Natural Phenomena: Rain, Thunder and Lightning

1. Exercise **Multiple Choice Questions** Ice changes to water through the process of

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Champs

(a) freezing (b) evaporation (c) melting (d) condensation

1.

- 2. Where is the most water found on Earth? (a) in glaciers (b) in lakes (c) in rivers (d) in oceans
- 3. The source of energy which evaporates the most water from Earth's surface is (b) lightning (a) volcanoes
 - (c) the sun (d) wind
- Liquid water changes to water vapour by the 4. process of (a) evaporation (b) condensation
 - (c) precipitation (d) freezing
- 5. What does heat from the sun cause liquid water to do?
 - (a) evaporate into the air
 - (b) travel deeper into the soil
 - (c) change into a solid
 - (d) fall from clouds as rain
- Which type of rainfall would be most helpful to 6. farmers?
 - (a) rainfall that evaporates quickly
 - (b) rainfall that runs off the land quickly
 - (c) rainfall that soaks into the soil slowly
 - (d) very little rainfall
- 7. The state of water depends on
 - (a) the shape or size of the container
 - (b) where it has been stored
 - (c) if it is being used for irrigation
 - (d) temperature
- 8. The reverse process of evaporation is
 - (a) condensation (b) sublimation (c) freezing (d) precipitation
- 9. Where does condensation occur in the water cucle?
 - (a) when cloud is forming
 - (b) when ocean water changes into water vapour
 - (c) when water flowing down a river
 - (d) when underground water soaking into rocks and soil

- 10. What do we see on the surface of glass containing ice-chilled water? (a) dust (b) water droplets (c) water vapour (d) ice
- 11. There are..... stage of water cycle. (a) 2 (b) 3 (c) 4 (d) 6

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- 12. What causes puddles to get smaller and smaller? (a) condensation (b) evaporation (c) precipitation (d) the Sun
- 13. Which of these is an example of liquid water? (a) Frost (b) Rain (c) Ice (d) Steam
- 14. How can water vapour in the air return to Earth? (a) it evaporates and is blown by the wind (b) it evaporates and forms clouds (c) it condenses then precipitates (d) it stick to any warm surface it comes in contact with
- 15. You can expect the most evaporation from the surface of a pond in (a) cold rainy day (b) cold sunny day (c) warm rainy day (d) warm sunny day
- 16. How much of Earth's water is fresh water? (a) 97% (b) 50% (c) 3% (d) 1%
- 17. Which of the following is NOT one of the processes including in water cycle? (a) condensation (b) evaporation (c) precipitation (d) erosion
- 18. At the time of cloud formation, heat is released into the atmosphere? It is true (a) Yes (b) No (c) Sometimes (d) Cannot say

DIRECTIONS: Match Column-1 with Column-11 an the columns.

19.

Column-I	Column-II
(a) Lightning	(p) collection of tiny water droplets
(b) Thunder	(q) falling of water from the sky
(c) Clouds	(r) loud sound with lightning
(d) Rain	(s) flash of light

(a)
$$A \rightarrow (p); B \rightarrow (r); C \rightarrow (s): D \rightarrow (q)$$

(b) $A \rightarrow (s); B \rightarrow (r); C \rightarrow (p): D \rightarrow (q)$
(c) $A \rightarrow (p); B \rightarrow (s); C \rightarrow (r): D \rightarrow (q)$

(d)
$$A \rightarrow (s); B \rightarrow (p); C \rightarrow (r): D \rightarrow (q)$$

20.

Column-I	Column-II	
(a) Process of freezing	(p) water to ice	
results		
(b) Process of boiling	(q) steam to water	
results		
(c) Process of melting	(r) water to steam	
results		
(d) Process of	(s) ice to water	
condensation results		
(a) $A \rightarrow (p); B \rightarrow (s); C \rightarrow (r): D \rightarrow (q)$		
(b) $A \rightarrow (p); B \rightarrow (q); C \rightarrow (r): D \rightarrow (s)$		
(c) $A \rightarrow (p); B \rightarrow (r); C \rightarrow (r$	\rightarrow (s): $D \rightarrow$ (q)	
(d) $A \rightarrow (q); B \rightarrow (s); C \rightarrow (s$	\rightarrow (r): $D \rightarrow$ (p)	

Passage Based Questions

DIRECTIONS (Qs.21-26): Read the passage (s) given below and answer the questions that follow.

Passage 1

Lightning is the visible discharge of electricity that occurs when a region of a cloud acquires an excess electrical charge either positive or negative that is sufficient to break down the resistance of air. When lightning is likely to occur people are advised to stay indoors, away from open doors and avoid contact with any electrical appliances.

- **21.**Lightning occurs when region of cloud acquires
(a) negative charge
(c) both (a) and (b)(b) positive charge
(d) neither (a) nor (b)
- **22.** When lightning is likely to occur it is advised (a) to stay indoors
 - (b) to stay near open doors and windows
 - (c) to avoid contact with electrical appliances
 - (d) both (a) and (c)
- **23.** Lightning is
 - 1. a visible discharge of electricity.

2. having sufficient power to break down the resistance of air.

3. usually occurred during thunderstorm.

- (a) (1) only (b) (1) and (2)
- (c) (1), (2) and (3) (d) (2) and (3)

Passage 2

Rain is liquid water in the form of droplets that have condensed from atmospheric water vapour and then precipitated that is, become heavy enough to fall under gravity. Rain is a major component of the water cycle and is responsible for depositing most of the fresh water on the Earth.

24. Rain is

1. form of water drople	ets that have condensed
from water vapour	
2. form of precipitation.	
(a) only (1)	(b) only (2)
(c) both (1) and (2)	(d) neither (1) nor (2)

- **25.**Rain is a major component of
(a) evaporation
(c) precipitation(b) condensation
(d) water cycle
- 26. In very cold region, rain drops fall on earth as
 (a) hail
 (b) rain
 (c) drops
 (d) all of these

Assertion/Reason Based Questions

DIRECTIONS: The questions in this segment consists of two statements, one labelled as "Assertion A" and the other labelled as "Reason R". You are to examine these two statements carefully and decide if the Assertion A and Reason R are individually true and if so, whether the reason is a correct explanation of the assertion. Select your answers to these items using codes given below.

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

Assertion (A): Lightning never strikes the same place twice.
 Reason (R): Lightning strikes almost

Reason (**R**): Lightning strikes almost everywhere.

28. Assertion (A): Lightning is a big charge of electricity.Reason (R): The electricity moves from the

negative terminal to the positive terminal.

29. Assertion (A): Clouds contain millions of tons of water.

Reason (B): A cloud is a large group of tiny water droplets that we can see in the air.

DIRECTIONS: Read the following two statements carefully and choose the correct options.

(a) Statement (i) is correct while statement (ii) is incorrect.

(b) Statement (ii) is correct while statement (i) is incorrect.

- (c) Both statements are correct
- (d) Both statements are incorrect.
- **Statement-1:** Water is the only thing that can be a gas, liquid and a solid. **Statement-2:** About one-third of our body is made up of water.
- **31. Statement-1:** Water vapour is gaseous state of water.

Statement-2: Water vapour in the clouds cools down and it becomes water again.

2. Exercise

- During lightning which of the following is a safe place?
 (a) open field
 (b) inside a house
 (c) bus stop
 (d) elevated ridge
- In thunderstorm, the charges accumulate near the upper edges of clouds are.
 (a) negatively charged
 (b) positively charged
 (c) neutral
 (d) None of these
- **3.** Name the scientists who showed that lightning and the spark from your clothes are essentially the same phenomena?
 - (a) Thomas Alva Edison
 - (b) Franklin D. Roosevelt
 - (c) Benjamin Franklin
 - (d) Issac Newton
- **4.** The process of transferring the charge from a charged object to the earth is called
 - (a) earthing (b) discharging
 - (c) transferring (d) charging
- **5.** Which of the following is incorrect? m an event of lightning, we should
 - (a) not hold any metallic pipes
 - (b) stand under a tree if in a plain area

(c) remove all metallic objects from our pockets if in a plain area.

(d) disconnect all electrical appliances connected to external antenna.

6. Cloud forms through the process of (a) condensation (b) precipitation 7. Why do we always see a lightning before we hear thunder? (a) because lightning occurs first. (b) because light travels faster than sound. (c) because thunder occurs late. (d) because sound travels fester than light. 8. What is the sound of thunder caused by a nearby main trunk airwave? (a) sharp crakle (b) low rumble (c) loud crash (d) feeble crash 9. Forests that experience high levels of rainfall are called (a) rain forests (b) snow forests (c) rain guages (d) flood forests 10. (1) Lightning contains millions of volts of electricity. (2) Direct lightning are usually fatal. Which statements) is/are correct? (a) 1 only (b) 2 only (c) both (1) and (2) (d) neither (1) nor (2)11. By boiling process water converts into (a) water vapour (b) snow (c) hail (d) cloud 12. Hot water vapour is called (a) steam (b) snow (c) hail (d) rain 13. Instrument, which is used to detect and monitor rain is (b) Weather radar (a) Reengage (c) pH meter (d) Hydrometer

(d) transpiration

(c) freezing

- 14.Lightning can never strike the same place twice.(a) it is true(b) it is false(c) maybe(d) may not be
- **15.** The water cycle begins with
 - (a) condensation
 - (b) evaporation
 - (c) precipitation
 - (d) the water cycle has no beginning or end.
- **16.** The water cycle is the Earth's way of
 - (a) getting rid of water
 - (b) recycling water
 - (c) using up all of our water
 - (d) cleaning our water

17. When you see clouds forming in the sky, the water above you is forming droplets in what stage of the water cycle?

(a) collection	(b) evaporation
(c) condensation	(d) precipitation

18. Where does the energy that powers the water cycle comes from?
(a) plants
(b) electric shocks
(c) animals
(d) the sun

Match the Column

DIRECTIONS: Match Column-I with Column-II and select the correct answer using the codes given below the columns.

19.

Column-I	Column-II		
(a) Upper edge of clouds	(p) hail		
(b) Lower edge of clouds	(q) water vapour		
(c) Gaseous state of water	(r) having excess of		
	positive charges		
(d) Falling of ice crystals on	(s) having excess of		
earth	negative charges		
(a) $A \rightarrow (p); B \rightarrow (q); C \rightarrow (r); D \rightarrow (s)$			
(b) $A \rightarrow (r); B \rightarrow (s); C \rightarrow (q); D \rightarrow (p)$			
(c) $A \rightarrow (r); B \rightarrow (p); C \rightarrow (q); D \rightarrow (q)$			

(d) $A \rightarrow (r); B \rightarrow (q); C \rightarrow (s); D \rightarrow (p)$

20.

Column-I	Column-II	
(a) Water cycle	(p) falls in very cold regions	
(b) Clouds	b) Clouds (q) made of metals.	
(c) Snow or hail	(r) Natural circuit of water in its	
	different states	
(d) Lightning	(s)condensed form of water vapour	
conductor		
(a) $A \rightarrow (r); B \rightarrow (s); C \rightarrow (p); D \rightarrow (q)$		

(b) $A \rightarrow (s); B \rightarrow (r); C \rightarrow (q); D \rightarrow (p)$ (c) $A \rightarrow (r); B \rightarrow (s); C \rightarrow (q); D \rightarrow (p)$

(d)
$$A \rightarrow (p); B \rightarrow (q); C \rightarrow (r); D \rightarrow (s)$$

Passage Based Questions

DIRECTIONS (Qs.21-28): Read the passage (s) given below and answer the questions that of follow.

Passage 1

Use the model of the water cycle to answer the following question.



- **21.** Water is evaporating into the air (a) from A to B (b) from B to C (c) from C to D (d) from D to A
- 22. Where is water condensing? (a) from A to B (b) from B to C (c) from C to D (d) from D to A
- 23. Where is precipitation occurring? (a) from A to B (b) from B to C (c) from C to D (d) from D to A

Passage 2

A lightning conductor is a metal (usually copper) rod connecting the highest point on a building to the earth.

Its purpose is to protect the building from a damaging discharge of electricity between the atmosphere and the building, that is, lightning strike. This device is invented by Benjamin Fanklin in 1750.

- **24.** Lightning conductor is made of (a) metal (b) plastic (c) insulator (d) wood
- 25. Lightning conductor is used
 (a) to protect buildings from rain
 (b) to protect buildings from effects of lightning
 (c) to protect buildings from thunder.
 (d) all of these
- **26.** Lightning conductor is invented by
 - (a) Benjamin Franklin
 - (b) Albert Einstein
 - (c) Issac Newton
 - (d) Franklin D. Roosevelt

Passage-3

The diagram shows a person observing a thunderstorm located several kilo meters away. The person hears the thunder several seconds after seeing the lightning.



- 27. Which form of energy, other than light and sound is often present during a thunderstorm?
 (a) Electric
 (b) Magnetic
 - (c) Geothennal (d) Nuclear
- 28. The person hears the thunder several seconds after seeing the lightning because(a) speed of sound is greater than the speed of light in air.

(b) speed of light is greater than the speed of sound in air.

- (c) lightning restrict the speed of sound
- (d) None of these

Assertion/Reason Based Questions

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(b) Both A and R are true but R is not the correct explanation of A.

- (c) A is true but R is false.
- (d) A is false but R is true.
- **29.** Assertion (A): Astrophobia is the fear of thunder and lightning.**Reason** (R): Thunder is the sound caused by lightning.
- **30. Assertion** (A): Heavy rain can cause flooding. **Reason** (**R**): Rainfall directly depends on temperature.
- **Assertion** (A): Lightning conductors are used to protect buildings from lightning. **Reason (R):** Direct lightning strike is **useful.**

Statement Based Questions

DIRECTIONS: Read the following three statements carefully and choose the correct option.

(a) Statement (i) and (iii) are incorrect while statement (ii) is correct.

(b) Statement (i) and (ii) are incorrect while (iii) is correct.

(c) All the statements are correct.

(d) All the statements are incorrect.

32. Statement-1: Lightning always create thunder.
Statement-2: Thunder is uncommon but not rare
Statement 3: More thunder means more

Statement-3: More thunder means more lightning.

33. Statement-1: Lightning connects to the ground from the clouds.

Statement-2: Electricity follows the longest route.

Statement-3: Lightning conductor was inverted by Issac Newton.

34. A diagram of the water cycle is shown below. The letters A through E represent five different processes taking place.



Which of the following is correct?
(a) A-Precipitation, B-Run off, C-Condensation, D-Ground water, E-Evaporation
(b) A-Evaporation, B-Ground water, C-Run off, D-Condensation, E-Precipitation.
(c) A-Run off B-Precipitation, C-Evaporation, D-Ground water, E-Condensation
(d) A-Condensation, B-Precipitation, C-Run off, D-Ground water, E-Evaporation

Hints & Solutions

Exercise-1

- 1. (c) In melting solid after absorbing heat converts into liquid.
- **2.** (d) Oceans are the biggest source of water on the earth.
- **3.** (c) The heat of sun evaporate the most water from Earth's surface.
- **4.** (a) Evaporation is the process in which water changes into water vapour.
- **5.** (a) As the temperature rises liquid water evaporates into the air.

- **6.** (c) Rainfall that soaks into the soil slowly is most helpful to fanners.
- **7.** (d) The state of water depends on its temperature.
- **8.** (a) m the process of evaporation water drops convert into water vapour on the other hand in condensation water vapour converts into liquid water.
- **9.** (a) Clouds are the condensed form of water vapour.
- **10.** (b) Water droplets collect on the outer surface of glass containing ice-chilled water due condensation of water vapour present in the atmosphere.
- **11.** (c) The stages are evaporation, condensation precipitation and collection.
- **12.** (b)
- **13.** (b) Liquid form of water is rain.
- **14.** (c) Water vapour condenses and fall on the earth in the form of rain.
- **15.** (d)
- **16.** (c) Only 2.6% of total water is fit for human consumption.
- **17.** (d) Erosion is not a part of water cycle.
- **18.** (a) Since, water vapour is cool down while forming clouds, so heat is released in this process.

Match the Column

- **19.** (b) $A \rightarrow (s); B \rightarrow (r); C \rightarrow (p); D \rightarrow (q)$
- **20.** (c) $A \rightarrow (p); B \rightarrow (r); C \rightarrow (s); D \rightarrow (q)$

Passage Based Questions Passage 1

- **21.** (c)
- **22.** (d) One should always stay away from open door and windows during lightning.
- **23.** (c)

(c)

Passage 2

- **25.** (d)
- **26.** (a) In very cold regions raindrops while pouring down freeze into ice crystals. These ice crystals fall on earth as hail or snow.
- **27.** (d) (A) is false but (R) is true.
- **28.** (b) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- **29.** (a) (A) and (R) both are correct and (R) is the correct explanation of (A).
- **30.** (c)
- **31.** (c)

EXERCISE-2

- **1.** (b)
- **2.** (b)
- **3.** (c)
- **4.** (a) Lightning conductor thus is used to protect buildings from lightning is earthed so that atmospheric charge reached deep inside the earth.
- **5.** (b)
- **6.** (a) Water vapour condenses on dust particles present in atmosphere to form tiny droplets of water which float in air and known as cloud.
- 7. (b) The speed of light $(3 \times 10^8 \text{ m/s})$ is more than speed of sound 332 m/s in air. So, we can see lightning before we hear thunder.
- **8.** (c)
- **9.** (a)
- **10.** (c)
- **11.** (a) In boiling water absorbs heat and transfer to vapour state.
- **12.** (a)
- **13.** (b)

24.

- **14.** (b) Lightning can strike the same place more than once.
- **15.** (d) Since, water cycle is a cyclic process, so it can be start from any stage.
- **16.** (b) Water cycle is the cyclic movement of water from the atmosphere to the earth and back to the atmosphere through various processes.
- **17.** (c) Clouds are formed because of condensation.
- **18.** (d) The energy that come from sun is an important factor to power water cycle.

Match the Column

- **19.** (b) $A \rightarrow (r); B \rightarrow (s); C \rightarrow (q); D \rightarrow (p)$
- **20.** (a) $A \rightarrow (r); B \rightarrow (s); C \rightarrow (p); D \rightarrow (q)$

Passage 1

- **21.** (c)
- **22.** (d)
- **23.** (a)

Passage 2

- **24.** (a) To make a lightning conductor, we require a substance which has very low resistance.
- **25.** (b)
- **26.** (a)

Passage-3

- **27.** (a) Lightning is due to friction between charged particles present in the atmosphere.
- **28.** (b) Speed of sound (332 m/s) is less than speed of light $(3 \times 10^8 \text{ m/s})$, hence person hears the thunder several seconds after seeing the lightning.
- **29.** (b) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
- **30.** (c) (A) is true but (R) is false.
- **31.** (c) (A) is true but (R) is false.
- **32.** (a)
- **33.** (b)

34. (d) In evaporation, liquid transfer to vapour state.

In condensation vapour transfer to liquid state.