SCIENTIFIC REASONS

Q1. An object immersed in water appears lighter. Why?

When an object is immersed in water it experiences an up thrust exerted by water in upward direction. Hence, it appears light in weight.

Q2. Why does a ship made up of iron floats on water?

The ship is made in such a way that it is hollow from within. Therefore, only a fraction of volume of ship can displace water equal to its own weight. Thus, a fairly large fraction of ship stays above the level of water.

Q3. An ink pad absorbs ink. Why?

An ink pad works on the principle of capillary action. Ink pad is porous therefore when wet ink is put on it, the ink rises in its fine pores and gets absorbed by capillary action.

Q.4 A ship can be loaded more on sea in comparison to than on river. why?

The density of river water is less than that of sea water therefore ship has to displace more volume of water so as to support its own weight. The sea water, however, provides greater up thrust than river water due to which it can be loaded more.

Q5. It is easier to carry two buckets in either hands as compared to one heavy bucket. why?

It is easier to carry two buckets in either hands as compared to one heavy bucket. It is because in the latter case Centre of Gravity shifts towards the bucket and there is a tendency that the line joining center of gravity (C.G.) and center of equilibrium (C.E.) may fall outside our feet. However, in the former case the C.G. not only gets lowered, but also it is at such a point that line joining C.G. and C.E. falls within our feet. Hence one is in stable equilibrium.

Q6. An ice cube floats on water. Why?

The density of an ice cube is lower than that of water and it has a large volume. Therefore, the ice cube displaces the volume of water equal to its own weight and hence it floats.

Q7. Ongoing to high altitudes there is a danger of bursting of blood capillaries. Why?

The atmospheric pressure decreases to a great extent on moving at high altitudes. The internal pressure of the blood capillaries is greater than the external atmospheric pressure. Therefore, there is danger of bursting of capillaries.

Q8. While climbing up the hill a person has to bend in forward direction. Why?

While climbing up the hill a person bends forward to maintain its equilibrium. Because in doing so he lowers as well as shifts his C.G. in forward direction, such that the line joining C.G. and C.E. falls within his feet, thereby maintaining his equilibrium.

Q9. It is easier to lift an object in water than in air. Why?

According to Archimedes principle, when an object is immersed in water it experiences a fall in its weight. This fall in its weight is equal to the weight of the water displaced by it. Hence, it is easier to lift an object in water than in air.

Q10. It is advised to empty a pen's ink before moving on a plane. Why? Why does a fountain pen leak on higher altitudes?

On higher altitudes a fountain pen starts leaking because air inside the pen is at higher pressure than air outside as the atmospheric pressure decreases considerably on higher altitudes.

Q11. On jumping from a moving train the person is advised to run in the direction of motion of train for some distance. Why?

When a person jumps from a moving train the velocity of his body is same as that of the train. As his feet come in contact with the ground, his feet come at rest but because of inertia of motion the upper part of his body remains moving ahead and he may fall. To avoid it, he is advised to run ahead for some distance so that his feet may also remain in motion along with his body.

Q12. Water pipes burst in winters. Why?

The temperature of water falls in winters due to which the water inside the pipe freezes and its volume increases. The ice tends to occupy the space equal to its volume. Therefore, water pipe bursts.

Q13. Why are raindrops spherical?

The free surface of a liquid tends to occupy minimum surface area. The surface area of water decreases due to surface tension. The surface area of a sphere is minimum. Therefore, raindrops are spherical in shape.

Q14. A train stops on pulling the chain. Why?

When the chain is pulled the rod comes out of vacuum chamber and air fills its space. Due to which the brakes are applied on the wheels and the train stops.

Q15. While taking a turn on a circular path, the cyclist leans towards the center of the path. Why?

If a cyclist takes a turn on the road he moves on the circular path. For moving on this path, he requires a centripetal force. Leaning towards the center of the circular path provides him this necessary centripetal force.

Q16. Why is mercury filled in a barometer and not water?

Since the relative density of mercury is 13.6 times greater than that of water, only 76 cm height of mercury column is needed to balance the normal atmospheric pressure. On the other hand, with water the length of the column needed will be nearly 10 m which is inconveniently large. Apart from it, the surface of mercury is shining and opaque and thus it is easily seen while taking the observations.

Q17. Presence of the atmosphere increases the length of the day. Why?

Due to the refraction of sunlight while passing through the layers of atmosphere, the sun can be seen even when it is below the horizon at sunrise. Similarly, at sunset also sun can be seen when below the horizon. Therefore, length of the day increases by about 8 minutes.

Q18. Water remains cool in an earthen pot. Why?

An earthen pot is porous consisting of small pores through which water comes out on the surface of the pot. This increases the surface area of water and it starts vaporizing. The latent heat for vaporization is taken from the water contained inside the pot. Therefore, the water inside the earthen pot becomes cool.

Q19. We can see our breath in winters and not in summers. Why?

In winters the temperature of the atmosphere is quite lower than our body temperature. Therefore, when we breathe out our breath liquefies because the temperature of the atmosphere is quite low and it appears as smoke. But in summers, the atmospheric temperature is greater than the body temperature, therefore, it does not get liquefied and it cannot be seen.

Q20. Ice covered by saw dust does not melt quickly. Why?

Ice covered with saw dust does not melt quickly because saw dust contains large amount of trapped air, which acts as insulator and does not allow the heat from outside to reach ice.

Q21. There is space between the two railway lines. Why?

Rails are made of steel, which expands on heating and contracts on cooling. If the rails are fixed tightly, leaving no space for expansion or contraction, they will bend and hence, a train will get derailed. However, if the various segments of rails are joined together, leaving small spaces in between them, the space will get closer in summer and wider in winter, but the rail will not bend.

Q22. Water boils at lower temperature at mountains. Why?

The atmospheric pressure decreases on mountains, therefore, the boiling point of water decreases. That is why, it boils at a lower temperature.

Q23. Food cooks quickly in a pressure cooker. Why?

Pressure inside the pressure cooker is quite high, therefore, the boiling point of water increases and food gains more heat. Hence, it gets cooked quickly.

Q24. Wet clothes get dried in summers sooner than in rainy season. Why?

Atmosphere is more humid in rainy season than in summers. Therefore, the rate of evaporation of water from the clothes decreases. However, water evaporates quickly in summers and clothes are dried soon.

Q25. Woolen clothes are warmer than cotton clothes. Why?

Woolen clothes are warmer than cotton clothes, because woolen yarn contains large amount of trapped air. Since, air is a bad conductor of heat, therefore, it does not allow the body heat to flow out. As our body stops losing heat, therefore, we feel warm.

Q26. Why do birds puff-up their feathers in winter?

Birds puff-up their feathers in winter, because in doing so they trap large amount of air, which in turn acts as an insulator and does not allow their body heat to flow-out.

Q27. Water remains hot in a thermos flask. Why?

Thermos flask keeps the temperature of a liquid constant for about 24 hours. It is made in such a way that it prevents the loss of heat by conduction, convection or radiation. Thus, water remains hot in a thermos flask for a long time.

Q28. Handles of the cooking pans are wooden or plastic. Why?

Cooking pans are provided with wooden or plastic handles because they are bad conductors of heat. Hence, the heat from hot appliances does not flow in our hands and we can hold them without any difficulty.

Q29. It is difficult to cook rice on mountains than in plains. Why?

The atmospheric pressure on mountains is lesser than in plains. The boiling point of water decreases due to the lowering of atmospheric pressure on mountains, therefore, water begins to boil at lower temperature. Hence the heat required for cooking rice is not obtained and it takes longer to get cooked.

Q30. Cloudy nights are warmer than the clear nights. Why?

Earth loses the heat from its surface by radiation. But in cloudy nights the clouds reflect this radiant heat and it comes back to earth. Hence, it becomes warm at cloudy nights. However, in clear nights the radiant heat of earth is lost in space and nights are less warm.

Q31. A fire caused due to the petrol does not extinguish by water. Why?

Petrol is lighter than water. When water is thrown on the petrol fire, it is unable to cover the petrol and quickly gets evaporated. Due to which, it is unable to extinguish the fire.

Q32. Why are two thin woolen blankets warmer than a thick woolen blanket?

Two thin woolen blankets are warmer than a thick woolen blanket, because there is an extra layer of air trapped between thin blankets, which acts as an insulator and does not allow the body heat to flow out.

Q33. We wear light colored clothes in summers, but dark colored clothes in winters. Why?

Light colored clothes are good reflectors and dark colored clothes are good absorbers of heat. Therefore, we feel more comfortable by wearing light shade clothes in summer and dark colored clothes in winter.

Q34. Why is water cooled, when ice is immersed in it?

When ice is immersed in water it starts melting. It takes latent heat from water for melting and the temperature of the water decreases. Therefore, water is cooled.

Q35. Why is a radiator used in motor cars?

The engine of a motor car gets heated due to constant usage, hence, its temperature increases. Radiator is required to regulate the temperature of the engine, which radiates heat outside.

Q36. Fire from a burning object gets extinguished, when sand is thrown on it. Why?

When sand is thrown on a burning object, it covers the object completely and hence, it does not get the oxygen necessary for burning. Therefore, the fire gets extinguished.

Q37. Water extinguishes the fire. Why?

When water is thrown on fire, it converts into vapor, which surrounds the fire all around. Thus, cutting-off the supply of oxygen from the atmosphere, necessary for combustion, Therefore, the fire extinguishers.

Q38. Food in the refrigerator remains fresh. Why?

The temperature inside the refrigerator is very low, which slows down the fermentation of substances inside it. Therefore, the food kept in it remains fresh.

Q39. Water in an earthen pot becomes cool in summer but not in rainy season. Why?

In summers, the atmospheric temperature being high, the air is dry. Due to which the rate of evaporation of water from the surface of the pot is fast and hence, water becomes cool. But, in rains the air is humid, due to which the water from the surface of pot evaporates at a slower rate and water does not become that cool.

Q40. When a liquid is heated from bottom, it becomes hot, but on heating at the surface, it does not. Why?

When liquid is heated from bottom convection currents take place, which heat the whole liquid. But, when a liquid is heated at the surface the liquid at the surface gets heated and not the entire liquid in the vessel. This is because convection currents do not take place on heating at the surface.

Q41. Why do diamonds sparkle?

Diamond has a very low critical angle and it is cut in such a way that the angle of incidence of the light ray entering the diamond is greater than the critical angle. Therefore, light undergoes total internal reflection due to which the diamond sparkles.

Q42. Why does the sky appear blue?

Scattering of light is inversely proportional to the fourth power of its wavelength. Since, the wavelength of blue color is the least therefore the scattering of the blue color is maximum. Hence, the sky appears to be blue in color.

Q43. Why do stars twinkle?

The different layers in the atmosphere are of varying densities. Hence, the light coming from stars has to travel through these layers. It, therefore, undergoes refraction while entering from one layer into another. The intensity of light also varies and the atmospheric layers also move randomly. Therefore, star twinkle.

Q44. A red color surface appears red in daylight but appears black at night in the light of a mercury lamp. Why?

When white light falls on a red surface then it absorbs all the colors except red and the red color is reflected back. Therefore, the surface appears red. But, when the light from a mercury lamp (not containing red color) falls on a red surface, the surface absorbs all the colors as this light does not contain red color. Therefore, the surface appears black at night.

Q45. When oil is put on the water surface, a beautiful colored view is seen. Why?

When oil is put on the water surface, it spreads on the surface, when light falls on it then rays of different wavelengths are reflected and a beautiful colored view may be observed by their interference.

Q46. A Rainbow is seen in west in the morning and in east in the evening. Why?

A rainbow, a 7-colored curve seen in sky, VIBGYOR - Violet, Indigo, Blue, Green, Yellow, Orange and Red, is formed when raindrops are opposite to sun. In the morning the sun is in the east, therefore a rainbow is seen in the west. Similarly, the sun is in the west in evening, therefore, rainbow is seen in the east.

Q47. Why is a traffic signal red?

The red color is least scattered; therefore, it may be seen from long distance. Hence, a traffic signal is red in color.

Q48. What is mirage and what is the cause of its formation?

Mirages in deserts occur due to total internal reflection of light. In deserts, one sees images of trees around noon. Since in nature, images of trees, etc. are formed only in water, therefore one can be tricked to believe that tree is situated near some water. However, on reaching the tree, it is found that water has vanished. This phenomenon is called mirage.

Q49. Glass is transparent but its mixture is opaque. Why?

Light gets refracted through a glass hence it is transparent, but its mixture does not undergo refraction of light. Therefore, it is opaque.

Q50. Grass appears green in sunlight but black in red light. Why?

When sunlight falls on the grass, it reflects only green color absorbing all the other colors of light. Therefore, it appears green. But it absorbs red color when seen in red light and does not reflect any color. Therefore, it appears black.

Q51. Why does it not become completely dark after sunset?

Due to the refraction from the atmosphere the apparent position of the sun is higher than its actual position. That is why even when sun is below the horizon, its rays manage to reach earth due to refraction. Thus, in a way giving rise to dusk.

Q51. Shadow of the birds flying in the sky cannot be seen on earth. Why?

When a light source is larger in size than the object, the image of an object may only be seen up to a fixed distance. That is why shadow of the birds flying in the sky does not form on earth as sun (light source) is very large in size as compared to birds and earth, which acts as a screen, is too far.

Q52. Sound of a lightning is heard after it is seen. Why?

The speed of light is quite larger than the speed of sound in air. Therefore, sound takes more time than light to travel through the same distance. Hence, sound of a lightning is heard after it is seen.

Q53. Sound of frogs can be heard from long distances in a rainy season. Why?

In rainy season the air is humid due to which the density of air decreases and the speed of sound in air increases. Therefore, sound of frogs can be heard from long distances in rainy reasons.

Q54. Bats can fly at night in dark without colliding with the obstacle. Why?

Bats produce supersonic waves which strike against the object in their path and send back echoes to the bat's ear. The echoes tell the bat how they must turn in air to avoid colliding with objects or with one another. By using their ears, the bats can fly skillfully at night in the dark.

Q55. When a bullet is fired from a gun standing on the moon's surface its sound is not heard even at a small distance. Why?

Sound requires a medium to travel. But, since there is no atmosphere at the moon therefore sound cannot travel. Hence, when a bullet is fired from a gun its sound is not heard even at a small distance.

Q56. An electric bulb makes sound on bursting. Why?

There is vacuum inside an electric bulb. Therefore, air quickly enters in to fill the space when the bulb bursts, thereby producing sound.

Q57. What are shock waves?

When a jet plane or a rocket moves at a supersonic speed (greater than the speed of sound), special type of waves are produced. These waves are called shock waves. These waves have so much power that high buildings may fall due to their collision.

Q58. Pendulum clocks go fast in winters but slowdown in summers. Why?

The length of the pendulum decreases in winters because the temperature goes down, due to which its time period decreases and the clock goes fast. In summers, the length of the pendulum increases because of the increase in temperature. Therefore, its time period increases and the clock goes slow.

Q59. Sound is heard more easily in water than in air. Why?

The speed of sound in water is greater than that in air. Thus, sound is heard more easily in water than in air.

Q60. It is dangerous to touch an electric wire, through which current is flowing on being barefooted?

It is dangerous to touch an electric wire through which current is flowing when one is barefooted because our body is a good conductor of electricity therefore current begins to flow through our body and the ground completes the circuit. Thus, a potential difference is created in our body and we get a shock.

Q61. Why is silver the best electrical conductor?

Silver is the best electrical conductor because it contains a large number of free electrons. The extent of conductivity of an electric conductor depends upon the number of free electrons present in it. Therefore, it is better conductor than all the other metals.

Q62. What is the function of a fuse in an electric circuit?

Fuse prevents the electrical appliances connected in the circuit from damaging, because fuse is made up of a wire with low melting point. Therefore, when a current of high potential flows through the circuit. The fuse wire breaks due to melting and hence the circuit breaks thereby preventing the electrical appliances from getting damaged.

Q63. Vacuum is created inside an electric bulb. Why?

Vacuum is created inside an electric bulb so that its filament remains protected. If there was air inside the bulb, the filament will burn on coming in contact with the oxygen in air.

Q64. Why are lightning conductors fitted on top of high buildings?

When charged clouds float over the top of a building, the layer of charge on the underside of the cloud induces a positive charge on the top surface of the building below it. Since this induced charge is of very high order, the building on which, it falls is completely destroyed. The building can be saved from destruction by using lightning conductors.

One end of lightning conductor is pointed and the other is connected to earth the charge flows from pointed end into the earth and the building is saved from destruction.

Q65. Why does an electric bulb glow when it is switched on?

Electric bulb contains a tungsten filament and an inert gas is filled inside the bulb. Tungsten has a high melting point. When the bulb is switched on tungsten gets heated to high temperatures and therefore, it glows giving off light.

Q66. Why does the temperature of liquid fall on vaporization?

The kinetic energy of the molecules on the upper surface of a liquid is high and therefore, they convert into vapor leaving the liquid surface. The average kinetic energy of the rest of the liquid molecules decreases resulting into the fall in the temperature of the liquid.

Q67. Why does the temperature of a solid not increase on heating at its melting point?

A solid substance converts into a liquid on heating at its melting point. The energy given at that instant is used in moving away its molecules against their cohesive force and there is no net increase in the kinetic energy of the molecules. Therefore, the temperature of the solid substance remains constant at its melting point.

Q68. Why are electrons, protons and neutrons the elementary particles of a substance?
Electrons, protons and neutrons are the smallest particles of a substance. It is not possible to divide a substance into more smaller particles than these. Therefore, electrons, protons and neutrons are the elementary particles of a substance.

Q69. Why is an atom neutral?
The total negative charge of the electrons situated in their respective shells is equal to the total positive charge of the protons in the nucleus. Therefore, atom is neutral.

Q70. Why does an alpha particle experience repulsion by an atomic nucleus?
Alpha particles arc positively charged and the nucleus of an atom is also positively charged due to the presence of protons. Therefore, an alpha particle experiences a repulsive force by the nucleus.

Q71. Why does ice convert directly into steam on heating at moon?
The boiling point of water is 0□ at 0.46 cm pressure of mercury. The atmospheric pressure on moon is even less than 0.1 cm of mercury column. At such a low pressure the boiling point of water is even less than 0□. Therefore, on heating ice at moon it directly converts into steam.

Q72. Why do sun, stars and aeroplanes appear higher than their actual positions?
Atmosphere consists a number of parallel layers of air of varying densities, such that most dense layer is near the surface of earth and least dense layer is the topmost layer. Their refractive indices decrease as we move up from the earth's surface. When the rays of light coming from the sun, stars or aeroplane pass through atmosphere of varying density, they bend towards normal. That is why, the sun, stars and aeroplanes appear higher than their actual positions.

Q73. Why is the water in a well cold in summers and warm in winters?
Earth is a bad conductor of heat. That is why the heat from the atmosphere is unable to pass through the earth and heat the water in the well keeping it cool. Similarly, in winters the heat from the well is unable to escape out from the earth, keeping the water in the well warm.

Q74. On turning the knob of a radio, we hear the programs on various stations. Why?
The waves of different frequencies are transmitted by different radio stations. Radio contains an L-C circuit which undergoes electrical vibrations. On turning its knob, the capacitance of the capacitors changes (an electrical instrument connected inside the radio set) due to which the normal frequency of the electric circuit changes. When this frequency matches with the frequency of the waves transmitted by a radio station, the L-C circuit receives those waves and the programs on the radio station is heard.

Q75. Why do rocks on the mountains crack in winters?
The water seeps through the pores and fissures in the rocks. In winters this water freezes and its volume increases. Due to which the internal pressure increases considerably and the rocks crack.

Q76. Why are the walls of a dam thick at the bottom and thin at the top?

The pressure of water increases with depth. Therefore, there is a high pressure of water on the walls of the dam at the bottom. That is why the walls of the dam are thickest at the bottom and their width gradually decreases towards the top.

Q77. Water converts into steam on heating. Why?

The inter-molecular space between the molecules of a liquid is larger than solids and lesser than gases. Therefore, the force of attraction between the liquid molecules is lesser than the molecules of a solid. The water molecules are therefore free to move within the container. When water is heated to its boiling point the inter-molecular force between its molecules becomes negligible. The kinetic energy of its molecule increases to such an extent that they begin to move randomly with increased velocity in all directions and finally leave the water surface, converting into vapor.

Q78. Why does camphor dance on water?

Camphor is soluble in water but irregular in size. A part of camphor gets dissolved in water more than the other part. When camphor dissolves in water the surface tension of water decreases. The surface tension of water remains more where it does not dissolve. As a result, the surface tension of water on one side of camphor piece is less as compared to that on other side, hence a resultant force (from the direction of low surface tension to high surface tension) acts on the camphor piece and it moves towards the direction of the resultant force.

Again, the same process continues at the place where it reaches and hence, it appears to dance on the water surface.

Q79. Before taking off, why does an aeroplane run some distance of runaway?

By doing so, the velocity of air in its contact increases and by virtue of its streamlined shape, the velocity of air layer above it becomes more than that of air below it. By Bernoulli's principle, the pressure of air above it becomes less than that below it. Because of this pressure difference an upward lift acts on the aeroplane which makes it go up.

Q80. When we rub our palms, the temperature rises to a certain extent only. Why?

On rubbing our palms, the work is converted into heat, due to which the temperature rises. After a certain temperature the further heat produced is dissipated to the surroundings and so the temperature does not rise further.

Q81. While laying railway tracks at the turn, the outer track is kept slightly raised than the inner track. Why? Why is a road given slight slope inwards at the turn?

While laying railway tracks at the turn, the outer track is slightly raised than the inner track since centripetal force is required for moving on a circular path therefore by doing so, while taking the turn, the train or car leans inwards by itself and the centripetal force required for circular motion is obtained from the normal reaction of the track.

Q82. A closed room cannot be cooled by operating an electric fan inside it. Why?

A closed room cannot be cooled by operating an electric fan inside it instead, the room will get heated. Because when the fan is operated, the molecules of air present inside the room begin to move rapidly (i.e.

their average kinetic energy increases) and they begin to collide more frequently. As a result, their internal energy increases.

Q83. It rains more in places near forests in comparison to those that are far. Why?

There is humidity in the atmosphere near forests due to transpiration by plants. This water vapor rises up to form clouds which cause rain. Therefore, the places near forests experience more rainfall than other places.

Q84. Why does a human being not feel atmospheric pressure?

The average area of a human body is 16 square feet and the atmospheric pressure is about 15 tones. But we do not feel the presence of such a heavy weight. This is because the air that we inhale is filled in lungs and the lungs send this air to blood vessels at atmospheric pressure. The oxygen from air is used for purification of blood. Therefore, the same internal pressure is exerted from within the body which balances the external atmospheric pressure and we do not feel this atmospheric pressure, exerted on us externally.

Q85. When a liquid is left after stirring it comes to rest. why?

When liquid in a vessel is left after stirring it comes to rest after some time. If the liquid is not viscous it does not come to rest after being stirred. Thick liquids are more viscous (like coal tar, glycerin, honey) therefore thick fluids come to rest sooner than thinner fluids. If we drop coal tar on a table, it will soon come to rest. On the other hand, if we drop water on a table it will flow to a longer distance.

Q86. Sometimes we are able to hear the programs from a far radio station but not from a nearby radio station. Why?

The radio waves transmitted from a radio station either reach the radio station after getting refracted from the ionosphere or directly. Due to the interference between these two waves the resultant waves are of high intensity at some points and weak at other points. That is why, we are able to hear the far radio stations and not the nearby radio stations.

Q87. Why is oil sprayed on sea waves to calm them?

This is because on spraying oil, the breeze spreads the oil on the sea water in its own direction. The surface tension of sea water without oil is greater than that of oily water. Hence, the water without oil pulls the oily water against the direction of breeze and the sea waves become calm.

Q88. Why rolling friction is less than sliding friction?

Force of friction depends upon the contact surface. When a body roll over the surface the contact surface is much less than the sliding, therefore rolling friction is less than sliding friction.

Q89. Why a body become weight less in space?

Weight is the force which earth attracts a body towards it center. As the body taken away from the earth its weight decreases because the gravitational pull of the earth also decreases. In space there is no gravitational force, therefore a body becomes weightless in space.

Q90. Why it dangerous to jump from a fast-moving vehicle?

Our body is in motion along with the moving the moving vehicle. If we jump from the moving vehicle our body tends to move forward because of inertia but the lower part of the body is in contact with earth at rest, hence we may fall. Therefore, it dangerous to jump from a fast-moving vehicle.

Q91. Why do we not hear explosive sounds produced in the sun?

There is vast vacuum between the sun and the earth. Sound waves are mechanical waves and cannot travel through a vacuum. Hence explosive sound produced in the sun cannot be heard on the earth.

Q92. Why the passengers fall in forward direction when a moving bus suddenly stops.

If the moving bus suddenly stops the lower part of a body in contact with the bus comes to rest but upper part of the body continues its motion with bus because of inertia. Therefore, the passengers fall in forward direction when a moving bus suddenly stops

Q93. When a gun is fired its sound is heard a little after seeing its flash. Why?

When a gun is fired. Its sound is heard a little after seeing its flash. The reason is that light travels much faster than sound. Due to its slow velocity sound lags behind and so, it is heard a little after seeing the flash.

Q94. The weight of a body at the poles of the earth is greater than that at the equator. Why?

Weight of the body depends upon the value of **g** at that place. Value of **g** depends on the distance of that place from the center of the earth. **g** decreases as the distance from the center of earth increases. Radius of the earth at poles is less than its radius at equator. Therefore, at poles value of **g** is greater than **g** at equator. Since at poles of earth the weight of the body is greater than at the equator.

Q95. Small gaps are left between two adjacent pieces of rails.

Materials expand on heating. Rails also expand as the temperature rises in summer days. To accommodate this expansion the gap between two pieces of rail is left. In the absence of this provision, railway tracks will buckle and get destroyed.

Q96. A boy thrown upward always fall to the ground.

According to Newton's law of gravitation everybody in the universe attracts every other body. Earth also attracts everything towards its center. When a body is thrown upward then because of gravitational force of earth it always falls to the ground.

Q97. How is heavy body balanced by a lighter body on a sea saw?

Heavy body is balanced by the lighter body on sea saw by satisfying second condition of equilibrium. For the lighter body the moment arm will be longer whereas for heavy body the moment arm is smaller. In balanced condition, the torque due to each body will be equal and opposite in direction.

Q98. It is not possible to measure the alternating current with the help of moving coil galvanometer.

A moving coil galvanometer is used to measure the magnitude and direction of current. Alternating current changes its direction many times a second if it is passed through a moving coil galvanometer, the needle

will simply vibrate about the mean position because of magnetic effect. It is therefore not possible to measure alternating current with a moving coil galvanometer.

Q99. Why does a nail sink but a ship having a huge mass floats on water?

Nail is a solid body because it does not contain air whereas a ship is a large hollow body because it contains air. Density of nail is more than density of water. Anything whose density is more than that of water will sink into it. While the density of a ship is less than that of water. Hence nail sinks but a ships floats on water.

Q100. Why is lightening seen earlier than the sound of thunder?

Speed of light is much higher than speed of sound. Light travels faster than sound. Hence lighting on a rainy day is seen earlier than the sound of thunder.

Q101.How do fish and other aquatic animals survive in extremely cold water in rivers, lakes and seas?

When atmospheric temperature falls, the cooler and denser water (4^0C) flows to bottom because the density of water at 4^0C is maximum. If the temperature further falls below 4^0C then the water at the surface expands (Anomalous expansion) and become lighter and does not sink. The ice continuous to build up at the surface, because it is less dens than water, while water near the bottoms remains at 4^0C. This helps fish and other aquatic animals to survive in extreme cold water.

Q102.The value of g at the poles is greater than at the equator.

The distance of poles from the center of the earth is less than the distance of equator from the center of the earth. hence the value of g at the poles is greater than at the equator.

Q103.Why is a concave lens of suitable focal length used to remove short sightedness of the eye?

In short sightedness a person can see near objects clearly but distance objects are not seen clearly. The reason for this defect is either the focal length of the eye lens is too short or the eye ball is too elongated. Image in short sightedness is formed in front of retina. This defect can be remove by wearing spectacles (or contact lens) with concave lens of suitable focal length. These lenses can be focus the image clearly on the retina.

Q104.Sharp knife cuts things easily but blunt knife cuts with difficult. Give the reason.

In case of sharp knife, the area of contact is smaller so the pressure is greater. In case of blunt knife, the area of contact is greater so the pressure is smaller so we cut things easily with sharp knife and it is difficult to cut with blunt knife.

Q105.Why steel is more elastic than rubber?

When we bring a change in rubber, we require less force than steel. Steel has more resistance than rubber against applied force. Therefore, steel is more elastic than rubber.

Q106.Saline water exerts more pressure than pure water why?

Due to salinity water the density of the saline water is more than the pure water and hence it exerts more pressure.

Q107. Why Body floats on the surface of the liquid?

Body floats on the surface of the liquid when the weight of the body is balanced by the up-thrust force.

Q108.Why submarine submerges into water?

There are large hollow tanks fitted in the submarine. These tanks are filled with water increasing the weight of the submarine. Due to increase in the weight of submarine it submerges into water.

Q109.Why steam produces more serve burns than boiling water.

Steam absorbs more amount of heat energy than that of boiling water although both are at same temperature. Its latent heat of vaporization is 2.26×10^6 J/Kg more than that of boiling water hence it produces severe burns that boiling water.

Q110.When a carpet is jerked, the dust is removed, why?

When a carpet is jerked, the dust moves in the air. After some time, the carpet comes to its original position while dust particle remains in air due to inertia hence it is removed from the carpet.