7th Science Lesson 7 Questions in English

7] Heat and Temperature

1. Assertion(A): You shiver when it is cold outside and sweat when it is hot outside

Reason (R): Temperature is involved in many aspects of our daily lives, including our own bodies and health

a) Both (A) and (R) are correct, but (R) does not explain (A)

b) Both (A) and (R) are wrong

c) Both (A) and (R) are correct and (R) explains (A)

d) (A) is Correct and (R) is wrong

Explanation

You shiver when it is cold outside and sweat when it is hot outside, but how can you measure those weather temperatures? **Temperature is involved in many aspects of our daily lives**, including our own bodies and health; the weather; and how hot the stove must be in order to cook food.

2. The measurement of warmness or coldness of a substance is known as its_____

a) Heat
b) Kinetic energy
c) Potential energy
d) Temperature

Explanation

The **measurement of warmness or coldness of a substance is known as its temperature**. Temperature is related to how fast the atoms within a substance are moving.

3. Which of the following are the units of temperature?

1) Degree Celsius
2) Fahrenheit
3) Kelvin

a) 1, 2
b) 1, 3
c) 2, 3
d) All the above

Explanation

There are three units which are used to measure the temperature: **Degree Celsius, Fahrenheit and Kelvin**.

Degree Celsius: Celsius is written as°C and read as degree. For example, 20°C; it is read as twenty degree Celsius. Celsius is called as Centigrade as well.

Fahrenheit: Fahrenheit is written as °F for example 25°F; it is read as twenty-five degree Fahrenheit.

4. Which of the following is the SI unit of temperature?

a) Degree Celsius
b) Fahrenheit
c) Kelvin
d) All the above

Explanation

Kelvin is written as K. For example: 100K; it is read as hundred Kelvin. The **SI unit of temperature is kelvin (K)**.

5. Assertion(A): The temperature of the object is well approximated with the kinetic energy of the substances.

Reason(R): The high temperature means that the molecules within the object are moving at a faster rate.

a) Both (A) and (R) are correct, but (R) does not explain (A)

b) Both (A) and (R) are wrong

c) Both (A) and (R) are correct and (R) explains (A)

d) (A) is Correct and (R) is wrong

Explanation

The temperature of the object is well approximated with the kinetic energy of the substances. The high temperature means that the molecules within the object are moving at a faster rate. Molecules in any substance are very small to analyse and calculate its movement (Kinetic energy) in order to measure its temperature. You must use an indirect method to measure the kinetic energy of the molecules of a substance.

6. When liquid is heated it____, when cooled it gets_____

a) Expand, Expand
b) Contract, Expand

c) Expand, Contract
d) Contract, Contract

Explanation

In a thermometer, **when liquid gets heat, it expands and when it is cooled down, it contracts**. It is used to measure temperature. Like solid and liquid objects, the effect of heat is also observed on gaseous objects.

7.____ is the most common instrument to measure temperature

a) Anemometer
b) Thermometer
c) Galvanometer
d) Wattmeter

Explanation

Thermometer is the most common instrument to measure temperature. There are various kinds of thermometers. Some of them are like glass tubes which look thin and are filled with some kind of liquid.

8. Assertion(A): Mostly Alcohol and Mercury are used in thermometers as they remain in liquid form even with a change of temperature in them

Reason(R): A small change in the temperature causes change in volume of a liquid

a) Both (A) and (R) are correct, but (R) does not explain (A)

b) Both (A) and (R) are wrong

c) Both (A) and (R) are correct and (R) explains (A)

d) (A) is Correct and (R) is wrong

Explanation

Mostly Alcohol and Mercury are used in thermometers as they remain in liquid form even with a change of temperature in them. **A small change in the temperature causes change in volume of a liquid.** We measure this temperature by measuring expansion of a liquid in thermometer.

9. Which of the following properties of Mercury?

1) Its expansion is not uniform
2) It is opaque and shining.
3) It is a good conductor of heat
    a) 1, 2
    b) 1, 3

c) 2, 3
d) All the above

Explanation
Properties of Mercury:-

- Its **expansion is uniform**. (For equal amounts of heat, it expands by equal lengths.)
- It is opaque and shining.
- It does not stick to the sides of the glass tube.
- It is a good conductor of heat.

10. What is the boiling point of Mercury?

a) 320 °C
b) 257 °C
c) 357 °C
d) 157°C

Explanation

Mercury has a **high boiling point (357°C) and a low freezing point (–39°C)**. Hence a wide range of temperatures can be measured using a mercury thermometer.

11. Which of the following are the features of Alcohol?

1) The freezing point of alcohol is less than –100°C.
2) Its expansion per degree Celsius rise in temperature is very large
3) It can be coloured brightly and hence is easily visible
   a) 1, 2
   b) 1, 3
   c) 2, 3
   d) All the above

Explanation

Properties of Alcohol

- The **freezing point of alcohol is less than –100°C**. So, it can be used to measure very low temperatures
- Its **expansion per degree Celsius rise in temperature is very large**.
- It can be **coloured brightly and hence is easily visible**

12. Which of the following statement is correct?

1) All clinical thermometers have a kink that prevents the mercury from flowing back into the bulb when the thermometer is taken out of the patient's mouth, so that the temperature can be noted conveniently

2) A clinical thermometer indicates temperatures from a minimum of 35°C or 94°F to a maximum of 42°C or 108°F.
    a) 1 alone
    b) 2 alone
    c) 1, 2
    d) None

Explanation

Clinical Thermometer are used to measure the temperature of a human body, at home, clinics and hospitals. **All clinical thermometers have a kink that prevents the mercury from flowing back into the bulb when the thermometer is taken out of the patient's mouth, so that the temperature can be noted conveniently**. There are temperature scales on either side of the mercury thread, one in Celsius scale and the other in Fahrenheit scale. Since the Fahrenheit scale is more sensitive than the Celsius scale, body temperature is measured in F only. **A clinical thermometer indicates temperatures from a minimum of 35°C or 94°F to a maximum of 42°C or 108°F**.

13. Before using the Clinical thermometer mercury level should be below_____ °C

a) 94
b) 45
c) 35
d) 25

Explanation

Precautions to be Followed While Using a Clinical Thermometer:

- The thermometer should be washed before and after use, preferably with an antiseptic solution.
- Jerk the thermometer a few times to bring the level of the mercury down.
- **Before use, the mercury level should be below 35°C or 94°F**.
- Do not hold the thermometer by its bulb
- Keep the mercury level along your line of sight and then take the reading.
- Handle the thermometer with care. If it hits against some hard object, it may break.
- Do not place the thermometer in a hot flame or in the hot sun.

14. A laboratory thermometer has only the Celsius scale ranging from ___°C to ____°C

a) 10, 110
b) – 10, 100
c) 35, 100
d) -35, 100

Explanation

Precautions to be Followed While Using a Laboratory Thermometer:

- Do not tilt the thermometer while measuring the temperature. Place it upright
- Note the reading only when the bulb has been surrounded by the substance from all sides
- A laboratory thermometer has only the Celsius scale ranging from **–10°C to 110°C**.

15. Which of the following statement is correct?

1) Laboratory thermometers are used to measure the temperature in school and other laboratories for scientific research.
2) They are also used in the industry as they can measure temperatures higher than what clinical thermometers can record
3) The stem and the bulb of a lab thermometer are longer when compared to that of a clinical thermometer
    a) 1, 2
    b) 1, 3
    c) 2, 3
    d) All the above

Explanation

Laboratory thermometers are used to measure the temperature in school and other laboratories for scientific research. They are also used in the industry as they can measure temperatures higher than what clinical thermometers can record. **The stem and the bulb of a lab thermometer are longer when compared to that of a clinical thermometer** and there is no kink in the lab thermometer.

16. What is the average internal temperature of human?

a) 37°C
b) 34°C
c) 27°C
d) 47°C

Explanation

In humans, the average internal temperature is 37°C (98.6°F), though it varies among individuals. However, no person always has exactly the same temperature at every moment of the day. Temperatures cycle regularly up and down through the day according to activities and external factors.

17. Which of the following statement about Clinical Thermometer is correct?

1) Clinical thermometer is scaled from 25°C to 42°C or from 94°F to 108°F.
2) Temperature can be read after removing the thermometer from armpit or mouth.
3) To lower the mercury level jerks are given.
    a) 1, 2

b) 1, 3
c) 2, 3
d) All the above

Explanation

Clinical Thermometer
Clinical thermometer is scaled from 35°C to 42°C or from 94°F to 108°F.
Mercury level does not fall on its own, as there is a kink near the bulb to prevent the fall of mercury level.
Temperature can be read after removing the thermometer from armpit or mouth.
To lower the mercury level jerks are given.
It is used for taking the body temperature.

18. Which of the following statement about Laboratory Thermometer is incorrect?

a) Laboratory thermometer is generally scaled from 10°C to 110°C.
b) Mercury level falls on its own as no kink is present
c) No need to give jerk to lower the mercury level.
d) Temperature is read while keeping the thermometer in the source of temperature

Explanation

Laboratory Thermometer
Laboratory thermometer is generally scaled from −10°C to 110°C.
Mercury level falls on its own as no kink is present.
Temperature is read while keeping the thermometer in the source of temperature, e.g. a liquid or any other thing.
No need to give jerk to lower the mercury level.
It is used to take temperature in laboratory.

19. Which of the following statement is correct?

1) Digital thermometers are available which use mercury along with a sensor
2) Digital thermometers are mainly used to take the body temperature
3) Mercury is a toxic substance and is very difficult to dispose of if a thermometer break.

a) 1, 2
b) 1, 3
c) 2, 3
d) All the above

Explanation

Here is a lot of concern over the use of mercury in thermometers. Mercury is a toxic substance and is very difficult to dispose of if a thermometer break. These days, **digital thermometers are available which do not use mercury**. Instead, it has a sensor which can measure the heat coming out from the body directly and from that can measure the temperature of the body. Digital thermometers are mainly used to take the body temperature.

20. Assertion(A): We should not use Clinical thermometer to measure the temperature of hot milk

Reason(R): A Clinical thermometer has small temperature range

a) Both (A) and (R) are correct, but (R) does not explain (A)

b) Both (A) and (R) are wrong

c) Both (A) and (R) are correct and (R) explains (A)

d) (A) is Correct and (R) is wrong

Explanation

Alex wanted to measure the temperature of hot milk using a clinical thermometer. His teacher stopped him from doing so. We are advised not to use a clinical thermometer for measuring the temperature of any object other than human body. **A Clinical thermometer has small temperature range**. The glass will crack/ burst due to excessive pressure created by expansion of mercury.

21. The temperatures of the previous day reported in weather reports are measured by____

a) Clinical thermometer
b) Digital thermometer
c) Laboratory thermometer
d) Maximum _ minimum thermometer

Explanation

The maximum and minimum temperatures of the previous day reported in weather reports are measured by a thermometer called the **maximum - minimum thermometer**

22. After whom Celsius scale was termed?

a) Anders Morgan
b) Daniel Gabriel Celsius

c) Anders Celsius
d) Daniel Gabriel Morgan

Explanation

Celsius is the common unit of measuring temperature, termed after Swedish astronomer, Anders Celsius in 1742, before that it was known as Centigrade as thermometers using this scale are calibrated from (Freezing point of water) 0°C to 100°C (boiling point of water). In Greek, 'Centium' means 100 and 'Gradus' means steps, both words make it centigrade and later Celsius.

23. Freezing point of water is taken as ___°F

a) 32
b) 213
c) 323
d) 13

Explanation

Fahrenheit is a Common unit to measure human body temperature. It is termed after the name of a German Physicist Daniel Gabriel Fahrenheit. **Freezing point of water is taken as 32°F and boiling point 212°F**. Thermometers with Fahrenheit scale are calibrated from 32°F to 212°F.

24. Kelvin scale is termed after____

a) Lord Celsius
b) Lord Kelvin
c) Lord Fahrenheit
d) Andres Kelvin Morgan

Explanation

Kelvin scale is termed after Lord Kelvin. It is the SI unit of measuring temperature and written as K also known as absolute scale as it starts from absolute zero temperature.

25. Match the following:

I.	Boiling point of water (°C)	1. 37
II.	Boiling point of water (°F)	2. 100
III.	Mean temperature of human body (°C)	3. 212
IV.	Room temperature (°C)	4. 72

a) 2, 1, 3, 4
b) 2, 3, 1, 4
c) 2, 3, 4, 1
d) 4, 1, 2, 3

Explanation

Temperature	Celsius scale (°C)	Farenheit scale (°F)	Kelvin scale (K)
Boiling point of water	100	212	373.15
Freezing point of water	0	32	273.15
Mean temperature of human body	37	98.6	310.15
Room temperature (Average)	72	23	296.15

26. Which of the following are equal?

1) (F - 32)/ 9
2) C/5
3) 9C

a) 1, 3
b) 2, 3
c) 1, 2
d) None

Explanation

Relation between Fahrenheit scale and Celsius scales is as under.

$$\frac{(F-32)}{9} = \frac{C}{5}, \quad K = 273.15 + C$$

27. Which of the following is Absolute zero Temperature?

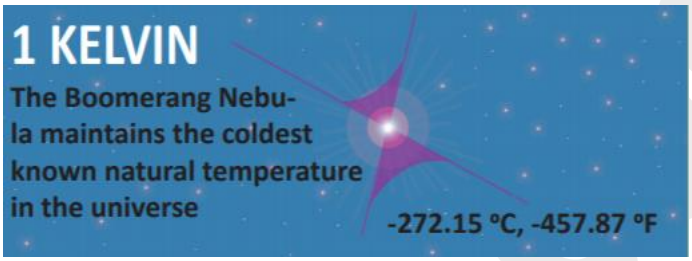
a) 0 K
b) -273.15 °C
c) -459.67 °F
d) All the above

Explanation

28. _____maintains the coldest known natural temperature in the universe

a) Boomerang Nebula
b) Boomerang Gamora
c) Boomerang Wanda
d) Boomerang Vision

Explanation



29. Coldest natural temperature ever recorded on Earth is____

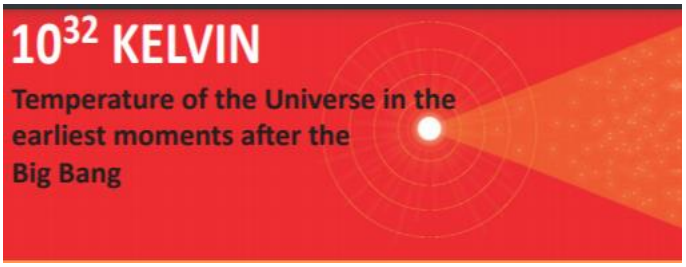
a) 0 °C
b) -94.7 °F
c) -94.7 °C
d) 273 °C

Explanation

30. Temperature of the Universe in the earliest moments after the Big Bang was ____

a) 10^32 K
b) 10^2 K
c) 10^132 K
d) 10^22 K

Explanation



31. Which of the following are the boiling point of water?

1) 100 °C
2) 212° F
3) 373.15 K

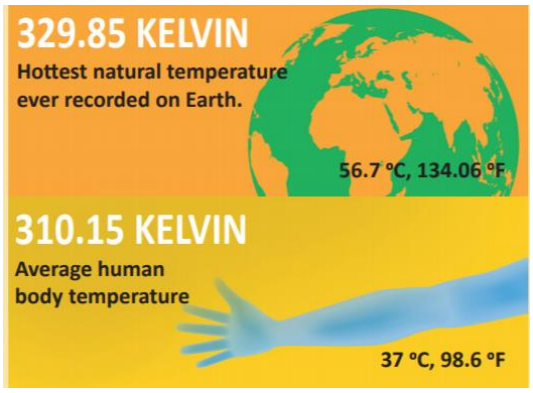
a) 1, 2
b) 1, 3
c) 2, 3
d) All the above

Explanation

32. Hottest natural temperature ever recorded on Earth

a) 100 °C
b) 56.7 °C
c) 134.06 °C
d) 329.85 °C

Explanation



33. Which of the following scale is used to measure temperature for day to day purpose?

a) Kelvin
b) Celsius
c) Fahrenheit
d) All the above

Explanation

Most of the people in the world use the Celsius scale to measure temperature for day to day purpose. The Kelvin scale has been designed in such a way, it is not only an absolute temperature scale, but also 1°C change is equal to a 1K change. This makes the conversion from Celsius to absolute temperature scale (Kelvin scale) easy, just the addition or subtraction of a constant 273.15.

34. United States prefer___ scale

a) Kelvin
b) Celsius
c) Fahrenheit
d) All the above

Explanation

In **United States they prefer to use the Fahrenheit scale**. The problem is, converting Fahrenheit to absolute scale (Kelvin) is not easy.

35. Which of the following statement is correct?

1) The Rankine scale was named after the Glasgow University engineer and physicist Rankine, who proposed it in 1859
2) It is an absolute temperature scale, and has the property of having a 1°R change is equal to a 1.5°F change.
    a) 1 alone
    b) 2 alone
    c) 1, 2
    d) None

Explanation

The Rankine scale was named after the Glasgow University engineer and physicist Rankine, who proposed it in 1859. It is an **absolute temperature scale, and has the property of having a 1°R change is equal to a 1°F change**. Fahrenheit users who need to work with absolute temperature can be converted to Rankine by R= F+ 459.67

36. How much will the temperature of 68°F be in Celsius?

a) 20
b) 323
c) 320
d) 25

Explanation

C = 5x 36/ 9 = 20°C

K = C + 273.15 = 20 + 273.15 = 293.15

Thus, the **temperature in Celsius = 20 degree C** and in Kelvin = 293.15 K

37. At what temperature will its value be same in Celsius and in Fahrenheit?

a) 40
b) – 40
c) 20
d) – 20

Explanation

2. At what temperature will its value be same in Celsius and in Fahrenheit?

Given : If the temperature in Celsius is C, then the temperature in Fahrenheit (F) will be same,

$$\text{i.e. } F = C. \quad \frac{(F-32)}{9} = \frac{C}{5}$$

(or)

$$\frac{(C-32)}{9} = \frac{C}{5}$$

$$(C-32) \times 5 = C \times 9$$

$$5C - 160 = 9C$$

$$4C = -160$$

$$C = F = -40$$

The temperatures in Celsius and in Fahrenheit will be same at – 40