The Brigade School

Class 10 Physics Revision W/s

Calorimetry

ENGLISH

1 Define the term 'Heat capacity' and state its S.I unit. 1

2 Rishi is surprised when he sees water boiling at 115° C in a container. Give reasons as to why water can boil at the above temperature. 1

3 State two factors upon which the heat absorbed by a body depends. 1

4 Which extinguishes a fire more quickly, hot water or cold water? 1

5 Why does a hot cup of tea get cooled on adding sugar to it? 1

6 Why does the temperature of the surroundings start falling when the ice of a frozen lake starts melting? 1

7 Differentiate between heat capacity and specific heat capacity. 2

8 What do you mean by the term regelation? 2

9 A certain amount of heat Q will warm 1 g of material X by 3 °C and 1 g of material Y by 4 °C. Which material has the greater specific heat? 2

10 Explain why bottled soft drinks are more effectively cooled by cubes of ice than by ice water. 2

11 An electric heater supplies 1.8 kg of power in the form of heat to a tank of water. How long will it take to heat the 200 kg of water in the tank from 10 °C to 70 °C? Assume heat losses to the surroundings to be negligible. 2

12 Specific heat capacity of substance A is 3.8 J $g^{-1}K^{-1}$ whereas the specific heat capacity of Substance B is 0.4 Jg^{-1} K^{-1}.
(a) Which of the two is a good conductor of heat?
(b) How did you come to the above conclusion?
(c) If substances A and B are liquids then which one would be more useful in car radiators? 3

13 (a) (i) What is the principle of method of mixtures?
(ii) What is the other name given to it?
(iii) Name the law on which the principle is based.
(b) Some ice is heated at a constant rate, and its temperature is recorded after every few seconds, till steam is formed at 100°C. Draw a temperature time graph to represent the change. Label the two phase changes in your graph. 3

14 (i) Write an expression for the heat energy liberated by a hot body.
(ii) Some heat is provided to a body to raise its temperature by 25 °C.
What will be the corresponding rise in temperature of the body as shown on the kelvin scale? 3
(iii) What happens to the average kinetic energy of the molecules as ice melts at 0 °C?

15 (a) State in brief, the meaning of each of the following :
(i) The heat capacity of a body is 50 J $°C^{-1}$.
(ii) The specific latent heat of fusion of ice is 336000 J kg^{-1}. 3
(iii) The specific heat capacity of copper is 0.4 J g^{-1} $°C^{-1}$

16 What material is the calorimeter made up of? Why? 3

17 A hot solid of mass 60 g at 100 °C is placed in 150 g of water at 20 °C. The final steady temperature recorded is 25 °C. Calculate the specific heat capacity of the solid. 3
[Specific heat capacity of water = 4200 J kg^{-1} $°C^{-1}$]

18 200 g of hot water at 80 °C is added to 300 g of cold water at 10 °C.
Calculate the final temperature of the mixture of water. Consider the heat taken by 3
the container to be negligible. [Specific heat capacity of water is 4200 J kg^{-1} $°C^{-1}$]

19 40 g of water at 60 °C is poured into a vessel containing 50 g of water at 20 °C. The final temperature recorded is 30 °C. Calculate the thermal capacity of the vessel. 3
(Take specific heat capacity of water as 4.2 J g^{-1} $°C^{-1}$).

20 250 g of water at 30 °C is present in a copper vessel of mass 50 g. Calculate the mass of ice required to bring down the temperature of the vessel and its contents to 5 °C. 3
Specific latent heat of fusion of ice = 336×10^3 J kg^{-1}
Specific heat capacity of copper vessel = 400 J kg^{-1} $°C^{-1}$
Specific heat capacity of water = 4200 J kg–1 $°C^{-1}$.

21 Calculate the amount of ice which is required to cool 150 g of water contained in a vessel of mass 100 g at 30 °C, such that the final temperature of the mixture is 5 °C. (Take specific heat capacity of material of vessel as 0.4 J g^{-1} $°C^{-1}$, specific latent heat of fusion of ice = 336 J g^{-1}, specific heat capacity of water = 4.2 J g^{-1} $°C^{-1}$). 3

22 Materials X, Y and Z are solids that are at their melting temperatures. Material X requires 200 J to melt 4 kg, Y requires 300 J to melt 5 kg and Z requires 300 J to melt 6 kg. Rank the materials according to their heats of fusion in descending order. 4