Physics (New Book) - 9th Class Physics Chapter 8 Long Question Preparation

Q1. Define specific heat capacity. Give the importance of large heat capacity of water

Ans 1:
Specific heat capacity: specific heat capacity of a substance is defined as the amount of heat required to raise the temperature of 1kg mass of the substance through 1K.
Unit: the SI unit of specific heat capacity is $JKg^{-1}K^{-1}$
Examples: specific heat capacity of water , ice and soil are 4200 $Jkg^{-1}K^{-1}$, 2100$Jkg^{-1}k^{-1}$ and 810$JKg^{-1}K^{-1}$ respectively

Ans 2: Importance of large heat capacity of water: specific heat capacity of water is large than dry soil. As a result , the temperature of soil would increase five times more than the same mas of water by the same amount of heat. Thus the temperature of land rises and falls more rapidly than that of sea. hence the temperature variations from summer to winter are much smaller at places near the sea than land for away from sea.
Water has a large specific heat capacity . For this reason, it is very useful in storing and caring thermal energy ue ti its high specific heat capacity. The cooling system of automobiles uses water to carry away unwanted thermal energy. In an automobile, large amount of heat is produced by its engine due to which its temperature goes on increasing. The engine would cease unless it is note cooled down. Water circulating around the engine maintains its temperature. Water absorbs unwanted thermal energy of the engine and dissipates heat through its radiator. in central heating system hot water is used to carry thermal energy through pipes from boiler to radiators. These radiators are fixed inside the house at suitable places.

Q2. Q no: 7(A) What causes a glider to remain air.?

Ans 1: A glider such looks like a small airoplanewithout engine. Glider pilots use of heat .These rising currents of hot air are called theimals, Gliders ride over these thermals, the upward movement of air currents in thermal helps them to stay in air for a long period. The birds stretch out their wings and circle in these thermals, the upwordmovement of air help, birds toclimb up with it. Eagle hawks and vulture are expert thermal climber

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Q3. Write a note on linear thermal expansion in solids

Ans 1: Thermal expansion; when heat is provided to any substances, the expansion of substances is known as thermal expansion. Most of the substances solids, liquids and gases expand on heating and contract on cooling. Their thermal expansions and contractions are usually small and are not noticeable.
The kinetic energy of the molecule of an object depends on its temperature. The molecules of a solid vibrate with larger amplitude at high temperature than at low temperature.
Thus, on heating, the amplitude of vibration increase.
Thermal expansion results an increase in length, breadth and thickness of a substance.

Ans 2: Linear thermal expansion of solids: the expansion of solid along in one direction is called linear thermal expansion of solid. It has been observed that solids expand on heating and their expansions is nearly uniform over a wide range of temperature .
Unit; the unit of coefficient of thermal expansion is K^{-1}

Q4. Write a note on volume thermal expansion of solids

Ans 1: Volume thermal expansion; the volume of a solid also changes with the change in temperature and is called volume thermal expansion or cubical thermal expansion

Ans 2: Explanation: consider a solid of initial volume V_o at certain temperature T_o. On heating the solid to a temperature T, let its volume becomes V, then
change in the volume of solid=$V-V_o$
change in temperature= $T-T_o$

Q5. Define and explain heat capacity

Ans 1: Heat capacity: heat capacity of a body is the quantity of thermal energy absorbed by it for one kelvin(1K) increase in its temperature.

Ans 2: Explanation; heat capacity of a body is equal to the product of its mass of the body and its specific heat capacity. For example, heat capacity of 5kg of water is ($5kg*4200JKg^{-1}$) $21000JK^{-1}$. That is 5kg of water needs 21000J of heat for every 1K rise in its temperature. thus, larger is the quantity of substances, larger will be its heat capacity.
The presence of large water reservoirs such as lakes and seas keep the climates of nearby land moderate due to the large heat capacity of these reservoirs.

Q6. Q no: 6(A) Explain land and Sea breeze are example of convection.?

Ans 1: Land and Sea Breezes:
Land and Sea breezes are the result of convection.
Sea Breeze:
On a hot day the temperature of the land increase more quickly than the sea. itis because the specific heat of land is much smaller as compared to water. The air above land gets hot and rise up.
Land Breeze.
At night the land codsfasterthan the sea, therforeair above the sea is warmer, rise up and the cold air form the land begins to move towards the sea.

Q7. Define latent heat of fusion and explain it

Ans 1: Latent heat of fusion: heat energy required to change unit mass of a substance from solid to liquid state at its melting point without change in its temperature is called its latent heat of fusion. It is denoted by Hf.
Ice changes at 0C into water. latent heat of fusion of ice is 3.36*105JKg-1. That is 3.36*105 joule heat is required to melt 1 kg of ice into water at 0C.

Ans 2: Melting or fusion: when a substance is changed from solid to liquid state by adding heat, the process is called melting or fusion

Ans 3: Fusion or melting point : the temperature at which a solid starts melting is called its fusion or melting point. Different substances have different melting points.

Ans 4: Freezing point: the temperature at which a substance changes from liquid to solid state is called its freezing point. the freezing and melting point of a substance are same.

Ans 5: Experiment: take a beaker and place it over a stand. Put small pieces of ice in the beaker and suspended a thermometer in the beaker to measure the temperature. Place a burner under the beaker. The ice will start melting. The temperature of the mixture containing ice and water will not increase above 0C until all the ice melts. Note the time which the ice takes to melt completely into water at 0C.
Continue heating the water at -C in the beaker . Its temperature will begin to increase. Note the time which the water in the beaker takes to reach its boiling point at 100C from 0C.

Q8. Explain the scales of temperature

Ans 1: Temperature scales: a scale is marked on thermometer. The temperature of the body in contact with the thermometer can be read on that scale.
Three scales of temperature are in common use. These are:

Ans 2: Celsius scale or centigrade scale: on Celsius scale, the interval between lower and upper fiexd points is divided into 100 equal parts. The lower fixed point is marked as 0C and upper fixed point is marked as 100C.

Ans 3: Fahrenheit scale: on Fahrenheit scale, the interval between lower and upper fixed points is divided into 180 equal parts. Its lower fixed point marked as 32F and upper fixed poin is marked as 212F

Ans 4: Kelvin scale: In SI unit of temperature is kelvin(K) and its scale is called kelvin scale of temperature. The interval between upper and lower fixed points is divided into 100 equal parts. thus, a change in 1C is equal to a change of 1 K. The lower fixed point on this scale corresponds to 273K and the upper fixed point is referred as 373K. The zero on this scale is called the absolute zero and is equal to -273C

Ans 5: From Celsius to kelvin scale; the temperature T on kelvin scale can be obtained by adding 273 in the temperature C on Celsius scale. Thus,
T(K)= 273+C
From kelvin to Celsius scale: the temperature on Celsius scale can be found by subtraction 273 from the temperature in kelvin scale. Thus,
C=T(K)-273
From Celsius to Fahrenheit scale: since 100 divisions on Celsius scale are equal to 180 divisions on Fahrenheit scale. Therefore, each division on Celsius scale is equal to 1.8 divisions on Fahrenheit scale. Moreover, 0C corresponds to 32 F
F= 1.8C+32

Q9. What is bimetal strip ? explain and write its uses

Ans 1: Bimetal strip: a bimetal strip consists of two thin strips of different metals such as brass and iron joined together. On heating the strip , brass expands more than iron. This unequal expansion causes bending of strip.

Ans 2: Uses; bimetal strip are used for various purposes. bimetal thermometers are used to measure temperature especially in furnaces and ovens. Bimetal strips are also used in thermostats. Bimetal thermostat switch is used to control the temperature of heater coil in an electric iron.

Q10. Q no: 7 (B) Normal temperature of is 98.6 F. Convert it in the Celsius scale and .

Ans 1: Solution:
T_f=98.6°F
T_k=?
c=5/9 (98.6-30)
c=5/9 (66.6)
c= 37°C
T_k=c +273
T_k =310k
