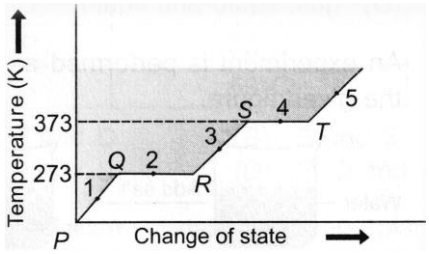
Matter in Our Surroundings

1. A piece of chalk can be broken into small particles by hammering but a piece of iron cannot be broken into smaller particles by hammering. It illustrates that
(a) Particles of matter have space in between them
(b) Particles of matter possess kinetic energy
(c) Particles of matter attract one another
(d) All of these.

2. Which of the following represents the correct increasing order of the densities of given substances?
(a) Cotton < Exhaust from chimneys > Honey < Iron < Air
(b) Air < Exhaust from chimneys < Cotton < Honey < Iron
(c) Cotton <Air< Exhaust from chimneys < Iron < Honey
(d) Air < Cotton < Exhaust from chimneys < Iron < Honey

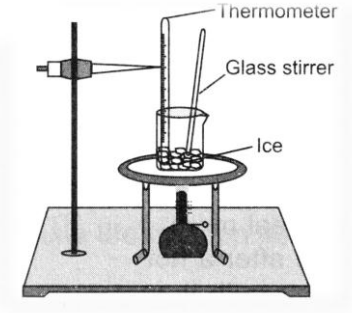
Direction (Q. No. 3 and 4): Study the given graph carefully and answer the following questions.



3. What is the physical state of matter at points 1, 3 and 5 respectively?
(a) 1-Solid, 3-Liquid, 5-Gas
(b) 1-Solid, 3-Gas, 5-Liquid
(c) 1-Liquid, 3-Gas, 5-Solid
(d) 1-Liquid, 3-Solid, 5-Gas

4. What is represented by straight lines QR and ST in the graph?
(a) Temperature remains same during the change of state.
(b) OR represents latent heat of fusion, while ST represents latent heat of vaporisation.
(c) At QR, matter exists in both solid and liquid states, while at ST matter exists in both liquid and gaseous states.
(d) All of these.

5. Sneha set up the experiment for melting of ice in a beaker and noted down the temperature throughout the process. What do you think she observed when the ice was melting?



(a) The temperature in the thermometer kept increasing till the whole ice melted.
(b) Once the melting process started, the temperature in thermometer remained constant though the heating was on.
(c) There was no change in temperature throughout the experiment.
(d) Ice did not melt on heating. It was converted to vapours.

6. Which of the following statements are correct?
I. Temperature changes during the change of a state.
II. Dry ice gets converted directly into gaseous state under normal atmospheric conditions.
III. Higher boiling point of liquid indicates weaker intermolecular forces.
IV. Latent heat of vaporisation is generally higher than the latent heat of fusion for a substance.

(a) I and IV (b) II and IV
(c) II and III (d) III and IV

7. Read the given statements and mark the correct option.
Statement 1: Solid CO_2 , changes its state when exposed to air.

Statement 2: CO_2, undergoes sublimation.

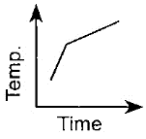
(a) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.
(b) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
(c) Statement 1 is true and statement 2 is false.
(d) Both statements 1 and 2 are false.

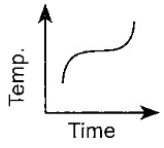
8. Match column I with column II and choose the correct option from the codes given below.

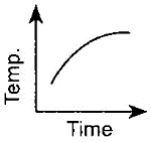
Column I	Column II
P. Hot tea poured in saucer gets cooled faster.	(i) Evaporation increases with increase in temperature
Q. We feel more cold after a hot water bath than a cold water bath.	(ii) Evaporation increases with decrease in humidity.
R. Water is cool in earthen pitcher during dry hot day.	(iii) Evaporation increases with increase in wind speed.
S. We feel comfortable under a moving fan in summer	(iv) Evaporation increases with increase in surface area.

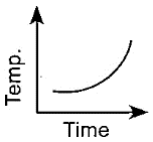
(a) P - (ii), Q - (i), R - (iii), S - (iv)
(b) P - (iii), Q - (iv), R - (ii), S - (i)
(c) P - (iv), Q - (i), R - (ii), S - (iii)
(d) P - (iv), Q - (ii), R - (iii), S - (i)

9. Which of the following curves would be obtained on heating solid naphthalene to a temperature which is above its melting point?

(a) 

(b) 

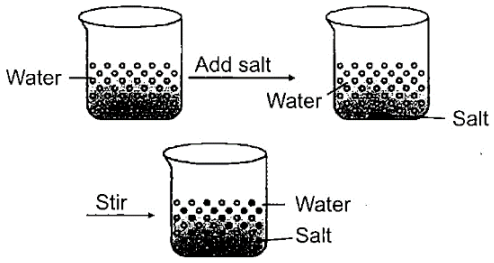
(c) 

(d) 

10. What is the correct increasing order of molecular motion (kinetic energy) of particles in the following?
(a) Brick, water, air, curd
(b) Curd, water, air, brick
(c) Air, water, curd, brick
(d) Brick, curd, water, air

11. An organic compound 'X' has a melting point of $-33°C$ and a boiling point of $66°C$. The physical states of substance 'X' at temperature $-100°C$, $0°C$ and $100°C$ are respectively
(a) solid, liquid and liquid
(b) liquid, solid and liquid
(c) solid, liquid and gas
(d) gas, liquid and liquid.

12. An experiment is performed as shown in the given figure.



The conclusion we can draw from the above experiment is that
(a) Nature of matter is continuous
(b) Matter is made up of particles
(c) Particles of salt get into the spaces between the particles of water
(d) Both (b) and (c).

13. Fill in the blanks P, Q, R and S left in the table with appropriate words.

Properties	Solid	Liquid	Gas
Interparticle spaces	Very less	Comparatively large	P
Intermolecular Forces	Q	Weak	Very weak
Compressibility	R	Very Small	High
Diffusion	Negligible	S	Very Fast

	P	Q	R	S
(a)	Very large	Strong	Negligible	Slow

(b)	Large	Weak	Small	Fastest
(c)	Less	Strong	High	Slow
(d)	Large	Strong	Strong	Fast

14. Ritwik was given four inflammable substances P, Q, R and S. He was asked to handover them to Ramesh who was the resident of a hot area (temperature, $46°C$). Ritwik collected the data about the substances as shown in the table. Which substances Ritwik should not carry to the hot area where Ramesh lives?

Substance	Ignition Temperature
P	$40°C$
Q	$38°C$
R	$52°C$
S	$59°C$

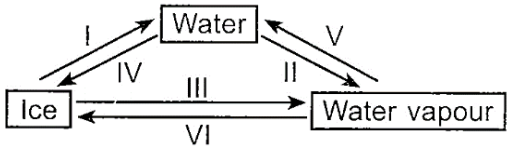
(a) P and Q (b) R and S
(c) P and S (d) P, Q and S

15. Choose the correct statements about plasma state.
I. The state consists of super energetic and super excited particles.
II. The particles of plasma state are in the form of ionised gases.
III. The plasma is created on stars.
IV. Colour of plasma glow depends on temperature of gas only.

(a) I, II and III (b) I and II
(c) II and III (d) All of these

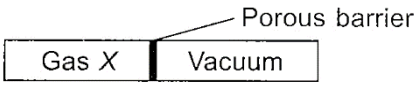
Achievers Section (HOTS)

16. Observe the given figure carefully.



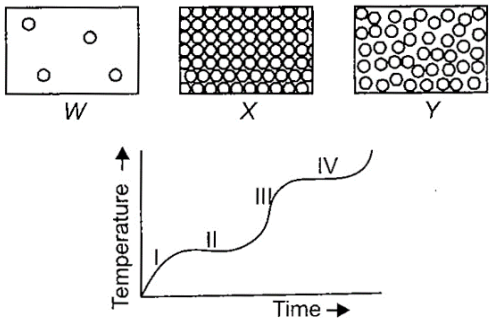
Which of the following statements is incorrect?
(a) Processes I, II and III are endothermic while processes IV, V and VI are exothermic.
(b) Water vapours formed during process II when come in contact with skin give out 22.5×10^5 J/kg more heat than the boiling water.
(c) Latent heat for process I is 3.34×10^6 J/kg
(d) None of these.

17. The given apparatus is used to study the diffusion of a number of gases at the same temperature and pressure.



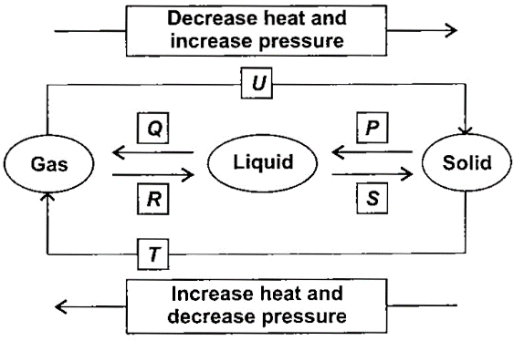
Which of the following pairs of gases would diffuse into the vacuum at the same speed?
[Given: Atomic mass of H=1u, C=12u, N=14u, S=32u, O=16u]
(a) NH_3 and H_2 (b) CO and SO_2
(c) CO and N_2 (d) NH_3 and N_2

18. Diagrams W, X and Y show how the particles of a substance are packed at different temperatures.



The given graph shows the temperature changes which occur on warming the substance. In which region of the graph would all the particles be packed as in Y?
(a) I (b) II
(c) III (d) IV

19. Observe the given diagram showing change in state carefully.



Which of the following is correct identification for processes P to U?

(a) Q → Vaporisation, S → Liquification, U → Solidification

(b) P → Melting, Q → Condensation, S → Solidification

(c) S → Sublimation, P → Liquification, U → Solidification

(d) P → Fusion, R → Condensation, T and U → Sublimation

20. Match column I with column II and select the correct option from the codes given below.

Column I	Column II
(P) Liquid	(i) Highly compressible
(Q) Gas	(ii) Definite volume
(R) Plasma	(iii) Super low density
(S) Bose-Einstein condensate	(iv) Super energetic

(a) (P) - (i), (Q) - (ii), (R) - (iii), (S) - (iv)

(b) (P) - (ii), (Q) - (i), (R) - (iii), (S) - (iv)

(c) (P) - (ii), (Q) - (i), (R) - (iv), (S) - (iii)

(d) (P) - (iii), (Q) - (i), (R) - (ii), (S) - (iv)

Answer key

1. C	**2.** B	**3.** A	**4.** D	**5.** B
6. B	**7.** A	**8.** C	**9.** B	**10.** D
11. C	**12.** D	**13.** A	**14.** A	**15.** A
16. D	**17.** C	**18.** C	**19.** D	**20.** C

HINTS & EXPLANATIONS

1. (c) : Particles of matter attract one another and forces of attraction are weak in case of chalk but quite strong in case of iron.

2. (b) Not Available

3. (a) : Below 273 K (PQ), matter exists in solid state. At 273 K (QR), inter conversion of solid to liquid takes place. Above 273 K (RS), matter exists in liquid state. At 373 K (ST), inter conversion of liquid to gas takes place. Above 373 K matter exists in gaseous state.

4. (d) : At QR (273 K), inter conversion of solid to liquid takes place so, matter exists in both solid and liquid states and it represents latent heat of fusion. At ST(373 K), inter conversion of liquid to gas takes place so, matter exists in both liquid and gaseous states and it represents latent heat of vaporisation. Temperature remains constant at OR and ST.

5. (b) : During the experiment of melting, once the melting point is reached, temperature remains constant till all the ice melts. This happens even though we continue to heat the beaker. The heat supplied gets used up in changing the state by overcoming the forces of attraction between the particles.

6. (b) Not Available

7. (a) Not Available

8. (c) Not Available

9. (b) Not Available

10. (d) : Kinetic energy (molecular motion) of the particles increases from solid to liquid to gas. Thus, the correct increasing order of molecular motion (kinetic energy) of particles is brick, curd, water, air.

11. (c) ; Substance exists as a liquid between $-33°C$ to $66°C$ (;.e., at $0°C$). At $-100°C$, it will be a solid and at $100°C$, it will be in gaseous state.

12. (d) :When common salt is added to water, the particles of salt get into the empty spaces between the particles of water.

13. (a) Not Available

14. (a) : Ritwik should not carry the substances P and Q to the hot area where temperature is $46°C$ as these substances have the ignition temperatures lower than $46°C$ hence, these will catch fire immediately.

15. (a) :The plasma glows with a special colour depending on the nature of the gas, not only on the temperature of the gas.

16. (d) Not Available

17. (c) : Rate of diffusion depends upon the molecular mass of gases. CO and N_2 have the same molecular mass hence, both will diffuse at the same rate.

18. (c) Not Available

19. (d) Not Available

20. (c) Not Available