6.AIR, WIND AND CYCLONES
SOLUTIONS

TEACHING TASK

JEE MAINS LEVEL QUESTIONS
Multiple Choice Questions

1. What is the primary cause of cyclones?
A) High air pressure B) Warm, moist air rising
C) Cold air sinking D) Ocean currents

Answer:B

Solution:Cyclones form when warm, moist air rises, creating a low-pressure area that draws in surrounding air, leading to swirling winds.

2. How does air pressure affect winds?
A) High pressure causes winds to slow down
B) Low pressure causes winds to speed up
C) High pressure causes winds to speed up
D) Low pressure causes winds to slow down

Answer:B

Solution:Wind flows from high-pressure to low-pressure areas, and stronger pressure differences cause faster winds.

3. What happens to a balloon when it's heated?
A) It shrinks B) It expands C) It pops D) It stays the same size

Answer:B

Solution:When heated, air molecules move faster and spread out, causing the balloon to expand

4. How does wind affect the drying of clothes?
A) Slows down the drying process B) Speeds up the drying process
C) Doesn't affect the drying process D) Makes clothes wetter

Answer:B

Solution:Wind increases evaporation by moving moist air away from the clothes, allowing drier air to absorb more moisture.

5. Which experiment demonstrates that air occupies space?
A) Bursting balloon experiment B) Syringe experiment
C) Expansion of air experiment D) Wet glass experiment

Answer:D

Solution:(In Wet glass experiment, a glass is inverted over water, trapping air inside and showing that air occupies space.

6. What causes the lifting of the postcard in the postcard lift experiment?
A) High air pressure B) Low air pressure C) Gravity D) Magnetism

Answer:B

Solution: In the postcard lift experiment, you blow air over the top of a postcard placed over a glass or bottle, which reduces the air pressure above the postcard (Bernoulli's principle).
The higher air pressure below the postcard then lifts it up.

So the cause of the lift is low air pressure above the postcard.

7. What is the primary factor contributing to land and sea breezes?

A) Ocean currents B) Pressure differences C) Earth's rotation D) Wind direction

Answer:B

Solution:Land heats and cools faster than water, creating pressure differences that cause breezes.

8. How do cyclones form?

A) Due to cold air sinking B) Due to high air pressure

C) Warm, moist air rising D) Wind blowing from the equator

Answer:C

Solution:Cyclones form when warm ocean air rises, creating a low-pressure system that draws in winds.

9. Which technology provides early warnings of cyclones?

A) Telescopes B) Satellites C) Microscopes D) Binoculars

Answer:B

Solution:Satellites monitor weather patterns and provide early cyclone warnings by tracking storm formations.

10. What happens to the water level in a glass when air is blown over it?

A) It rises B) It lowers C) It remains the same D) It disappears

Answer:B

Solution: Blowing air reduces pressure above the water, causing the water to rise slightly inside the straw or move due to pressure changes (Bernoulli's principle).

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. How does wind impact daily life?

A) Affects weather changes B) Influences outdoor sports

C) Causes soil erosion D Provides energy through wind turbines

Answer:A,B,C,D

Solution:Wind plays many roles: it brings weather changes, influences sports like sailing and flying kites, causes erosion by blowing away topsoil, and generates renewable energy.

12. What happens when air is heated? (Select all that apply)

A) Air expands B) Air contracts C) Air becomes denser D) Air rises

Answer:A,D

Solution:

A) Air expands (Heating makes air molecules move faster, increasing volume.)

B) Air contracts (Cooling, not heating, causes contraction.)

C) Air becomes denser (Heated air becomes less dense.)

D) Air rises (Warm air is lighter and rises, creating convection currents.)

13. Which activities demonstrate the movement of air? (Select all that apply)

A) Postcard lift experiment B) Wet glass experiment

C) Lighting a candle in a closed room D) Blowing through a straw into water

Answer:A,D

Solution:

A) Postcard lift experiment (Blowing air reduces pressure, lifting the postcard.)

B) Wet glass experiment (Shows air occupies space, not necessarily movement.)

C) Lighting a candle in a closed room (Shows convection currents as hot air rises and cold air sinks.)
D) Blowing through a straw into water (Air movement creates bubbles, proving air flows.)

Assertion and Reason Type:

A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.
B) Both Assertion and Reason are true, but Reason is NOT the correct explanation for Assertion.
C) Assertion is true, but Reason is false.
D) Assertion is false, but Reason is true.

14. Reasoning : Why does a balloon expand when heated?
Assertion : A balloon expands when heated because the heat increases the kinetic energy of air molecules inside the balloon, causing them to move faster and exert greater pressure on the balloon walls, leading to expansion.

Answer:A

Solution:Assertion (True): The balloon does expand when heated.
Reason (True & Correct Explanation): Heating increases molecular motion, raising internal pressure and expanding the balloon.

15. Reasoning : How does wind impact the dispersion of sounds?
Assertion : Wind can carry sounds farther or muffle them depending on its speed and direction, allowing distant sounds to be heard more clearly or hindering the transmission of nearby sounds due to scattering.

Answer:A

Solution:Assertion (True): Wind affects sound transmission (can amplify or scatter it).
Reason (True & Correct Explanation): Wind direction and speed influence sound wave propagation (e.g., downwind carries sound farther, turbulence scatters it)

16. Reasoning : Why does a glass of water with a wet postcard stick to it?
Assertion : The wet postcard sticks to the glass of water because the air pressure inside the glass is greater than the pressure outside, causing the postcard to be pushed against the glass by the higher pressure air inside.

Answer:D

Solution:Assertion (False): The sticking is not due to higher pressure inside.
Reason (True, but misapplied): The correct explanation is that air pressure outside is higher (since some air was displaced when filling the glass), pushing the postcard up against the glass.

Matrix Matching Type

17. Match the air-related experiment with its description.

Column A	Column B
1. Bursting Balloon Experiment	A. Shows how air movement creates low pressure, lifting a paper stuck to a wet surface.
2. Wet Glass Experiment	B. Displays the formation of water spraydue to air blown through a straw in water

3. Postcard Lift Experiment	C. Demonstrates how air pressure causes a balloon to burst when overfilled.
4. Straws Experiment	D. Illustrates how air movement can lift a postcard due to pressure differences.

Answer: 1-C,2-A,3-D,4-B

Solution:

Column A	Column B
1. Bursting Balloon Experiment	C. Demonstrates how air pressure causes a balloon to burst when overfilled..
2. Wet Glass Experiment	A. Shows how air movement creates low pressure, lifting a paper stuck to a wet surface
3. Postcard Lift Experiment	D. Illustrates how air movement can lift a postcard due to pressure differences
4. Straws Experiment	B. Displays the formation of water spraydue to air blown through a straw in water .

Comprehension Type

When biking, wind plays a crucial role in determining the level of ease or difficulty experienced by cyclists. The direction of the wind, whether it's blowing from behind (a tailwinD) or towards the cyclist (a headwinD), significantly influences the biking experience. A tailwind, blowing from behind the rider, acts as a supportive force, propelling the bike forward and making pedaling easier. Cyclists often feel a boost in speed and efficiency when riding with a tailwind, allowing them to cover more ground with less effort. Conversely, a headwind, blowing against the cyclist, poses a challenging obstacle. It increases resistance, making pedaling more laborious and slowing down forward progress. Cyclists facing a headwind must exert more energy to maintain speed and may find their journey more demanding and time consuming.

18. How does a tailwind affect a cyclist's biking experience?

A) It slows down the bike B) It makes pedaling more difficult

C) It propels the bike forward D) It has no effect on biking

Answer:C

Solution: A tailwind supports the rider, helping move the bike forward and making pedaling easier.

19. What impact does a headwind have on cycling?

A) It reduces resistance B) It makes pedaling easier

C It increases resistance D) It speeds up forward progress

Answer:C

Solution:A headwind blows against the cyclist, increasing resistance and making the ride harder.

20. Why do cyclists find it easier to ride with a tailwind?

A) It slows down their speed B) It makes pedaling more challenging

C) It provides a supportive force D) It doesn't affect their biking experience

Answer:C

Solution:The tailwind pushes from behind, helping the cyclist pedal with less

effort.

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS
Multiple Choice Questions

1. What is wind?
A) Still air B) Moving air C) Air pressure D) Humid air
Answer:B
Solution:Wind is the movement of air caused by differences in air pressure
2. Why is it easier to ride a bicycle with the wind?
A) Wind provides resistance B) Wind pushes the bicycle forward
C) Wind makes the bicycle heavier D) Wind slows down the bicycle
Answer:B
Solution:A tailwind reduces resistance and provides a pushing force, making pedaling easier.
3. What is one effect of wind on clothes?
A) Making them wetter B) Making them heavier
C) Drying them faster D) Wrinkling them
Answer:C
Solution:Wind speeds up evaporation by carrying away moist air, helping clothes dry quicker.
4. What causes land and sea breezes?
A) Uneven heating of the atmosphere B) High air pressure over land
C) Movement of ocean currents D) Wind blowing from east to west
Answer:A
Solution:Land heats up and cools down faster than water, causing pressure differences that lead to breezes.
5. Why does warm air rise near the equator?
A) Due to ocean currents B) Because of low air pressure
C) Because of high air pressure D) Due to uneven heating of Earth's surface
Answer:D
Solution:The equator receives more direct sunlight, heating the air and causing it to rise—forming low-pressure zones.

JEE MAINS LEVEL QUESTIONS

6. Why does warm air rise near the equator?
A) Due to high air pressure B) Due to uneven heating of Earth's surface
C) Due to ocean currents D) Due to cold air sinking
Answer:B
Solution:The equator receives more direct sunlight, causing air to heat up, become less dense, and rise
7. What is the primary cause of wind?
A) Earth's rotation B) Movement of ocean currents

C) Uneven heating of Earth's surface D) Gravitational pull

Answer:C

Solution:Temperature differences create pressure variations, making air move from high to low pressure areas

8. What causes the expansion of air in the expansion of air experiment?

A) Heating B) Cooling C) Pressure increase D)Pressure decrease

Answer:A

Solution:Heating air increases molecular motion, causing it to expand

9. Why does a balloon expand when heated?

A) Due to increased pressure B) Due to decreased pressure

C) Due to contraction of air D) Due to expansion of air

Answer:D

Solution:Heating the air inside increases volume, causing the balloon to expand

10. What do land and sea breezes result from?

A) High air pressure over the land B) Low air pressure over the land

C) Low air pressure over the sea D) High air pressure over the sea

Answer:B,C

Solution:Day (Sea Breeze): Land heats faster $\rightarrow$ Low pressure over land $\rightarrow$Air flows from sea to land.

Night (Land Breeze): Land cools faster $\rightarrow$ Low pressure over sea $\rightarrow$ Air flows from land to sea.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. How does uneven heating contribute to the formation of wind?

A) Warm air rises, creating low pressure.B) Cool air sinks, creating high pressure.

C) Air moves from high pressure to low pressure areas.

D) Wind speed increases with decreasing air temperature.

Answer:A,B,C

Solution:Uneven heating $\rightarrow$Warm air rises (low pressure) & cool air sinks (high pressure) $\rightarrow$ Wind flows from high to low pressure.

12. Which factors contribute to the intensity of a cyclone?

A) Size of the storm B) Location of landfall

C) Speed of the wind D) Humidity level in the atmosphere

Answer:A,B,C,D

Solution:A) Size of the storm – Larger storms can carry more energy.

B) Location of landfall – Cyclones hitting densely populated/coastal areas can cause more damage.

C) Speed of the wind – Higher wind speeds mean stronger, more intense cyclones.

D) Humidity level in the atmosphere – High humidity (moisture) provides energy to cyclones.

13. What are the effects of cyclones?

A) Heavy rain B) Strong winds C) Destruction of crops D) Decrease in air pressure

Answer:A,B,C,D

Solution:Cyclones cause all listed effects due to low pressure, high winds, and heavy precipitation.

Assertion and Reason Type:

A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.
B) Both Assertion and Reason are true, but Reason is NOT the correct explanation for Assertion.
C) Assertion is true, but Reason is false.
D) Assertion is false, but Reason is true.

14. Reasoning : Why do clothes dry faster on a windy day?
Assertion : Clothes dry faster on a windy day because wind increases the rate of evaporation by carrying away moisture from the fabric's surface.

Answer:A

Solution:Assertion (True): Clothes do dry faster on windy days.
Reason (True & Correct Explanation): Wind removes humid air near the fabric, allowing faster evaporation.

15. Reasoning : What causes the lifting of a postcard when air is displaced above it?
Assertion : The lifting of a postcard occurs because the displacement of air above it creates a region of low pressure, causing higher pressure air underneath to push the postcard upwards.

Answer:A

Solution:Assertion (True): The postcard lifts when air is blown over it.
Reason (True & Correct Explanation): Bernoulli's principle explains this: fast-moving air (low pressure) above allows higher atmospheric pressure below to lift the postcard.

16. Reasoning : Why does warm air rise near the equator?
Assertion : Warm air rises near the equator because the direct angle of sunlight results in heating of the air, causing it to become less dense and ascend, creating a low-pressure area.

Answer:A

Solution:Assertion (True): Warm air does rise near the equator.
Reason (True & Correct Explanation): Intense solar heating reduces air density, making it rise and form low-pressure zones.

Matrix Matching Type

17. Match the effect of wind with its example.

Column A	Column B
1.Flying a Kite	A. Wind can affect the trajectory and movement of balls in outdoor sports.
2.Riding a Bike	B. Wind can carry sounds, making them clearer or more distant on its strength and direction.
3.Playing Sports	C. Wind helps lift and keep a kite in the air.
4.Hearing Sounds	D. Wind can either assist or hinder a cyclist, depending on its direction.

Answer:1-C,2-D,3-A,4-B

Solution:

1.Flying a Kite	C. Wind helps lift and keep a kite in the air.
2.Riding a Bike	D. Wind can either assist or hinder a cyclist, depending on its direction

3.Playing Sports	A. Wind can affect the trajectory and movement of balls in outdoor sports.
4.Hearing Sounds	B. Wind can carry sounds, making them clearer or more distant on its strength and direction.

Comprehension Type

Flying a kite is not just a simple pastime but an activity deeply intertwined with the forces of nature, particularly the wind. The success of flying a kite hinges entirely on the presence of wind. Without wind, a kite remains grounded, its colorful form lying still on the ground, unable to catch flight. However, when a steady breeze graces the air, the dynamics change entirely. With the aid of this gentle yet persistent force, a kite can ascend into the sky, defying gravity and dancing among the clouds. The experience of flying a kite becomes a harmonious interaction between the wind and the kite flyer, with the wind providing the necessary lift and momentum, while the flyer maneuvers the string to control the kite's movements. In essence, flying a kite is not just about launching an object into the air but about harnessing the power of the wind to create a moment of joy and wonder.

18. What is the role of wind in flying a kite?

A) Wind makes the kite heavier B) Wind causes the kite to crash

C) Wind helps the kite to lift off D) Wind slows down the kite's movement

Answer:C

Solution:The passage states that wind provides the "necessary lift and momentum" for the kite to ascend.

19. What happens to a kite without wind?

A) It soars high in the sky B) It remains grounded

C) It flies erratically D) It spins uncontrollably

Answer:B

Solution:The text explicitly mentions that without wind, the kite "remains grounded" and cannot catch flight

20. How would you describe the relationship between wind and kite flying?

A) Competitive B) Harmonious C) Antagonistic D) Indifferent

Answer:B

Solution:The passage describes it as a "harmonious interaction," where wind and the flyer work together to create flight.

KEY

				TEACHING TASK					
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
B	B	B	B	D	B	B	C	B	B
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16	17		18	19
A,B,C,D	A,D	A,D	A	A	D	1-C,2-A,3-D,4-B		C	C
20									
C									
				LEARNERS TASK					
				CUQ'S					
1	2	3	4	5					
B	B	C	A	D					
			JEE MAINS LEVEL QUESTIONS						
6	7	8	9	10					
B	C	A	D	B,C					
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16	17		18	19
A,B,C	A,B,C,D	A,B,C,D	A	A	A	:1-C,2-D,3-A,4-B		C	B
20									
B									