

11. PHYSICAL PROPERTIES AND USES OF VARIOUS COMPONENTS OF AIR SOLUTIONS

TEACHING TASK

JEE MAINS LEVEL QUESTIONS

1. Hot air is _____ dense than warm air **(FA & SA- 2 Marks)**
A) More B) Less C) The same D) None of these

Answer:B

Solution: Hot air is less dense than warm air.

2. Air pushes in _____ directions
A) A bunch of B) Two C) All D) No

Answer:C

Solution: Air pushes in all directions.

3. In photosynthesis process which gas is released **(FA & SA- 3 Marks/4 Marks)**
A) N_2 B) O_2 C) water vapour D) CO_2

Answer:B

Solution: In photosynthesis process, oxygen gas is released.

4. The amount of water vapour present in air is
A) Density B) Mass C) Humidity D) Gravity

Answer:C

Solution: The amount of water vapour present in air is humidity.

5. The percentage of total Nitrogen and oxygen in air is **(FA & SA- 5 Marks/8 Marks)**
A) 80% B) 85% C) 92% D) 99%

Answer:D

Solution: The percentage of total Nitrogen and oxygen in air is 99%.

6. Air is gaseous _____
A) substance B) Mixture C) Compound D) none

Answer:B

Solution: Air is a gaseous mixture.

7. Which the following constituent used in photosynthesis
A) N_2 B) CO_2 C) Dust D) O_2

Answer:B

Solution: The constituent used in photosynthesis is carbon dioxide.

8. A gas maintains earth's temperature is
A) carbon dioxide B) Nitrogen C) hydrogen D) Oxygen

Answer:A

Solution:A gas that maintains Earth's temperature is carbon dioxide.

9. Which of the following is not a component of air
A) N_2 B) O_2 C) Cl_2 D) Ar

Answer:C

Solution:Chlorine (Cl_2) is not naturally present in the atmosphere; air mainly contains N_2 , O_2 , CO_2 , Ar, and water vapour.

10. Very high speed or strong moving air is____
A) smoke B) Flood C) storm D) Breeze

Answer:C

Solution: Very high speed or strong moving air is a storm.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. Which of the following are properties of air
A) Air has weight B) Air is invisible
C) Air is impacted by temperature D) Air is oxygen

Answer:A,B,C

Solution:A) Air has weight → Yes

B) Air is invisible → Yes (colorless)

C) Air is impacted by temperature → Yes (expands when heated, contracts when cooled)

D) Air is oxygen → No (air is a mixture, not just oxygen)

12. Which are the components of air
A) oxygen B) Water vapour C) Chlorine D) Hydrogen

Answer:A,B,D

Solution:A) Oxygen → Yes (~21%)

B) Water vapour → Yes (variable)

C) Chlorine → No (not a normal component)

D) Hydrogen → Yes (trace amounts ~0.00005%)

Statement type:

A) Both statement I and II are correct and statement II is correct explanation of statement I.

B) Both statement I and II are correct and statement II is not correct explanation of statement I.

C) Statement I is correct and statement II is incorrect.

D) Statement I is incorrect and statement II is correct

13. **Statement I** : Air can be compressed by increasing pressure
Statement II : Air contains oxygen

Answer:B

Solution:Statement I: Air can be compressed by increasing pressure.

Correct — Gases are compressible.

Statement II: Air contains oxygen.

Correct — Air is about 21% oxygen.

But Statement II does not explain why air can be compressed.

Compressibility is due to large intermolecular spaces in gases, not because air contains oxygen.

So both are correct, but II is not the correct explanation of I.

Comprehension Type:

To balance out oxygen, there is Nitrogen. It is a non-combustible gas and occupies the highest percentage of air. This is why, when you blow on a candle it is easily extinguished. This is done because of the presence of nitrogen. Nitrogen is also one of the most abundantly found gases on earth.

14. The which is non-combustible is

- A) Oxygen B) Air C) Nitrogen D) None of these

Answer:C

Solution:Nitrogen: Does not support combustion and is non-combustible.

Integer type

15. The percentage of nitrogen in air is ———

Answer:78%

Solution:The percentage of nitrogen in air is approximately 78% by volume.

Matrix Matching

- | 16. | Column—I | Column—II |
|-----|----------------|---------------|
| a) | Nitrogen | 1) 0.03-0.04% |
| b) | Oxygen | 2) 0.90% |
| c) | Carbon dioxide | 3) 78% |
| d) | Inert gases | 4) 21% |

Answer:a-3,b-4,c-1,d-2

- Solution: a) Nitrogen 3) 78%
 b) Oxygen 4) 21%
 c) Carbon dioxide 1) 0.03-0.04%
 d) Inert gases 2) 0.90%

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ'S)

1. The major component of air is

- A)Oxygen B) Carbon dioxide C) Nitrogen D) Hydrogen

Answer:C

Solution:Nitrogen makes up about 78% of the air.

2. _____ supports burning.

- A) Oxygen B) Carbon dioxide C) Nitrogen D) Carbon monoxide

Answer:A

Solution: Oxygen supports combustion (burning).

3. The moving air is called _____
A) Smoke B) Wind C) Storm D) Breeze

Answer:B

Solution: Moving air is called wind.

4. Air is considered be a/an _____
A) Mixture B) Compound C) Element D) Solvent

Answer:A

Solution: Air is a mixture of different gases.

5. Air occupies space and has _____
A) Colour B) Smell C) Mass D) None of these

Answer:C

Solution: Air has mass and occupies space.

6. Which of the following constituents of air is used in respiration?
A) Nitrogen B) Oxygen C) Water D) Carbon dioxide

Answer:B

Solution: Oxygen is used in respiration by living organisms.

7. Air exerts _____
A) Cooling B) Heating C) Rain D) Pressure

Answer:D

Solution: Air exerts pressure in all directions.

8. Air expands on _____
A) Heating B) Cooling C) On its own D) None

Answer: A

Solution: Air expands when heated.

9. Which gas is released in respiration?
A) Nitrogen B) Carbon dioxide C) Carbon monoxide

Answer:B

Solution: Carbon dioxide is released during respiration.

10. The earth is surrounded by a thick blanket of _____
A) Water B) Air C) Soil D) None of these

Answer: B

Solution: The Earth is surrounded by a layer of air called the atmosphere.

JEE MAINS LEVEL QUESTIONS

1. Mountaineers carry oxygen cylinders with them because **(FA & SA- 2 Marks)**
A) There is no oxygen on high mountains
B) There is deficiency of oxygen on mountains at high altitude.

- C) Oxygen is used for cooking
- D) Oxygen keeps them warm at low temperature

Answer:B

Solution:Mountaineers carry oxygen cylinders because there is a deficiency of oxygen at high altitudes.

2. Ravi took an empty plastic bottle, turned it upside down and dipped its open mouth into a bucket filled with water. He then tilted the bottle slightly and made the following observation. Which observation is correct?
- A) Bubbles of air came out from the bottle.
 - B) Some water entered the bottle.
 - C) Nitrogen gas came out in the form of bubbles and oxygen got dissolved in water.
 - D) No bubbles formed, only water entered the bottle.

Answer:A

Solution:When an empty plastic bottle is turned upside down, dipped in water, and tilted, bubbles of air come out.

3. Seema took a lump of dry soil in a glass and added water to it till it was completely immersed. She observed bubbles coming out. The bubbles contains
- (FA & SA- 3 Marks/4 Marks)**
- A) Water vapour
 - B) Only oxygen gas
 - C) Air
 - D) None of these

Answer:C

Solution:Bubbles coming out from dry soil when water is added contain air.

4. Which of the following is not true about air?
- A) Air can be compressed by increasing temperature.
 - B) The higher you are above sea level, the less pressure air exerts.
 - C) Air contains oxygen
 - D) The temperature of air has little impact on its properties.

Answer:A

Solution:The statement that air can be compressed by increasing temperature is not true.

5. Which is true?
- A) Oxygen present in air used for breathing
 - B) Birds, bats and insects fly in air
 - C) Air used for winnowing.
 - D) All the above

Answer:D

Solution:All the given statements about air are true.

6. What is cabongen mixture made up of
- A) 95% O_2 & 5% of CO_2
 - B) 90% O_2 & 10% of CO_2
 - C) 70% N_2 & 30% of O_2
 - D) 80% N_2 & 20% of CO_2

D) Air is present everywhere but not in soil. → False — soil also contains air in its pores.

12. Wind does help in the movement of which of the following?

- A) Firki B) Weathercock C) Ceiling fan D) Sailing yacht

Answer:A,B,D

Solution:A) Firki (pinwheel) — Yes, wind spins it.

B) Weathercock — Yes, wind direction turns it.

C) Ceiling fan — No, it's electrically powered, not wind-powered.

D) Sailing yacht — Yes, wind pushes sails.

Statement Type :

A) Both statement I and II are correct and statement II is correct explanation of statement I.

B) Both statement I and II are correct and statement II is not correct explanation of statement I.

C) Statement I is correct and statement II is incorrect.

D) Statement I is incorrect and statement II is correct

13. **Statement I** : Birds can fly due to presence of air.

Statement II : It has no role in water cycle.

Answer:C

Solution: Correct — air provides lift.

Statement II: Incorrect — air (wind) plays a major role in water cycle (cloud movement, evaporation).

14. **Statement I** : Air makes the windmill rotate.

Statement II : Air helps in the movement of aeroplanes.

Answer:B

Solution:Statement I: Correct — wind energy rotates blades.

Statement II: Correct — lift from air enables flight.

Comprehension Type:

Air has weight and the pressure exerted by the air is known as air pressure. Due to gravity, this mixture of gases near the surface is denser than at high altitudes. So gaseous atmosphere in the mountains is thinner than at the surface. And on heating gas expands and occupies more space.

15. The pressure exerted by is

- A) Gravity B) Space C) Air pressure D) None

Answer:C

Solution:Pressure exerted by the air is known as air pressure

16. The gaseous atmosphere in the mountains is

- A) Higher than at the surface. B) Thinner than at the surface
C) Same as that at the surface D) None of these

Answer:B

Solution:Gaseous atmosphere in the mountains is thinner than at the surface

17. On heating gas exerts

- A) Expanded B) Compressed C) Remains same D) Condensed

Answer:A

Solution: On heating gas expands and occupies more space

Integer Type :

18. The number of atoms of oxygen in carbon dioxide is _____

Answer:2

Solution: Carbon dioxide formula: CO_2

It contains 2 oxygen atoms.

19. The percentage of oxygen in carbogen mixture is _____

Answer:95

Solution: From earlier question: Carbogen = 95% O_2 + 5% CO_2

So oxygen percentage = 95%

Matrix matching Type:

20. Column I

- i) photosynthesis
- ii) cloud formation
- iii) winnowing
- iv) respiration

Column II

- a) air
- b) CO_2 & O_2
- c) water vapour
- d) O_2 is released

Answer: i-d, ii-c, iii-a, iv-b

Solution:

- i) photosynthesis
- ii) cloud formation
- iii) winnowing
- iv) respiration

- d) O_2 is released
- c) water vapour
- a) air
- b) CO_2 & O_2

KEY

			TEACHING TASK						
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
B	C	B	C	D	B	B	A	C	C
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16				
A,B,C	A,B,D	B	C	78 a-3,b-4,c-1,d-2					
			LEARNERS TASK						
			CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ'S)						
1	2	3	4	5	6	7	8	9	10
C	A	B	A	C	B	D	A	B	B
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
B	A	C	A	D	A	B	D	C	C
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16	17	18	19	
A,B,C	A,B,D	C	B	C	B	A	2	95	
20									
i-d,ii-c,iii-a,iv-b									