوتا	Dissolves slowly آہستہ سے حل ہوتا ہے	Dissolves and precipitates حل ہوتا ہے اور رسوب بنتے ہیں
7 (d) (2018)	Which of the following will show negligible effect of temperature on its solubility? ان میں سے کس کی سولوبیلٹی پر ٹمپریچر کا معمولی اثر ہو گا:	KCl	KNO_3	$NaNO_3$	NaCl

8 **(c)** **(2016)**	Which of the following is heterogeneous mixture? درج ذیل میں سے کونسا ہیٹروجینیس مکسچر ہے؟	Milk دودھ	Ink روشنائی	Milk of magnesia ملک آف میگینشیا	Sugar solution شوگر کا سلوشن
9 **(c)** **(2017)** **(2019)**	Tyndall effects shown by: ٹنڈل ایفیکٹ کا مظاہرہ کرتے ہیں؟	Sugar solution شوگر کا سلوشن	Paints پینٹس	Jelly جیلی	Chalk solution چاک کا سلوشن
10 **(c)** **(2018)**	Tyndall effects is due to: ٹنڈل ایفیکٹ کس وجہ سے ہے؟	Blockage of beam of light روشنی کی شعاعوں کے رکنے کی وجہ سے	Non-scattering of beam of light روشنی کی شعاعوں کے منتشر نہ ہونے کی وجہ	Scattering of beam of light روشنی کی شعاعوں کے منتشر ہونے کی وجہ سے	Passing through beam of light روشنی کی شعاعوں کے گزرنے کی وجہ سے
11 **(c)**	If 10 cm^3 of alcohol is dissolved in 100 g of water, it is called: اگر 100 گرام پانی میں 10cm^3 الکحل حل کیا جائے تو یہ کہلاتا ہے:	% w/w	% w/v	% v/w	% v/v
12 **(d)** **(2017)**	When a saturated solution is diluted it turns into: جب ایک سیچوریٹڈ سلوشن کو ڈائیلوٹ کیا جاتا ہے تو یہ بن جاتا ہے۔	Supersaturated solution سپر سیچوریٹڈ سلوشن	Saturated solution سیچوریٹڈ سلوشن	A concentrated solution کنسنٹریٹڈ سلوشن	Unsaturated solution اَن سیچوریٹڈ سلوشن
13 **(d)** **(2019)**	Molarity is the number of moles of solute dissolved in: مولیریٹی سولیوٹ کے مولز کی تعداد ہے جو حل شدہ ہو:	1 Kg of solution سلوشن کے 1 کلوگرام میں	100 g of solvent سولوینٹ کے 100 گرام میں	1dm^3 of solvent سولوینٹ کے 1dm^3 میں	1dm^3 solution سلوشن کے 1dm^3 میں
MCQs of previous all Punjab Board papers					
14 **(d)** **(2012)**	The gas which can be absorbed by Palladium: پلاڈیم جو گیس جذب کر سکتی ہے؟	CO_2	N_2	O_2	H_2
15 **(b)** **(2012)**	Alcohol in water is an example of: پانی میں الکوحل مثال ہے:	Gas in liquid مائع میں گیس	Liquid in liquid مائع میں مائع	Solid in gas گیس میں ٹھوس	Gas in gas گیس میں گیس
16 **(a)** **(2014)**	Air is an example of solution: ہوا ایک سلوشن کی مثال ہے:	Gas in gas گیس میں گیس	Gas in solid ٹھوس میں گیس	Solid in gas گیس میں ٹھوس	Gas in liquid مائع میں گیس
17 **(b)** **(2015)**	The number of moles of solute dissolved in one dm^3 of the solution is called: سولیوٹ کے مولز کی وہ تعداد جو 1dm^3 سلوشن میں حل ہو، کہلاتی ہے:	Solubility سولوبیلٹی	Molarity مولیریٹی	Colloid کولائڈز	Suspension سسپنشن

18 (a) (2016)	Which thing is soluble in carbon tetrachloride: کون سی چیز کاربن ٹیٹرا کلورائیڈ میں حل پزیر ہے:	Grease گریس	Alcohol الکوحل	Sugar شوگر	Sodium chloride سوڈیم کلورائیڈ
19 (d) (2017)	Which one is universal solvent: کونسا یونیورسل سولوینٹ ہے؟	Benzene بینزین	Alcohol الکوحل	HCl	Water پانی
20 (a) (2017)	The minimum components of a solution are: سلوشن کے کم سے کم اجزاء ہوتے ہیں؟	2	4	5	3
21 (b) (2018) (2018)	Brass is a solid solution of: پیتل ٹھوس سلوشن کی مثال ہے:	C + Cu	Zn + Cu	Zn + Ag	Au + Zn
22 (b) (2018)	Example of "gas in liquid" is: "مائع میں گیس" کی مثال ہے:	Air ہوا	Oxygen in water پانی میں آکسیجن	Mist دھند	Smoke in air ہوا میں دھواں
23 (c) (2018)	Alloy metals are example of: الائے میٹلز مثال ہے:	Liquid in gas گیس میں مائع	Liquid in solid ٹھوس میں مائع	Solid in solid ٹھوس میں ٹھوس	Solid in liquid مائع میں ٹھوس
24 (a) (2019)	Example of aqueous solution is: ایکوئس سلوشنز کی مثال ہے:	Sugar in water پانی میں شوگر	Ether ایتھر	Petrol پٹرول	Benzene بینزین
25 (b) (2021)	If 10 g of sugar is dissolved in 100 g of solution , it is called: اگر 10 گرام شوگر کو پانی میں حل کر کے 100 گرام سلوشن بنایا جائے تو اسے کہتے ہیں۔	% v/v	% m/m	% m/v	% v/m
26 (d) (2021)	Which compound is not soluble in water? کونسا کمپاؤنڈ پانی میں حل نہیں ہوتا؟	Sugar شوگر	Alcohol الکوحل	Glucose گلوکوز	Benzene بینزین
27 (d) (2021)	Which one solution is more concentrated? کونسا سلوشن زیادہ کنسنٹریٹڈ ہوتا ہے؟	0.1 M	0.25 M	1.0 M	2.0 M
28 (b) (2021)	If 40 g of NaOH are dissolved in 1 dm^3 of solution, the solution will be? اگر 1 dm^3 میں NaOH کے 40 گرام حل ہوں تو سلوشن ہوا گا؟	0.5 M	1.0 M	2.0 M	2.5 M
29 (a) (2022)	Solubility of which one salt increases with the increase in temperature: کس ایک سالٹ کی سولوبیلٹی ٹمپریچر کے بڑھنے سے بڑھتی ہے؟	$NaNO_3$	Li_2SO_4	$Ce_2(SO_4)_3$	NaCl

30 (d) (2022)	A solution formed by dissolving a substance in water is called: ایسا سلوشن جو کسی شے کو پانی میں حل کرنے سے وجود میں آئے، کہلاتا ہے:	Sugar مرکب	Sugar شوگر	Electricity الیکٹریسٹی	Aqueous ایکوئس
31 (b) (2023) (2023)	If a solute in grams, is dissolved in 100 g of the solution, the percentage is: سولیوٹ کی گرامز میں وہ مقدار جو 100 گرام سلوشن میں حل ہو، پرسینٹیج کہلاتی ہے:	% v/v	% m/m	% m/v	% v/m
32 (c) (2023)	The solvent in which polar covalent compounds are soluble. وہ سالوینٹ جس میں پولر کوویلنٹ کمپاؤنڈز حل ہو جاتے ہیں۔	Petrol پٹرول	Ether ایتھر	Water پانی	Benzene بینزین
33 (a) (2023)	One of these settles in water. ان میں سے جو چیز پانی کی تہ میں بیٹھ جاتی ہے۔	Honey شہد	Kerosene oil کیروسین آئل	Benzene بینزین	NaCl سوڈیم کلورائیڈ

(1) Why the suspensions does not form a homogeneous mixture.

The suspensions do not form a homogeneous mixture because its particles are big enough and remains undissolved.

(2) Why we stir paints thoroughly before using?

Paints are examples of suspensions. If we do not stir the paint before use, the particles will settle down. **(3) What do you mean by, like dissolves like? Explain with examples.**

OR

What is general principle of solubility?

The general principle of solubility is ***"Like dissolves like".***

- Ionic and polar substances are soluble in polar solvents
- Non-polar substances are soluble in non-polar solvents.

(4) Why is iodine soluble in CCl_4 and not in water?

Iodine is non-polar and soluble in non-polar solvent CCl_4. While water is polar solvent and iodine is non-polar. Therefore iodine is not soluble in water.

(5) Why test tube becomes cold when KNO_3 is dissolved in water.

When KNO_3 is dissolved in water test tube becomes cold because heat is absorbed.

(6) Why are the colloids quite stable?

Colloids are quite stable because particles of colloids do not settle down for a long time.

(7) Why does the colloid show Tyndall effect?

Colloid show Tyndall effect because there particles are large enough to scatter the beam of light.

(8) What is Tyndall effect and on what factors it depends?

"The scattering of the path of beam light by colloid particles is called Tyndall effect". It depends upon the size of particles in colloids.

(9) Define Molarity. Write its formula.

"Number of moles of solute dissolved in one dm^3 of the solution is called molarity". It is represented by M. The formula used for the preparation of molar solution is as follows.

$$\text{Molarity (M)} = \frac{\text{Mass of solute (g)}}{\text{Molar mass of solute}(\text{g mol}^{-1}) \times \text{Volume of solution } (\text{dm}^3)}$$

(10) Define percentage $\frac{\textbf{Mass}}{\textbf{Mass}}$ $\left(\frac{\textbf{m}}{\textbf{m}}\%\right)$?

"The mass of solute in grams dissolved in 100 gram of solution is called %m/m". Its general formula is

$$\%\ \text{age}\frac{\text{m}}{\text{m}} = \frac{\text{Mass of solute (g)}}{\text{Mass of solution (g)}} \times 100$$

(11) Define percentage $\frac{\textbf{Mass}}{\textbf{Volume}}\left(\frac{\text{m}}{\text{v}}\%\right)$?

"The mass of solute in grams dissolved in 100 cm^3 of the solution is called %m/v". Its general formula is

$$\%\ \text{age}\frac{\text{m}}{\text{v}} = \frac{\text{Mass of solute (g)}}{\text{Volume of solution (cm}^3\text{)}} \times 100$$

(12) Define percentage $\frac{\textbf{Volume}}{\textbf{Mass}}\left(\frac{\text{V}}{\text{m}}\%\right)$?

"The volume of a solute in cm^3 dissolved in 100 g of the solution is called %v/m". Its general formula is

$$\%\ \text{age}\frac{\text{v}}{\text{m}} = \frac{\text{Volume of solute (cm}^3\text{)}}{\text{Mass of solution (g)}} \times 100$$

(13) Define percentage $\frac{\textbf{Volume}}{\textbf{Volume}}\left(\frac{\text{V}}{\text{v}}\%\right)$?

"The volume of a solute in cm^3 dissolved per 100 cm^3 of the solution is called %v/v". Its general formula is

$$\%\ \text{age}\frac{\text{v}}{\text{v}} = \frac{\text{Volume of solute (cm}^3\text{)}}{\text{Volume of solution (cm}^3\text{)}} \times 100$$

(14) Define solubility.

"The number of grams of the solute dissolved in 100 gram of a solvent to prepare a saturated solution at a specific temperature is called solubility".

(15) What is meant by aqueous solution? Give an example

"The solution in which water acts as solvent is known as aqueous solution". For example sugar in water and table salt in water.

(16) Define solute and solvent.

Solute:

"The component of solution which is present in smaller quantity is called solute".

Solvent:

"The component of solution which is present in larger quantity is called solvent".

For example salt solution is made by dissolving salt in water, here water is solvent and slat is solute.

(17) Define aqueous solution.

The solution formed by dissolving a substance in water is called aqueous solution. For example salt solution is made by dissolving salt in water, here water is solvent and slat is solute.

(18) Define saturated solution.

"A solution containing maximum amount of solute at a given temperature is called saturated solution".

(19) Define supersaturated solution.

"The solution which is more concentrated than a saturated solution is called supersaturated solution".

(20) Define unsaturated solution?

A solution which contains lesser amount of solute than that which is required to saturate it at a given temperature.

(21) What is difference between dilute and concentrated solution? (پیپر میں دونوں الگ الگ بھی پوچھے جاسکتے ہیں)

Sr. No	Dilute solution	Concentrated solution
1	Those solutions which have relatively small amount of solute are called dilute solutions.	Those solutions which have relatively large amount of solute are called concentrated solutions.

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Long questions of previous board papers

I. Define solubility and what is the general principle of solubility? Explain.

It can be defined as

"The number of grams of the solute dissolved in 100 gram of a solvent to prepare a saturated solution at a specific temperature is called solubility".

The general principle of solubility is "***Like dissolves like".***

- Ionic and polar substances are soluble in polar solvents. Ionic solids and polar covalent compounds are soluble in water e.g. NaCl, sugar and alcohol all are soluble in water.
- Non-polar substances are not soluble in polar solvents. Non-polar covalent compounds are not soluble in water e.g. ether, benzene and petrol are insoluble in water.
- Non-polar substances are soluble in non-polar solvents (also called organic solvents). For example grease, paints naphthalene are soluble in ether or carbon tetra chloride (CCl_4) etc.

II. What is the difference among the following? (پیپر میں کسی ایک کی خصوصیات بھی پوچھی جاسکتی ہیں یا کوئی سے 2 کا فرق پوچھا جاسکتا)

(i) Solution (ii) Colloids (iii) Suspensions

Sr. No	Solutions	Colloid	Suspension
1	The particles have diameter 10^{-8} cm.	Their size is in between solutions and suspensions.	The particles have diameter 10^{-5} cm.
2	It form a homogeneous mixture.	It appears as homogeneous but actually it forms heterogeneous mixture.	It form a heterogeneous mixture.
3	Particles cannot be seen by naked eye.	Particles cannot be seen by naked eye.	Particles can be seen by naked eye.
4	Particles can pass through filter paper.	Particles can pass through filter paper.	Particles cannot pass through filter paper.
5	They do not show tyndall effect.	They show tyndall effect.	They do not show tyndall effect.

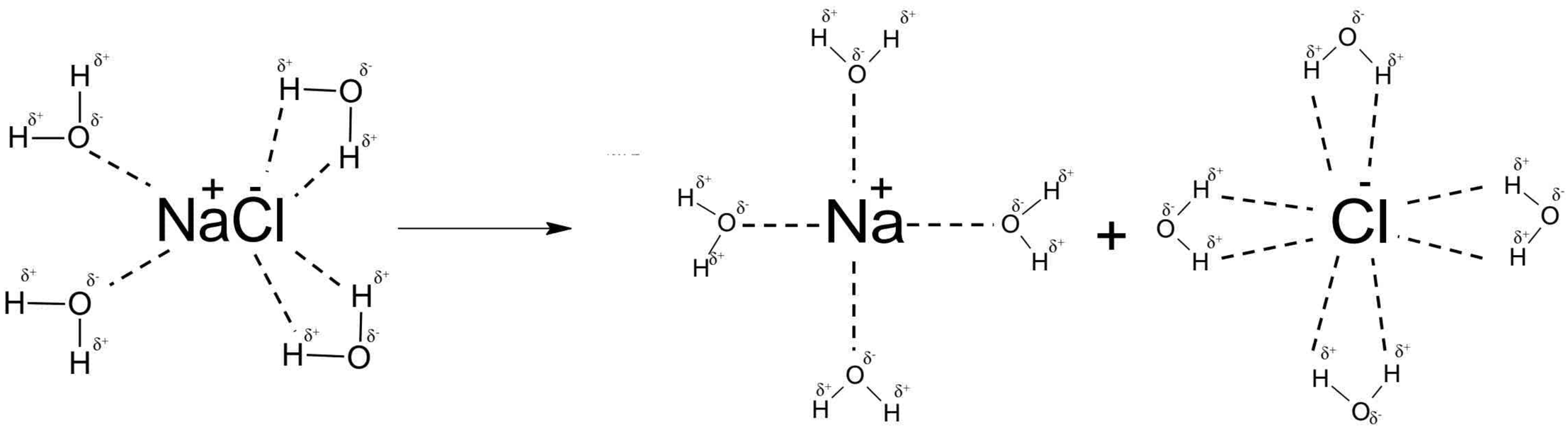
III. Describe the solute-solvent interaction for the preparation of solution.

To dissolve a solute in a solvent following three events must occur.

- Solute particles must separate.
- Solvent particles must separate.
- Solute and solvent particles must attract and mix up.

In solid NaCl, the positive Na^+ ions and negative Cl^- ions are held together by strong electrostatic forces of attractions. Water is a polar molecule. When solid NaCl is added into water it dissolves readily because the attractive interactions between ions of NaCl and polar water molecules are strong enough to overcome the attractive forces present between Na^+ ions and Cl^- ions.

In this process the positive end of the water dipole is oriented towards the Cl^- ions and the negative end of water dipole is oriented towards Na^+ ions. This ion-dipole interaction is so strong that they pull these ions from their positions in the crystal thus NaCl dissolves in water as shown in the figure.



IV. What is solubility? How temperature effect it. Write in detail.

It can be defined as

"The number of grams of the solute dissolved in 100 gram of a solvent to prepare a saturated solution at a specific temperature is called solubility".

Temperature has major effect on solubility. When a solute is dissolved in solvent there are following three possibilities.

Heat is absorbed:

When salts like KNO_3, $NaNO_3$ and KCl are dissolved in water the test tube becomes cold. It is an ***endothermic*** process. Usually solubility increases with increase in temperature for such solutes.

Solvent + solute + Heat → Solution

Heat is given out:

When salts like Li_2SO_4 etc. are dissolved in water the test tube becomes warm. It is an ***exothermic*** process. Usually solubility decreases with increase in temperature for such solutes.

Solvent + solute → Solution + Heat

No change in heat:

In some cases during solution formation neither the heat is absorbed nor released. When salts like NaCl is added in water, the solution temperature remains almost the same. In such solutions the temperature has minimum effect on solubility.