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the specific heat of a substance can be used to calculate the temperature change that a given substance will undergo when it is either heated or cooled the equation that relates heat q q to specific heat cp c p mass m m and temperature change Δt Δ t is shown below q cp m Δt q c p m Δ t we can calculate the heat released or absorbed using the specific heat capacity c the mass of the substance m and the change in temperature Δ t in the following equation q m c Δ t the specific heat is the amount of heat necessary to change the temperature of 1 00 kg of mass by 1 00 ºc the specific heat c is a property of the substance its si unit is j kg k or j kg c c the temperature change Δ t Δ t is the same in units of kelvins and degrees celsius but not degrees fahrenheit use the equation for heat transfer q m c Δ t q m c Δ t to express the heat transferred from the pan in terms of the mass of the pan the specific heat of aluminum the initial temperature of the pan and the final temperature the specific heat is numerically equal to the amount of heat necessary to change the temperature of 1 00kg of mass by 1 00oc the si unit for specific heat is j kg k or j kg oc recall that the

temperature change Δt is the same in units of kelvin and degrees celsius key points heat capacity is the measurable physical quantity that characterizes the amount of heat required to change a substance s temperature by a given amount it is measured in joules per kelvin and given by the heat capacity is an extensive property scaling with the size of the system multiply the change in temperature with the mass of the sample divide the heat supplied energy with the product the formula is c q Δt m cv q Δt m c m c q m Δt q Δt cv cp γ cp cv r cp cv find out how much heat is required to warm up a sample with the specific heat calculator the specific heat capacity is the amount of heat it takes to change the temperature of one gram of substance by 1 c so we can now compare the specific heat capacity of a substance on a per gram bases this value also depends on the nature of the chemical bonds in the substance and its phase q mc the specific heat of a substance can be used to calculate the temperature change that a given substance will undergo when it is either heated or cooled the equation that relates heat q to specific heat c p mass m and temperature change Δ t is shown below q c p m Δ t calculating heat and specific heat example 50 g of gold with a specific heat of 0 129 is heated to 115 0c the gold cools until the final temperature is 29 3 0c calculate the heat of the metal q m x c x Δt q metal j problems write the formula set up problem and answer in correct units 1 mechanical selection of heat exchanger tema layout and number of passes specification of tube parameters size

layout pitch and material setting upper and lower design limits on tube length specification of shell side parameters materials baffles cut baffle spacing and clearances calculate the heat capacity of a piece of wood if 1500 0 g of the wood absorbs 6 75 104 joules of heat and its temperature changes from 32 c to 57 c 5 100 0 ml of 4 0 c water is heated until its temperature is 37 c if the specific heat of water is 4 18 j g c calculate the amount of heat energy needed to cause this rise in temperature by putting known values into it and solving for the unknown value the specific heat of the ring is calculated as below begin align c frac q m t f t i frac 10 3 1 times 17 9 circ 0 18 quad rm cal g cdot circ c end align c m t f t i q 3 1 17 9 10 0 18 cal g c so the specific heat of the ring is c worksheet calculations involving specific heat 1 for q m c Δ t identify each variables by name the units associated with it 2 heat is not the same as temperature yet they are related explain how they differ from each other a perform calculations using q m c Δ t b determine if it s endothermic or exothermic 1 home mechanical transmission shaft key selection shaft keyway design guide february 13 2021 8 minutes of reading shaft key selection and keyway design should consider key types correct fit key material shaft material load fatigue safety factors heat transfer equation q m c Δ t heat transfer variables and constants q heat m mass c specific heat capacity t temperature learn for free about math art computer programming economics physics chemistry biology medicine

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