

PHYSICAL STATES OF MATTER

Sr. #	Questions	A	B	C	D
1 (b) (2016) (2017)	How many times liquids are denser than gases? مائع گیسز سے کتنے گنا بھاری ہیں؟	100 times گنا 100	1000 times گنا 1000	10,000 times گنا 10,000	100,000 times گنا 100,000
2 (c)	Gases are the lightest form of matter and their densities are expressed in terms of : گیسز مادہ کی ہلکی ترین حالت ہیں اور ان کی ڈینسٹیٹیز کو کن یونٹس میں ظاہر کیا جاتا ہے؟	mg cm ⁻³	g cm ⁻³	g dm ⁻³	kg dm ⁻³
3 (c)	At freezing point which one of the following coexists in dynamic equilibrium: فریزنگ پوائنٹ پر ان میں سے کون سے ڈائنامک ایکوی لبریم میں ہوتے ہیں؟	Gas and solid گیس اور ٹھوس	liquid and gas مائع اور گیس	liquid and solid مائع اور ٹھوس	All of these یہ تمام
4 (b)	Solid particles possess which one of the following motions? ٹھوس پارٹیکلز میں ان میں سے کون سی موشن پائی جاتی ہے؟	Rotational motions روتیشنل موشن	Vibrational motions واہبریشنل موشن	Translation motions ٹرانسلیشنل موشن	Both translation and vibrational motions ٹرانسلیشنل اور واہبریشنل موشن دونوں
5 (d)	Which one of the following is not amorphous? ان میں سے کونسا ٹھوس ایمرورفس نہیں ہے؟	Rubber ربر	Plastic پلاسٹک	Glass گلاس	Glucose گلوکوز
6 (a) (2018)	One atmospheric pressure is equal to how many pascals: 1 atm پر پریشر کتنے پاسکلز کے برابر ہوتا ہے؟	101325	10325	106075	10523
7 (c) (2016)	In the evaporation process, liquid molecules which leave the surface of the liquid have: ایوہپوریشن میں جو مالیکیولز مائع کی سطح کو چھوڑتے ہیں ان میں ہوتی ہے؟	Very low energy بہت کم انرجی	Moderate energy درمیانی انرجی	Very high energy بہت زیادہ انرجی	None of these ان میں سے کوئی بھی نہیں
8 (a) (2014) (2016) (2018) (2023)	Which one of the following gas diffuses fastest? ان میں سے کون سی گیس تیزی سے ڈیفیوژن کرتی ہے؟	Hydrogen ہائیڈروجن	Helium ہیلیم	Fluorine فلورین	Chlorine کلورین

نوٹ: جس گیس کا مالیکیولر ماس جتنا کم ہوگا، وہ اتنی تیزی سے ڈیفیوژن کرے گی۔ اور جس کا ماس جتنا زیادہ ہوگا، اُس کی ڈیفیوژن کم رفتار سے ہوگی۔

9 (d)	Which one of the following does not affect the boiling point? ان میں سے کون سی چیز بوائیگ پوائنٹ پر اثر انداز نہیں ہوتی:	Intermolecular forces انٹرمالیکولر فورسز	External pressure بیرونی پریشر	Nature of liquid مائع کی فطرت	Initial temperature of liquid مائع کا ابتدائی ٹمپریچر
10 (b)	Density of a gas increases, when its: گیس کی ڈینسٹی بڑھتی ہے جب	Temperature is increased ٹمپریچر بڑھتا ہے	Pressure is increased پریشر بڑھتا ہے	Volume is kept constant والیم کو کونسٹنٹ رکھا جاتا ہے	None of these ان میں سے کوئی بھی نہیں
11 (b)	The vapour pressure of a liquid increases with the: مائع کا واپر پریشر کب بڑھتا ہے؟	Increase of pressure پریشر میں اضافے سے	Increase of temperature ٹمپریچر میں اضافے سے	Increase of intermolecular forces انٹرمالیکولر فورسز میں اضافے سے	Increase of polarity of molecules مالیکیولز کی پولیریٹی میں اضافے سے

MCQs of previous all Punjab Board papers

12 (b) (2012)	Example of crystalline form of carbon is کاربن کی کرسٹلائن شکل کی مثال ہے	Coal کونلہ	Graphite گریفائیٹ	Cock کوک	Lamp black لیمپ بلیک
13 (c) (2014) (2018)	The densities of gases are expressed in terms of: گیسز کی ڈینسٹیز کو کن یونٹس میں ظاہر کیا جاتا ہے؟	mg cm ⁻³	g cm ⁻³	g dm ⁻³	kg dm ⁻³
14 (d) (2015)	How much concentration of salt is required to kill unwanted bacteria? ناپسندیدہ بیکٹیریا کو مارنے کے لیے کتنے % سلسٹر پینٹ نمک کی ضرورت ہوتی ہے؟	5 %	10 %	15 %	20 %
15 (c) (2015) (2015)	The temperature at which an ideal gas would have zero volume is: وہ ٹمپریچر جس پر کسی آئیڈیل گیس کا والیوم زیرو ہوگا؟	- 760 °C	- 173.5 °C	- 273.15 °C	0 °C
16 (c) (2016)	The boiling point of water is: پانی کا بوائیگ پوائنٹ ہے؟	0 °C	60 °C	100 °C	120 °C
17 (b) (2017)	Atmospheric pressure is measured by: ایٹمو سفیرک پریشر کو معلوم کرنے کے لیے استعمال کیا جاتا ہے؟	Thermometer تھر مو میٹر	Barometer بیرو میٹر	Manometer مانو میٹر	Kelvin scale کیلون سکیل
18 (c) (2019)	The density of gold is: سونے کی ڈینسٹی ہے؟	2.70 g/cm ³	7.86 g/cm ³	19.3 g/cm ³	4.88 g/cm ³
19 (a) (2019)	Which one of the following is crystalline solid? ان میں سے کونسا کرسٹلائن ٹھوس ہے؟	Diamond ہیرا	Rubber ربر	Plastic پلاسٹک	Glass گلاس

20 (c) (2021)	273 K in Kelvin scale is equal to: کیلون سکیل میں 273K برابر ہوتا ہے۔	100 °C	32 °C	0 °C	-273 °C
21 (d) (2022)	The scale of temperature in Kelvin scale starts from °C? کیلون سکیل میں ٹمپریچر °C سے شروع ہوتا ہے۔	100	-100	273	-273
22 (c) (2022)	Escaping of gas molecules through a tiny hole in the space with lesser pressure is called: گیس مالیکیولز کا ایک باریک سوراخ سے کم پریشر والی جگہ کی طرف اخراج کہلاتا ہے؟	Diffusion ڈیفیوژن	Compression کمپریشن	Effusion ایفیوژن	Density ڈینسٹی
23 (d) (2022)	Which one liquid evaporates rapidly? کونسا ایک مائع زیادہ تیزی سے وپیر میں تبدیل ہوتا ہے؟	C ₁₀ H ₂₂	C ₉ H ₂₀	C ₈ H ₁₈	C ₆ H ₁₄
نوٹ: جس مائع کا مالیکیولر ماس جتنا کم ہوگا (مطلب جس میں کاربن اور ہائیڈروجن کی تعداد زیادہ ہوگی)۔ اُس کی ایویپوریشن کی رفتار کم ہوگی۔ (مطلب جس میں کاربن اور ہائیڈروجن کی تعداد کم ہوگی)، وہ اتنی تیزی کے ساتھ وپیر میں تبدیل ہوگا۔ اور جس کا ماس جتنا زیادہ ہوگا (مطلب جس میں کاربن اور ہائیڈروجن کی تعداد زیادہ ہوگی)۔ اُس کی ایویپوریشن کی رفتار کم ہوگی۔					
24 (c) (2022)	The transition temperature of Tin (Sn = Stannum) is: ٹن (Sn) کا ٹرانزیشن ٹمپریچر ہے۔	15.2 °C	14.2 °C	13.2 °C	12.2 °C
25 (d) (2023)	Vapour pressure of water in mm Hg at 100 °C? 100 °C پر پانی کا وپیر پریشر mmHg میں ہوتا ہے؟	55.3	149.5	355.1	760

(1) Define a diffusion of gas with an example.

“The spontaneous (خود بخود) mixing up of molecules by random motion and collisions to form a homogeneous mixture”.

OR (دونوں تعریفوں میں سے کوئی ایک یاد کر لیں۔)

Movement of gas molecules from an area of higher concentration to an area of lower concentration to form homogeneous mixture is called diffusion.

Example:-

The spreading (پھیلنا) of fragrance (خوشبو) of rose.

(2) Define effusion and give an example. (2023)

Effusion:

It can be defined as “Escaping of gas molecules through a tiny hole in the space with lesser pressure is called effusion”.

Example:

When a tyre gets puncture, air effuses out.

Dependence:

It depends upon molecular mass of gas, lighter gases (having less molecular mass) effuse faster.

(3) Define standard atmospheric pressure. Write its units.

Standard atmospheric pressure can be defined as

“The pressure exerted (لگتا) by a mercury column of 760 mm height at sea level”.

UNITS:-

Its various units are given here

$$1 \text{ atm} = 760 \text{ torr} = 760 \text{ mm of Hg} = 76 \text{ cm of Hg} \quad (1 \text{ mm of Hg} = \text{One torr})$$

$$= 101325 \text{ Nm}^{-2} = 101325 \text{ Pa} \quad (\text{One Nm}^{-2} = \text{One Pa})$$

(4) Why are the densities of gases lower than that of liquids?

The densities of gases lower than that of liquids because they have light mass and occupies more volume due to presence of weak intermolecular forces.

(5) Why are the gases compressible?

Gases are compressible because there are large empty spaces between gas molecules due to presence of weak intermolecular forces.

(6) What is absolute zero? OR What do you know about absolute zero of temperature?

“It is the temperature at which an ideal gas would have zero volume”. Its value is zero kelvin (0 K) or **-273.15 °C**.

(7) Does Kelvin scale show a negative temperature?

No, Kelvin scale does not show a negative temperature.

**(8) What do you mean by condensation?**

The process of changing gases or vapours into liquid state is called condensation.

(9) Why is the boiling point of water higher than that of alcohol?

The boiling point of water is higher than that of alcohol because intermolecular forces (i.e. Hydrogen bonding) are stronger in water as compare to alcohol.

(10) What do you mean by dynamic equilibrium?

It can be defined as

“The state at which rate of evaporation and rate of condensation becomes equal is called dynamic equilibrium”.

**(11) Define the boiling point of liquid.**

“The temperature at which the vapour pressure of a liquid becomes equal to external atmospheric pressure is called boiling point of that liquid” e.g. boiling point of water is 100 °C at 1 atm pressure.

(12) Define the freezing point of liquid.

When vapour pressure of a liquid state becomes equal to the vapour pressure of the solid state this is called freezing point. For example freezing point of water is 0 °C.

(13) Define evaporation.

“The spontaneous process of changing of a liquid into vapours is called evaporation”.

(14) What do you mean by vapour pressure?

The pressure exerted by the vapours of a liquid at dynamic equilibrium with the liquid at a specific temperature is called vapour pressure.

(15) Define Boyle's law. Write its mathematical form. (Also a long questions part)

“The volume of a given mass of a gas is inversely proportional to its pressure, if the temperature remains constant”.

$$\text{Volume} \propto \frac{1}{\text{pressure}} \quad \text{or} \quad V \propto \frac{1}{P}$$

$$V = \frac{k}{P}$$

$$PV = k$$

(16) Define Charles's law. Write its mathematical form. (Also a long questions part)

“The volume of a given mass of a gas is directly proportional to the absolute temperature, if the pressure remains constant”. Mathematically it can be written as

$$\text{Volume} \propto \text{Temperature}$$

$$V \propto T$$

$$V = kT$$

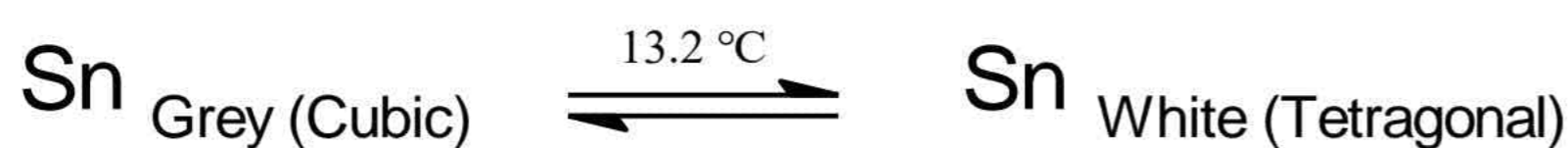
$$k = \frac{V}{T}$$

(17) Define the term allotropy with examples.

“The existence of an element in more than one forms in same physical state is called allotropy”. For example oxygen has two allotropes i.e. oxygen (O₂) and ozone (O₃).

(18) Define transition temperature and give an example.

The temperature at which one allotrope changes into another is called *transition temperature*.

**(19) In which form Sulphur exists at 100 °C.**

At 100 °C Sulphur exists in monoclinic form.

(20) What are amorphous solids? Give an example.

ٹھوس کی دونوں اقسام کو ملا کر ایک لائگ سوال بھی بن سکتا ہے

Those solids in which the particles are not regularly arranged are called amorphous solids. For example rubber glue etc.

(21) What are crystalline solids? Give examples.

Those solids in which the particles are regularly arranged are called crystalline solids. For example diamond, sodium chloride.

(22) Convert the following units.**(A) 850 mm of Hg to atm.**

$$760 \text{ mm of Hg} = 1 \text{ atm}$$

$$1 \text{ mm of Hg} = \frac{1}{760}$$

$$850 \text{ mm of Hg} = \frac{1}{760} \times 850 = 1.12 \text{ atm}$$

$$\text{So } 850 \text{ mm of Hg} = 1.12 \text{ atm}$$

(B) 205000 Pa to atm.

$$101325 \text{ Pa} = 1 \text{ atm}$$

$$1 \text{ Pa} = \frac{1}{101325}$$

$$205000 \text{ Pa} = \frac{1}{101325} \times 205000 = 2.02 \text{ atm}$$

$$\text{So } 205000 \text{ Pa} = 2.02 \text{ atm}$$

(C) 560 torr to cm Hg.

$$760 \text{ torr} = 76 \text{ cm of Hg}$$

$$1 \text{ torr} = \frac{76}{760}$$

$$560 \text{ torr} = \frac{76}{760} \times 560 = 56 \text{ cm of Hg}$$

$$\text{So } 560 \text{ torr} = 56 \text{ cm of Hg}$$

(D) 1.25 atm to Pa

$$1 \text{ atm} = 101325 \text{ Pa}$$

$$1.25 \text{ atm} = 101325 \times 1.25 = 126656 \text{ Pa}$$

$$\text{So } 1.25 \text{ atm} = 126656.25 \text{ Pa}$$

(23) Convert the following units.

$$\text{As } K = (T)^\circ\text{C} + 273$$

$$K = 750 + 273 = 1023 \text{ K}$$

$$\text{So } 750^\circ\text{C} = 1023 \text{ K}$$

(B) 150 °C to K

$$\text{As } K = (T)^\circ\text{C} + 273$$

$$K = 150 + 273 = 423 \text{ K}$$

$$\text{So } 150^\circ\text{C} = 423 \text{ K}$$

(C) 100 K to °C

$$\text{As } ^\circ\text{C} = (T) \text{ K} - 273$$

$$^\circ\text{C} = 100 - 273 = -173^\circ\text{C}$$

$$\text{So } 100 \text{ K} = -173^\circ\text{C}$$

(D) 172 K to °C

$$\text{As } ^\circ\text{C} = (T) \text{ K} - 273$$

$$^\circ\text{C} = 172 - 273 = -101^\circ\text{C}$$

$$\text{So } 172 \text{ K} = -101^\circ\text{C}$$

LONG QUESTIONS



I. Describe four factors which effect on the diffusions of liquids.

Movement of liquid molecules from an area of higher concentration to an area of lower concentration to form homogeneous mixture is called diffusion in liquids.

It depends upon following factors.

- **Temperature:**

It increases with increase in temperature because at high temperature the kinetic energy of molecules increases and they overcome intermolecular forces.

- **Intermolecular forces or nature of liquid:**

It decreases with increase in strength of intermolecular forces. Polar liquid have strong intermolecular forces while non-polar have weak intermolecular forces. So it is larger for non-polar liquids and smaller for polar liquids.

- **Size of molecules:**

It is smaller for large size molecules and vice versa.

II. Define boiling point and how it is affected by different factors?

“The temperature at which the vapour pressure of a liquid becomes equal to external atmospheric pressure is called boiling point of that liquid” e.g. boiling point of water is 100 °C at 1 atm pressure.

The boiling point depends upon following factors.

- **Intermolecular forces or nature of liquid:**

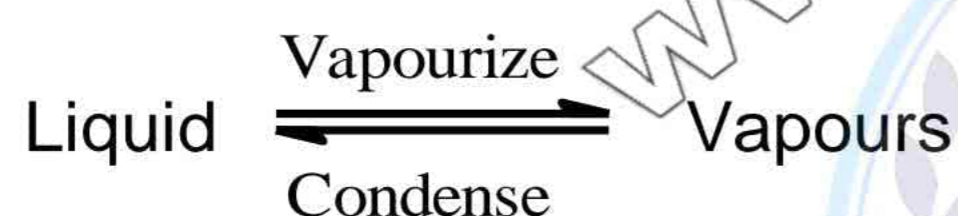
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- **External pressure:**

By increasing external pressure, the boiling point of the liquid increases and vice versa.

III. Define vapour pressure and explain different factors on which is depends.

The pressure exerted by the vapours of a liquid at dynamic equilibrium with the liquid at a specific temperature is called vapour pressure.



It depends upon following factors.

- **Temperature:**

It increases with increase in temperature because at high temperature the kinetic energy of molecules increases and they overcome intermolecular forces.

- **Intermolecular forces or nature of liquid:**

It decreases with increase in strength of intermolecular forces. Polar liquid have strong intermolecular forces while non-polar have weak intermolecular forces. So it is larger for non-polar liquids and smaller for polar liquids.

- **Size of molecules:**

It is smaller for large size molecules and vice versa.

IV. Define evaporation. Explain the factors which effect on evaporation.

“The spontaneous process of changing of a liquid into vapours is called evaporation”. It is a continuous process and takes place at all temperatures. It depend upon following factors.

- **Temperature:**

It increases with increase in temperature because at high temperature the kinetic energy of molecules increases and they overcome intermolecular forces.

- **Intermolecular forces:**

It decreases with increase in strength of intermolecular forces. Polar liquid have strong intermolecular forces while non-polar have weak intermolecular forces. So it is larger for non-polar liquids and smaller for polar liquids.

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- **Size of molecules:**
It is smaller for large size molecules and vice versa.

