

1. Question: A man with a load jumps from a high building. What will be the load experienced by him?

Answer: Zero, because while falling, both the man and the load are falling at the same acceleration i.e. acceleration due to gravity.

2. Question: A piece of chalk when immersed in water emits bubbles. Why?

Answer: Chalk consists of pores forming capillaries. When it is immersed in water, the water begins to rise in the capillaries and air present there is expelled in the form of bubbles.

3. Question: Why does a liquid remain hot or cold for a long time inside a thermos flask?

Answer: The presence of air, a poor conductor of heat, between the double glass wall of a thermos flask, keeps the liquid hot or cold inside a flask for a long time.

4. Question: Why does a ball bounce upon falling?

Answer: When a ball falls, it is temporarily deformed. Because of elasticity, the ball tends to regain its original shape for which it presses the ground and bounces up (Newton's Third Law of Motion).

5. Question: Why is standing in boats or double decker buses not allowed, particularly in the upper deck of buses?

Answer: On tilting the centre of gravity of the boat or bus is lowered and it is likely to overturn.

6. Question: Why is it recommended to add salt to water while boiling dal?

Answer: By addition of salt, the boiling point of water gets raised which helps in cooking the dal sooner.

7. Question: Why is the boiling point of sea water more than that of pure water?

Answer: Sea water contains salt, and other impurities which cause an elevation in its boiling point.

8. Question: Why is it easier to spray water to which soap is added?

Answer: Addition of soap decreases the surface tension of water. The energy for spraying is directly proportional to surface tension.

9. Question: Which is more elastic, rubber or steel?

Answer: Steel is more elastic for the same stress produced compared with rubber.

10. Question: Why is the sky blue?

Answer: Violet and blue light have short waves which are scattered more than red light waves. While red light goes almost straight through the atmosphere, blue and violet light are scattered by particles in the atmosphere. Thus, we see a blue sky.

11. Question: Why Does ink leak out of partially filled pen when taken to a higher altitude?

Answer: As we go up, the pressure and density of air goes on decreasing. A Partially filled pen leaks when taken to a higher altitude because the pressure of air acting on the ink inside the tube of the pen is greater than the pressure of the air outside.

12. Question: On the moon, will the weight of a man be less or more than his weight on the earth?

Answer: The gravity of the moon is one-sixth that of the earth; hence the weight of a person on the surface of the moon will be one-sixth of his actual weight on earth.

13. Question: Why do some liquid burn while others do not?

Answer: A liquid burns if its molecules can combine with oxygen in the air with the production of heat. Hence, oil burns but water does not.

14. Question: Why can we see ourselves in a mirror?

Answer: We see objects when light rays from them reach our eyes. As mirrors have a shiny surface, the light rays are reflected back to us and enter our eyes.

15. Question: Why does a solid chunk of iron sink in water but float in mercury?

Answer: Because the density of iron is more than that of water but less than that of mercury.

16. Question: Why is cooking quicker in a pressure cooker?

Answer: As the pressure inside the cooker increases, the boiling point of water is raised, hence, the cooking process is quicker.

17. Question: When wood burns it crackles. Explain?

Answer: Wood contains a complex mixture of gases and tar forming vapors trapped under its surface. These gases and tar vapors escape, making a cracking sound.

18. Question: Why do stars twinkle?

Answer: The light from a star reaches us after refraction as it passes through various layers of air. When the light passes through the earth's atmosphere, it is made to flicker by the hot and cold ripples of air and it appears as if the stars are twinkling.

19. Question: Why is it easier to roll a barrel than to pull it?

Answer: Because the rolling force of friction is less than the dynamic force of sliding friction.

20. Question: If a feather, a wooden ball and a steel ball fall simultaneously in a vacuum, which one of these would fall faster?

Answer: All will fall at the same speed in vacuum because there will be no air resistance and the earth's gravity will exert a similar gravitational pull on all.

21. Question: When a man fires a gun, he is pushed back slightly. Why?

Answer: As the bullet leaves the nozzle of the gun's barrel with momentum in a forward direction, as per Newton's Third Law of Motion, the ejection imparts to the gun as equal momentum in a backward direction.

22. Question: Ice wrapped in a blanket or saw dust does not melt quickly. Why?

Answer: Both wood and wool are bad conductors of heat. They do not permit heat rays to reach the ice easily.

23. Question: Why do we perspire on a hot day?

Answer: When the body temperature rises, the sweat glands are stimulated to secrete

perspiration. It is nature's way to keep the body cool. During the process of evaporation of sweat, body heat is taken away, thus giving a sense of coolness.

24. Question: Why does ice float on water but sink in alcohol?

Answer: Because ice is lighter than water it floats on it. However, ice is heavier than alcohol and therefore it sinks in alcohol.

25. Question: Why do we perspire before rains?

Answer: Before the rain falls, the atmosphere gets saturated with water vapors; as a result, the process of evaporation of sweat is delayed.

26. Question: Why does a thermometer kept in boiling water show no change in reading after 1000C?

Answer: The boiling point of water is 1000C. Once water starts boiling at this temperature, thermometer records no change in temperature. The quantity of heat supplied is being utilized as latent heat of evaporation to convert the water at boiling point into vapour.

27. Question: Why do we bring our hands close to the mouth while shouting across to someone far away?

Answer: By keeping hands close to mouth the sound is not allowed to spread (Phenomenon of diffraction of sound) in all direction, but is directed to a particular direction and becomes louder.

28. Question: Why does a corked bottle filled with water burst if left out on a frosty night?

Answer: Because of low temperature the water inside the bottle freezes. On freezing it expands, thereby its volume increases and pressure is exerted on the walls.

29. Question: Why is a small gap left at the joint between two rails?

Answer: To permit expansion of rails due to heat generated by friction of a moving train.

30. Question: Why cannot a copper wire be used to make elements in electric heater?

Answer: Copper melts at 108.30C and forms a black powder on reacting with atmospheric oxygen. For heater elements a metal should have more resistance to produce heat.

31. Question: Why are water or mercury droplets always round when dropped on a clean glass?

Answer: The surface of a liquid is the seat of a special force as a result of which molecules on the surface are bound together to form something like a stretched membrane. They tend to compress the molecules below to the smallest possible volume, which causes the drop to take a round shape as for a given mass the sphere has minimum volume.

32. Question: Why does a balloon filled with hydrogen rise in the air?

Answer: Weight of hydrogen is less than the weight of air displaced by it. In balloons hydrogen is normally filled because it is lighter than air.

33. Question: Why do we lean forward while climbing a hill?

Answer: In order to keep the vertical line passing through our centre of gravity always between our feet, which is essential to attain equilibrium or stability.

34. Question: Why does smoke curl up in the air?

Answer: Smoke contains hot gases which being lighter in weight, follows a curved path because of the eddy currents that are set up in the air.

35. Question: Why does an electric bulb explode when it is broken?

Answer: The bulb encompasses partial vacuum and as it breaks, air rushes in causing a small explosion.

36. Question: Why does a man fall forward when he jumps out of a running train or bus?

Answer: He is in motion while in the train or bus. When he jumps out, his feet comes to rest while touching the ground but his upper portion which is still in motion propels him forward.

37. Question: Why does an ordinary glass tumbler crack when very hot tea or milk is poured in it?

Answer: When a hot liquid is poured into a tumbler, the inner layer of the tumbler gets heated, it expands before the outer layer and an unequal expansion of both layers causes the tumbler to crack.

38. Question: Why is a compass used as an indicator of direction?

Answer: The magnetic needles of a compass under the influence of the earth's magnetic field lie in a north-south direction. Hence, we can identify direction.

39. Question: Why is water from a hand pump warm in winter and cold in summer?

Answer: In winter, the outside temperature is lower than that of water flowing out of the pump, and therefore, the water is warm. Whereas in summer, the outside temperature is higher than the water of the pump, and therefore, it feels cold.

41. Question: Why is a rainbow seen after a shower?

Answer: After a shower, the clouds containing water droplets act like a prism through which the white light is dispersed producing a spectrum.

42. Question: Why does a swimming pool appear less deep than it actually is?

Answer: The rays of light coming from the bottom of the pool pass from a denser medium (water) to a rarer medium (air) and are refracted (bend away from the normal). When the rays return to the surface, they form an image of the bottom of the pool at a point, which is little above the real position.

43. Question: Why is one's breath visible in winter but not in summer?

Answer: In winter, water vapor contained in the breath condenses into small droplets, which become visible but in summer they are quickly evaporated and not seen.

44. Question: Why doesn't the electric filament in an electric bulb burn up?

Answer: Firstly, because it is made of tungsten which has a very high melting point (3410°C) whereas the temperature of the filament required to glow is only 2700°C. Secondly, oxygen is absent since the bulb is filled with an inert gas which does not help in burning.

45. Question: Why does blotting paper absorb ink?

Answer: Blotting paper has fine pores, which act like capillaries. When a portion of blotting

paper is brought in contact with ink, ink enters the pores due to surface tension (capillary action of liquids) and is absorbed.

46. Question: Why does a small iron sink in water but a large ship float?

Answer: The weight of water displaced by an iron ball is less than its own weight, whereas water displaced by the immersed portion of a ship is equal to its weight (Archimedes' Principle).

47. Question: Why does ice float on water?

Answer: The weight of the ice block is equal to the weight of the liquid displaced by the immersed portion of the ice.

48. Question: Why does moisture gather outside a tumbler containing cold water?

Answer: The water vapour in the air condenses on cooling and appears as droplets of water.

49. Question: Why does kerosene float on water?

Answer: Because the density of kerosene is less than that of water. For the same reason cream rises in milk and floats at the top.

50. Question: Why is the water in an open pond cool even on a hot summer day?

Answer: As the water evaporates from the open surface of a pond, heat is taken away in the process, leaving the surface cool.

51. Question: Why is it less difficult to cook rice or potatoes at higher altitudes?

Answer: Atmospheric pressure at higher altitudes is low and boils water below 100°C. The boiling point of water is directly proportional to the pressure on its surface.

52. Question: Why is it difficult to breathe at higher altitudes?

Answer: Because of low air pressure at higher altitudes the quantity of air is less, and so that of oxygen.

53. Question: Why are winter nights and summer nights warmer during cloudy weather than when the sky is clear?

Answer: Clouds being bad conductors of heat do not permit radiation of heat from land to escape into the sky. As this heat remains in the atmosphere, the cloudy nights are warmer.

54. Question: Why is a metal tyre heated before it is fixed on wooden wheels?

Answer: On heating, the metal tyre expands by which its circumference also increases. This makes fixing the wheel easier and therefore cooling down shrinks it; thus fixing the tyre tightly.

55. Question: Why is it easier to swim in the sea than in a river?

Answer: The density of sea water is higher; hence the up thrust is more than that of river water.

56. Question: Who will possibly learn swimming faster—a fat person or a thin person?

Answer: The fat person displaces more water which will help him float much more freely compared to a thin person.

57. Question: Why is a flash of lightening seen before thunder?

Answer: Because light travels faster than sound, it reaches the earth before the sound of thunder.

58. Question: Why cannot a petrol fire be extinguished by water?

Answer: Water, which is heavier than petrol, slips down permitting the petrol to rise to the surface and continue to burn. Besides, the existing temperature is so high that the water poured on the fire evaporates even before it can extinguish the fire. The latter is true if a small quantity of water is poured.

59. Question: Why does water remain cold in an earthen pot?

Answer: There are pores in an earthen pot which allow water to percolate to the outer surface. Here evaporation of water takes place thereby producing a cooling effect.

60. Question: Why do we place a wet cloth on the forehead of a patient suffering from high temperature?

Answer: Because of body's temperature, water evaporating from the wet cloth produces a cooling effect and brings the temperature down.

61. Question: When a needle is placed on a small piece of blotting paper which is placed on the surface of clean water, the blotting paper sinks after a few minutes but the needle floats. However, in a soap solution the needle sinks. Why?

Answer: The surface tension of clean water being higher than that of a soap solution, it can

support the weight of a needle due to its surface tension. By addition of soap, the surface tension of water reduces, thereby resulting in the sinking of the needle.

62. Question: To prevent multiplication of mosquitoes, it is recommended to sprinkle oil in the ponds with stagnant water. Why?

Answer: Mosquitoes breed in stagnant water. The larvae of mosquitoes keep floating on the surface of water due to surface tension. However, when oil is sprinkled, the surface tension is lowered resulting in drowning and death of the larvae.

63. Question: Why does oil rise on a cloth tape of an oil lamp?

Answer: The pores in the cloth tape suck oil due to the capillary action of oil.

64. Question: Why are ventilators in a room always made near the roof?

Answer: The hot air being lighter in weight tends to rise above and escape from the ventilators at the top. This allows the cool air to come in the room to take its place.

65. Question: How does ink get filled in a fountain pen?

Answer: When the rubber tube of a fountain pen immersed in ink is pressed, the air inside the tube comes out and when the pressure is released the ink rushes in to fill the air space in the tube.

66. Question: Why are air coolers less effective during the rainy season?

Answer: During the rainy season, the atmosphere air is saturated with moisture. Therefore, the process of evaporation of water from the moist pads of the cooler slows down thereby not cooling the air blown out from the cooler.

67. Question: Why does grass gather more dew in nights than metallic objects such as stones?

Answer: Grass being a good radiator enables water vapour in the air to condense on it. Moreover, grass gives out water constantly (transpiration) which appears in the form of dew because the air near grass is saturated with water vapour and slows evaporation. Dew is formed on objects which are good radiations and bad conductors.

68. Question: If a lighted paper is introduced in a jar of carbon dioxide, its flame extinguishes. Why?

Answer: Because carbon dioxide does not help in burning. For burning, oxygen is required.

69. Question: Why does the mass of an iron increase on rusting?

Answer: Because rust is hydrated ferric oxide which adds to the mass of the iron rod. The process of rusting involves addition of hydrogen and oxygen elements to iron.

70. Question: Why does milk curdle?

Answer: Lactose (milk sugar) content of milk undergoes fermentation and changes into lactic acid which on reacting with milk protein (casein) form curd.

71. Question: Why does hard water not lather soap profusely?

Answer: Hard water contains sulphates and chlorides of magnesium and calcium which forms an insoluble compound with soap. Therefore, soap does not lather with hard water.

72. Question: Why is it dangerous to have charcoal fire burning in a closed room?

Answer: When charcoal burns it produces carbon monoxide which is suffocating and can cause death.

73. Question: Why is it dangerous to sleep under trees at night?

Answer: Plants respire at night and give out carbon dioxide which reduces the oxygen content of air required for breathing.

74. Question: Why does ENO's salt effervesce on addition of water?

Answer: It contains tartaric acid and sodium bicarbonate. On adding water, carbon dioxide is produced which when released into water causes effervescence.

75. Question: Why does milk turn sour?

Answer: The microbes react with milk and grow. They turn lactose into lactic acid which is sour in taste.

76. Question: Why is a new quilt warmer than an old one?

Answer: In a new quilt the cotton is not compressed and as such it encloses more air which is bad conductor of heat. Therefore, it does not allow heat to pass.

77. Question: Curved rail tracks or curved roads are banked or raised on one side. Why?

Answer: Because a fast moving train or vehicle leans inwards while taking turn and the banked or raised track provides required centripetal force to enable it to move round the curve.

78. Question: How do bats fly in dark?

Answer: When bats fly they produce ultrasonic sound waves which are reflected back to them from the obstacles in their way and hence they can fly without difficulty.

79. Question: Water pipes often burst at hill stations on cold frosty nights. Why?

Answer: The temperature may fall below 0°C during cold frosty nights which converts the water inside the pipes into ice, resulting in an increase in volume. This exerts great force on the pipes and as a result, they burst.

80. Question: Why are white clothes more comfortable in summer than dark or black ones?

Answer: White clothes are good reflectors and bad absorbers of heat, whereas dark or black clothes are good absorbers of heat. Therefore, white clothes are more comfortable because they do not absorb heat from the sun rays.

81. Question: Why does a rose appear red grass green in daylight?

Answer: Rose absorbs all the constituent colors of white light except red which is reflected to us. Similarly, grass absorbs all colors except green which is reflected to us.

82. Question: Why does a ship rise as it enters the sea from a river?

Answer: The density of sea water is high due to impurities and salts compared to river water as a result; the upthrust produced by the sea water on the ship is more than that of river water.

83. Question: Why are fuse provided in electric installations?

Answer: A safety fuse is made of a wire of metal having a very low melting point. When excess

current flows in, the wire gets heated, melts and breaks the circuit. By breaking the circuit it saves electric equipment or installations from damage by excessive flow of current.

84. Question: Why is it easier to lift a heavy object under water than in air?

Answer: Because when a body is immersed in water, it experiences an upward thrust (Archimedes' Principle) and loses weight equal to the weight of the water displaced by its immersed portion, and hence, is easier to lift objects.

85. Question: If a highly pumped up bicycle tyre is left in the hot sunlight, it bursts. Why?

Answer: The air inside the tube increases in volume when heated up. As sufficient space for the expansion of the air is not available because the tube is already highly pumped, it may result in bursting of the tyre.

86. Question: What will be the color of green in blue light?

Answer: Grass will appear dark in color because it absorbs all other colors of the light except its own green color. The blue light falling on grass will be absorbed by it, and hence, it will appear dark in color.

87. Question: Why do two eyes give better vision than one?

Answer: Because two eyes do not form exactly similar images and the fusion of these two dissimilar images in the brain gives three dimensions of the stereoscopic vision.