Termometria exercicios teoria

Knowledge about the scales of Kelvin, Celsius and Fahrenheit is necessary to solve exercises on a thermometric scale. Issue 1 (ITA) Summer 1994 was particularly hot in the United States of America. The difference between the maximum temperature of summer and the minimum of the previous winter was 60oC. What is the significance of this difference in the Fahrenheit scale? (a) 33oF b) 60oF c) 92oF d) 108oF and) 140oF see answer question 2 (Unesp 2003) Pot with water heated from 25 to 80 degrees Celsius. The temperature change incurred by the pot of water on Kelvin and Fahrenheit scales was: a) 32 K and 105 F. b) 55 K and 99'F. c) 57 K and 105'F. (d) 99 K and 105'F. (e) 105 K and 32'F. See answer question 3 Judge statements below: I - Scale Of Celsius assigns 0 to the melting point of ice and 100 to the boiling point of water; II - The lower limit on the Kelvin scale is -273 degrees Celsius; III - 1 degree Celsius equals 1 degree Fahrenheit. Correct: a) I and II only b) I and III only c) I, II and III d) II and III only e) I just see the answer to question 4 There is a temperature that has the same value on the Celsius scale and Fahrenheit scale. What's that temperature? See the answer to question 1 To convert the Celsius scale into the Fahrenheit scale, Used the following formula: TC htF 5 9 Replacement 60 Degrees Celsius of the aforementioned equation, we have 60 x x 5 9 12 x 12 x MTF 12.9 TF 108 F Alternative d. Answer to question 2 First we need to know what is the change of the Celsius scale. This value is achieved by the difference between the final value and the original value: C2 - C1 KK 80-25 KK and 55 degrees Celsius, when the temperature fluctuates by 1 degree on the Celsius scale, it undergoes the same changes in the Kelvin scale. So if the change was 55 on the Celsius scale, it was also 55 in the Kelvin scale. In the Fahrenheit scale, the same change is given: C and F 5 9 Replacement C by 55, we have: 55 f 5 9 11 f 9 F - 9.11 F and 99 F According to the results, the correct alternative is the letter b. The answer to question 3 Statement I and II are correct. Affirmative III is wrong because a change of 1o Celsius is equivalent to a variation of 1.8 degrees Fahrenheit. So, letter a. back question Answer to question 4 C and F - 32 5 9 If F and C, We can rewrite equation C - C 32 5 9C - 5 (C-32) 9C - 5C - 160 9C - 5C - -160 4C - -160 C - -160 4C - 40o Temperature, which coincides in the Scale Of Celsius and Fahrenheit - 40 degrees. back to the question Watch our video classes 1) Thermometry: In some Brazilian cities we find, in great circulation, thermometers that indicate local temperature measured on a scale Because of the World Cup games in Brazil, thermometers must undergo changes that allow temperature information also on the Fahrenheit scale used by some countries. So, after this adaptation, one of these thermometers, which indicates, for example, 25 degrees Celsius, will also indicate the temperature of the data: Conversion equation between the weights celsius and:2) Do you think about spending the night in the refrigerator or sleeping on a big ice stone? While this idea is frightening, there are already hotels made of ice that are like a lot of igloo. The world's first ice-cold Ice Hotel, fca in Sweden. This hotel has walls, beds, tables and everything in a normal hotel, just ice. There's no way you can be impressed. The unusual design is white, transparent and usually lasts only winter, because then the ice melts. In 2009, Raquel, a student with one of the ETECs, stayed at the Ice Hotel. That night, he noticed that the thermometer column was marked on the Fahrenheit (F) scale for external temperature, 32 degrees Fahrenheit, and for internal, 23 degrees Fahrenheit. Curiously, Raquel decided to calculate, in degrees Celsius (KK), these temperatures. Knowing that for water, the point of ice is 0 degrees Celsius or 32 degrees Fahrenheit and that the point of steam is 100 degrees Celsius or 212 degrees Fahrenheit, Raquel concluded that the hotel's external temperature and internal temperature stand, respectively, in degrees Celsius:3) (Puc-SP) In LHC (Big Hadroncollider), the particles will work against each other in the tunnel length of 2777 that has some chilled parts at - 271.25 degrees Celsius. The results of these clashes, however, will follow the world. The LHC grid will have 60,000 computers. The purpose of the Franco-Swiss complex, which cost 10 billion U.S. dollars and is managed by Cern (European Organization for Nuclear Research, in the French acronym), is that To revolutionize the way the universe is visioned.The temperature in the text is expressed on the scale of Fahrenheit and Kelvin, equivalent, respectively, to approximate values:a) - 456 and 544b) - 456 and 2c) 520 and 544d) 520 and 2e) - 456 and - 24) The coldest place in the world where a man never set foot. It is called Ridge A (Cordilla A), fca 4000 meters high - 30% higher than the city of La Paz, Bolivia - and 600 kilometers from the south pole. But the main feature of this place, which has just been revealed in satellite images, is another: the A ridge is the coldest point on earth, with an average temperature of minus 70 degrees Celsius. Before that, it was believed that the coldest place in the world was Lake Vostok in Antarctica, which reached minus 90 degrees Celsius. But that was the exception. On average, the A Ridge is much colder than Lake East or any other places, places, Will Saunders, astronomer at the University of New South Wales and discoverer of this place. Adapted from: Super Interesting Magazine. Release 271, p. 32, November 2009.Unlike us who use the temperature range Celsius, Americans use a range of Fahrenheit temperatures. If this text were addressed to American students, as the temperature would put it - 70 degrees Celsius?a) 0'Fb) - 60 Fc - 55 Fd - 40 Fe) - 94F5) Thermometry: On this day, the minimum temperature in Belo Horizonte was 15 degrees Celsius, and the maximum was 27 degrees Celsius. The difference between these temperatures, on the Kelvin scale, is:a) 12.b) 21.c) 263.d) 285.Exercise in physics at work: Weight, Spring and Kinetic Energy Theorem (TEC).6) Thermometry: Almir must heat a certain amount of water to 70 degrees Celsius. After starting the process, he accidentally broke the thermometer and had to use another, graduated Fahrenheit. On this scale, the heating should stop at 0 and 100 degrees Celsius, corresponding, respectively, to 32 degrees Fahrenheit 212 degrees Fahrenheit 102. c) 142.b) 126. (d) 158.7) The mercury column has a column 20 mm high at the melting point of water, and at boiling point - 80 mm. At 92 degrees Fahrenheit, the mercury column of this thermometer, in mm, is:a) 30. c) 50.b) 40. d) 60.8) Thermometry: The graph below shows how Celsius and Fahrenheit are associated. In winter, the temperature in New York reaches 10.4 degrees Fahrenheit. On the Celsius scale, this value corresponds to:a) - 12.0. c) - 38.9 b) - 13.6. d) - 42.0.9) (Puc-SP) Graph represents the relationship between the temperature measured by the hypothetical W temperature scale and the temperature measured on the Celsius scale at normal pressure. The temperature of the melting of ice and the boiling point of the water, in degrees B, respectively equal:a) - 40 and 40b) - 40 and 110c) 20 and 110d) - 40 and 100e) 20 and 10010) Thermometry: (Afa) Two identical thermometers, whose thermometric substance is ethyl alcohol, one of them graduated on a Celsius scale and the other graduated on the Fahrenheit scale, is now used simultaneously by a student to measure the temperature of the same physical system in his school's lab. In these conditions, it can be said correctly that:a) two thermometers will never forget equal numerical values.b) the unit of measurement of the thermometer, Graded on a Celsius scale, 1.8 times higher than the Fahrenheit.c scale, the height of the liquid column will be equal in two thermometers, but with always different numerical values.d) the height of the liquid column will differ in two thermometers. 🔘 qgt; check all our exercises and exercise. 2) a; 3) b; 4) and; 5) a; 6) g; 7) B; 8) a; 9) b; 10) Human activity has serious consequences for the environment, altering the quality of water, air, soil and causing temperature increases. In large urban centres, these problems are exacerbated by the removal of vegetation, soil compaction, seams, construction, emissions of polluting gases, disordered expansion, etc. But do you know what characterizes the island heat and why it happens?1. The introduction of thermology is part of the thermalology that is devoted to studying measurements of temperature and the effects caused by their change. Over the years, through his feelings, man hangs knowledge with the physical world that surrounds him. The first concept of temperature is established from a thermal sensation that provides touch, translated from the terms cold, hot, cold, etc. However, for scientific purposes the sensitive criterion of temperature assessment is vague and inaccurate because it depends on the person and the conditions in which he or she was. Therefore, it is necessary to create a standardized temperature measurement device, which does not depend on the sense of touch. The invention of the thermoscope, a thermometer whose physical principle was to expand the air, played an important role in the development of thermology, as many scientists spoke of between the late 16th century and the early 17th century. Thus, only since the determination of temperature with satisfactory accuracy, several quantities have acquired important practical importance in the development of physics and chemistry since the late eighteenth century. From ThermometryTemperatureIf we could look with a large magnity that forms the materials that surround us to see what they are made of, we would find something that could be interpreted as very small particles. Composite particles of matter have disordered movements. And for this reason it is often called molecular thermal arousal, that is, because such particles move randomly, in constant arousal, vibrate, rotate, constantly move molecules. In liquids and gases there is a rotation and displacement, so movement depends on the physical condition in which the body is located. In a solid state, for example, molecules move less. vibration, therefore, occurs, a magnitude that gives us an idea of this degree of thermal arousal in which the bodies are temperature. Thus, the higher the vibrational energy of the particles of this body, the higher their temperature.a) The lower the thermal arousal - the lower the temperature (b) the higher the thermal arousal - the higher the temperatureIn the synthesis:Temperature is a measure directly proportional to the degree of thermal arousal of body particles. The higher the agitation, the higher the temperature. What is the coldest city in the world? The Oymeacon in Siberia, whose inhabitants have experienced an astounding 71.2 kg below zero since January 26, 1926, is considered the coldest city in the world. The Oymecon means water that doesn't freeze. What is interesting, as the floor of this Siberian village with 900 inhabitants remains frozen until the summer. The least, only in Antarctica, where the columns of thermometers at the Russian station reached minus 89 degrees. And look, the little Oymyacon is far from the North Pole or high altitude, as one might imagine. It is 700 meters from sea level, and its latitude is 63 degrees, another 3 degrees from the Arctic Circle. Cold dimensions occur because the valley where the village is located is surrounded by mountains that prevent masses of hot air from entering. Winter, a period in which the temperature is about minus 40 degrees, lasts nine months. It is so cold that the breath turns into small ice crystals when you open your mouth. On the worst winter days in Oymyakon it will get colder to minus 60 degrees. The ground starts to crack and the air clicks. Schools are closing and no one is leaving the house. There are reports of frozen birds in the middle of the flight that shone like glass as they fall to the ground. Fortunately for them, scientists believe that the negative 71.2 degrees recorded 80 years ago will never be repeated due to global warming. That is, even in the coldest city in the world such winters as old. Source: BARTABURU, Xavier. Terra magazine, No. 175, Nov. 2006. p. 28.Thermal sensationThe difference we make between what is hot or cold is made from what we feel, as well as from the conditions that we are in. Which is impossible to say because we can feel very hot if we work on a cold day. Or can we say that this day is hot because we sweat after a football match? I'm sure not. This is due to the heat sensation. Heat sensations are the perception of temperature and the influence of room temperature and other factors such as wind and humidity. So you can learn a little more! Separate three bowls. Put cold water on the first; tap water, at room temperature, in the middle pool; and warm water in the third. (Beware of water depreciation ask an adult to do so.). Put one hand in a bowl of ice water and the other in a bowl of warm water. Keep them that way for a while. Now dip both hands in the middle bowl. What heat sensations did you get? Thermal energyConsider of two bodies, A and B, with the same temperature and the same material, but with different masses, we can conclude that if they have the same temperature, because the vibration level of molecule A is equal to the level of vibration of the body B molecule. Thus, by adding the energy of all molecules in the body B, we get a value greater than the amount of energy of all molecules in the body A.This total energy vibration of body molecules is called the thermal energy of the body. The body's thermal energy depends on temperature and mass. Do it yourself... In short: The heat balance of Imagine is that you put a little milk with ice in a cup of hot coffee, as shown below. Figure 1: (demyprati.blogspot.com) What happens to the temperature of the two liquids? When we put two bodies of different temperatures in contact, at the end we notice that the lower body temperature will warm up and the higher temperature will cool down, that is, we say that there was a transfer of heat that took out the body more heated to the lowest heat. This process occurs continuously until at a certain point the temperature of the two bodies is equal. Now we say that these two bodies are in thermal equilibrium. As with the situation shown above. Generalizations, we must: Thermal energy refers to the amount of energy of all molecules in the body. Two bodies are in thermal equilibrium when they have samebodies with different temperatures put in contact always tend to be thermal equilibrium. You could say... HeatIt is very often seen by people saying they are hot, however, physically speaking, this speech is wrong. The term heat can only be used to refer to thermal energy in transit, i.e. thermal energy that passes due to temperature differences. Therefore, there is no point in talking about the warmth contained in the body. The term internal energy is used to refer to the energy that the body has because of the arousal of its constituent particles. Thus, heat is defined as thermal energy along the way and flows from one body to another because of the temperature difference between them. This transfer of heat always occurs from the body with the highest temperature to the lowest temperature until both reach thermal equilibrium. It is important to note that No heat. Matter contains molecular kinetic energy and possibly potential energy rather than heat. Heat energy en route from one body to a higher temperature to another at a lower temperature. After transmission, the energy is no longer heated. Heat is a form of energy transmitted from one body to another as a function of temperature difference between them. Regulating body temperatureOrthregion of temperature is a very complex mechanism controlled mainly by the central nervous system. The human body, like the body of other mammals and birds, is homeothermic, does not represent temperature fluctuations depending on the environment, but in accordance with the internal conditions of itself. In humans, some environmental and personal factors can change the temperature of a healthy body (examples: eating hot or cold food, menstrual cycle time, exercise, room temperature, etc.), but these changes are usually very small and rapid adaptation to physiological changes of the body occurs. Homeothermy has advantages and disadvantages. Gomeothermia can survive in a variety of environments and can become active in winter. However, they have to eat more food than other animals because to maintain their temperature they require a lot of energy. The temperature remains stable due to the balance between production and loss of heat by the body. Heat production occurs mainly due to food consumption (and its use by the body) and contraction of skeletal muscles. Heat loss occurs when the ambient temperature is below body temperature, and can occur when objects of different temperatures are not in contact or not on conduct when the base of the heat room is done in direct contact. The skin is involved in the process of heat mixing between the body and the environment. Depending on the blood flow to the skin, more or less heat from within the body is lost. In addition, since the amount of hair in the human body is small, we use clothing to fully protect and prevent heat loss. The loss of heat by the skin is done continuously by eliminating sweat, i.e. sweating. There is an almost imperceptible loss of water in humans, 50 ml/hour, which depends on the evaporation of sweat, which in turn depends on the humidity of the environment. As the water has a specific high heat, evaporating 1 g of water removes about 0.6 kcal heat from the skin. In strenuous exercise, sweating can reach 1,600 ml/hour, resulting in a calorie loss of more than 900 kcal/hour. Fever is the body's response to substances released from blood cells in response to infection. feverish individual, thermoregulatory mechanisms react as if they were adjusted. A very high fever can lead to death from traumatic brain injury. In case of hypothermia (changes in body temperature), metabolic and physiological processes slow down. There is a decrease in heart rate and respiratory pressure, blood pressure and for you to learn a little more!3- Heat expansion When we increase the body temperature (solid or liquid) arousal of the particles that form it also increases, resulting in an increase in body size, he said that thermal expansion occurs. Similarly, lowering the temperature usually reduces body size, which characterizes thermal reduction. It is for this reason that bridges, buildings and railways, for example, are used in the construction of gaps called joint extensions (see picture below), which prevent cracks and ruptures caused by the thermal expansion of building materials. In the image below, we see what happened to the railroad tracks after reaching high temperatures. Why is this happening?flykerzsci.wordpress.comYsah could say... Linear thermal expansion Is a type of enlargement that is characterized by a change in body length when heated. Consider the L0-length metal bar, at 0. By increasing its temperature, the length assumes a new L Δ Δ value. Using other bars of the same material, but with other initial lengths (L0) and undergoing various temperature fluctuations (Δ), it is checked that the linear extension (ΔL) of the bar is directly proportional to these two quantities, allowing us to establish the law of linear thermal expansion, translated mathematically, by: Constant proportionality α is called the linear thermal coefficient characteristic of the material. Its unit of measurement is called the degree of reciprocity of Celsius, presented by an example that shows how to calculate the linear extension of the bar. Example: 2.5 x, has a length of 0 oC 2.0 m. When heated to one bar consisting of material, the ratio of linear thermal temperature expansion is 150 oC, its length increases. What is a linear extension of the bar and its length at 150 oC? Data: α 2.5 x; L0 and 2.0 m; ΔΘ No 150 oC Resolution: Knowing that ΔL and α x L0 x Δ , we will have: ΔL and 2.5 xx 2.0 x 150 ΔL and 7.5 xm De ΔL - L - L0, we will have L-L0 - ΔL - 2.0 - 0.0075 liters - 2.0075 m. Surface of thermal expansionIt type of expansion is associated with an increase in the length and width of the body, i.e. increases in two parts rectangular plate of any material. Be an A0 area value of its surface at 0. When its temperature rises to, the area of its surface becomes A. Changing the area of the plate, that is, its expansion of the surface ΔA proportional to the initial region of A0 and the change in temperature Δ, so similar to what happened for linear expansion. Thus, the law of surface thermal expansion can be translated according to the formula: ΔA β × A0 × Δ or A 1 - βΔ) Proportionality of permanent β is a factor of surface thermal expansion of the material from which the plate is made. Its value is twice the linear ratio (β 2 × α), and its unit is also a degree of reciprocity Celsius (o). Example: The rectangular steel sheet is 30 cm and 40 cm in size at 20 oC. Knowing that its temperature has reached 80 oC, determine: (a) malfunction in its area; b) its area at 80 oC. (Data: 12 x). Resolution a) A0 - 30 x 40 - 1200 x 2 x 12 x 24 x ΔA 1 β x A0 x ΔΘ 24 xx 1200 x 60 ΔC 1.7 Resolution b) Doing ΔA - A-A0, A-A0, We get: volume thermal expansionIt is an extension that is characterized by a change in the length, width and height of the body, that is, with the increase in temperature the body is exposed to variation in three dimensions. Consider, for example, a solid, cube. Be v0 your volume at 0. When the temperature rises, the volume assumes the value of the V. Variation in the volume of the solid, that is, its volume expansion ΔB is directly proportional to the original volume of V0 and the change in temperature Δ, so it is similar to what happens with linear and surface extensions. Thus, the law of bulk thermal expansion can be translated into form: linear thermal expansion α (γ No. 3 × α) and its unit is the degree of reciprocity of the Celsius constant of proportionality γ is the ratio of the volume thermal expansion of the material from which the body is made. Its value is three times higher than the steel ratio of 50, at the temperature of melting ice, for example: normal pressure. Calculate its volume at the temperature of water vapor at normal pressure. Resolution: V 50'1 - 3 x 12 xx (100 - 0) V - 50 x 1 - 3 x 12 xx 100 v V - 50.18 Necessary materials: Empty milk can powder; Hose durepox; crepe tape and 50 cm of the ruler. Procedure: Drill a hole with the same hose diameter on the lid of the tin. Disassemble the device equipment leaving only what is in the picture below. Place part 2 of the hose in the hole. Print the edges around the hole as well as the lid, with durepox. Stick the hose to the line with a crepe tape. The hose should form a curve at one end of the line. On the curve Can't bend. To place the water on the hose curve, fill the glass with water (preferably colored). Place one end of the hose in the water and pull the air out of the hose with your mouth at the other end. Fit the hose into the rubber that is attached to the can. Hold the can with both hands (to warm it) and watch the water rising in the hose. Release the can and watch the water go down the hose as it can cool down.Comments: Can be well sealed so that the air comes out just inside the hose. Water and its irregular or abnormal behavior Water does not behave thermally like most liquids. To better understand this behavior, let's imagine the following experience. By heating a certain mass of m of water, initially at 0 degrees Celsius, we checked that the volume decreases from 0 to 4 degrees Celsius, because the water level in the container is low, there is a decrease. From 4 degrees Celsius, continuing the warming, the water level rises, which means an increase in the volume, the expansion is taking place. Do it yourself... The chart below roughly shows how the volume of water changes depending on the temperature increase. The density (d th m/v) varies back with the volume of V. Then 0 to 4 degrees Celsius water density increases as the volume decreases in this range. Above 4 degrees Celsius, the volume of water increases, and therefore the density decreases. With a minimum amount of water at 4 degrees Celsius, the maximum density. The graph below shows how water density changes depending on temperature: Irregular water behavior, having its varied temperature, is due to the presence of a significant type of connection between its molecules: hydrogen bridges. This connection is electrical in nature and occurs between hydrogen atoms of different molecules. Hydrogen bridges are set by the fact that water molecules are polar, that is, have a certain electrical polarity. Models of hydrogen bridgesTen, when the temperature of a certain amount of water increases from 0 oC, there are two effects that counteract their macroscopic manifestation: greater molecular thermal arousal leads to an increase in the average distance between molecules, which leads to an increase in volume (characteristic expansion); rupture of hydrogen bridges and, in connection with this violation, in the new equilibrium situation molecules approach each other, which leads to a decrease in volume (causing compression). And that predominance of one or the other is that it will entail the expansion or reduction of water. Soon we see that 0 to 4 oC prevails the second effect, which leads to a reduction in When heated above 4 oC, the first, e4- ThermometersInvention of the thermometer, then known as the thermoscope, the great Italian mathematician, physicist and astronomer Galileo Galilei (1564 - 1642), which consisted of an air-filled light bulb, provided by a tube, immersed in a container containing liquid. It happens that when the light bulb air was hot, the pressure increased and the column was liquid; when it cooled, the pressure dropped, and the liquid column went up. This allowed us to estimate, even if unstable, the body temperature in contact with the lamp. However, over the years, technological evolution has caused increasingly complex thermometers to appear. There are different thermometers for different applications: mercury thermometer (we'll see later), gas thermometer, electric resistance thermometer, digital thermometer, etc. What's the point? The thermometer is nothing more than a tool used to measure the degree of heat arousal of the body, i.e. its temperature. And it is divided into three parts: (a) the bulb is the part containing the thermometric substance; b) Capillary - makes up most of the thermometer, where there are thermometer scales; c) The thermometer substance - the substance that occupies the inside of the thermometer, in turn, should represent a regular expansion, usually the most commonly used is mercury. Its functioning is based on the principle of thermal equilibrium, that is, in contact with the body over time, it will achieve a thermal equilibrium with this body, resulting in a thermometric substance will undergo expansion or compression, and when it does, it will indicate the temperature value. But this requires properly graded, that is, it is necessary to identify fixed points, the most commonly used are melting and temperature of steam or boiling water at normal atmospheric pressure. Mercury thermometerConscent one of the best and most common thermometers for the study, the mercury thermometer consists of a glass capillary, adapted to a small lamp, also glass, containing mercury metal in a liquid state. When the temperature changes, the mercury is thermally dilettered, increases in volume and rises through the capillary to a certain height. Learn how to build a homemade thermometer. Materials used: Incandescent lamp 76 cm woodglue durepoxWater with dye. Procedure: With duct tape fitting the hose into the bracket and then using durepox, you should glue the hose into the lamp after carefully removing the inside of it. At the end of the experiment, explain what's going on. Create your own scale by tingling it along with stand.5- Thermometeric scales (Celsius, Fahrenheit, and Kelvin) are a set of quantitative temperature values always associated with a predetermined thermal state called a fixed point of the scale. Do it yourself... The CelsiusAnders Celsius thermometer scale was a Swedish astronomer known worldwide for its scaleIt is a scale that originates from the article Observation on two persistent degrees in the thermometer of 1742. Celsius for two years found that melting snow or ice in places of different latitudes and with different atmospheric pressures was always at one point with the thermometer. Used this fixed point as a 100-degree reference. Another fixed point was chosen as a point corresponding to the boiling of water at a pressure of 755 m of mercury column, which is associated with 0 degrees. It divided the distance between two points into 100 equal parts, thus getting the so-called Celsius scale for measuring temperatures. Choosing 0 degrees for boiling point avoided using negative temperatures. After her death, fixed points 0 and 100 were exchanged, leaving the scale as we know it today. Given the nature of the scale, its division has been called Celsius for many years. In 1948, CIPM (International University of Pua and Mesures) decided to replace this designation with a degree in Celsius. German physicist Daniel Gabriel Fahrenheit, in turn, made many discoveries, but became known not around the world for his research, and the thermometric scale named after him. He was inspired to build his thermometry scale on the great Danish physicist Olaus Romer, who was the first person to measure the speed of light. Romer built thermometers, and Fahrenheit, who at the time lived in Copenhagen, used to visit it to learn how to make thermometers as well. Romer is used as a temperature solution in the balance of water and ice, as well as the temperature of the human body. When he started to build his thermometers, Fahrenheit went like this: he put thermometers (some of them) in a mixture of water and ice and pointed to them a value of 30; then placed them (one by one) in the armpit of the person with health and noted the 90.At this time the thermometers are already calibrated. To test the calibration, he placed them in a mixture of water, ice and sea salt, or water, ice and ammonium salt, and demanded that everyone mark the same temperature. This mixture was made at the time, without specified proportions, because it served only to verify that everyone marked the same temperature. This is reported in his work, published in the journal Philosophical Transactions of the Royal Society of London, Volume 3, p. 78, 1724. So he nowhere said what proportions of the mixture, and probably he himself did not know, and there was no need, purpose for which it was intended. Later the temperature of the water ice mixture came to be called 32, and that of the human body 96. The latter, of course, is no longer used: the boiling point of water at well-established pressure is used, as you know, for use by William Thomson, a British mathematician and physicist who was one of the most prominent figures in science in the Victorian era. Best known for his title of nobility, Lord Kelvin, he was the one who for the first time established the theoretical existence of a situation in which particles of matter would be completely devoid of energy and therefore stop. Kelvin conducted many experiments with gases and noticed that when it was snapped in containers of constant volume, they exerted ever lower pressure - so with molecules in a lower state - as the temperature dropped. To extrapolate the results obtained with gases at temperatures close to the melting point of the ice, Kelvin concluded that there should be an extremely low temperature in which the gas pressure will be zero, that is, a state in which gas molecules simply stop. To this theoretical situation, which is known today as unattainable in practice, gets the name of absolute zero and the associated temperature is zero. Therefore, this thermometry scale is called the absolute scale. At present, it is questioned whether the energy of molecules can be zero at absolute zero, but in any case there is no doubt that in this situation the kinetic energy of molecules is minimal. If there was a thermometer that measured the temperature from absolute zero, the scale of this thermometer would be divided into 273 parts from its origin to the melting point of ice. If the scale continues, this thermometer will indicate 373 K for the temperature at which the water boils at normal pressure. The relationship between the thermometer scales The following figure represents three thermometers duly graduated, respectively, in Celsius, Fahrenheit and Kelvin scales. To relate the scales and determine the transformation of the relationship between them we develop a proportion of the expression as follows: To convert the degree of Celsius (oC) into Kelvin (K), in a much simpler way, just add 273 in the relationship below: To convert the variation of the relationship we use the equation :Example: When taking a patient's temperature, the doctor only has a thermometer graduated in a degree of Fahrenheit. Of course, he has done some calculations before and noted on the thermometer the temperature corresponding to 42 oC (critical temperature of the human body). In what position of the thermometer scale did he mention this temperature?a)106.2b) 107.6 c) 102.6 g) 180.0 and) 104.4 Resolution: We will use, for this case, the following ratio: 5 (Tf - 32) 9 x Tc5TFf- 9 x 425Tf 378 and 160 Before this alternative b is correct. Thus, 42 oC is in a position corresponding to 107.6 oF thermometer. Some temperatures:Celsius Scale (KK) Fahrenheit Scale (F) Kelvin Scale (K)Lngy Air -39 -38.2

243 Highest Surface Temperature on Earth 58 136 331Lower Stempering on the Earth's Surface -89 -128 184Wood Combustion Point 250 482 523Paper Combustion Point184 363 257Lead Melting Point 327 62 0 600Iron melting point 1535 2795 1808 Ice Point 0 32 273.15 Mercury solidifying point -39 -38.2 234 Setam dot 100 212 373.15 Temperature in the flames of natural gas 660 1220 933Therperature on the surface of the Sun 5530 10000 58001. (Fgv 2005) As for the thermometry, it is correct to say that:a) - 273 K is the lowest temperature that can be reached by any substance.b) the amount of heat of the substance is equivalent to its temperature c) in a wooden door, the metal handle is always colder than the scale Kelvin is known as absolute, because it recognizes only positive values.e) the physical condition of the substance depends solely on the temperature at which it is located. What do you mean by heat sensation? 3. What is temperature? 4. Explain in your own words what you mean by heat balance. 5. What are the most commonly used thermometer scales? 6. What is absolute zero? 7. Set warm. 8. Determine the temperature of 78 K in: a) Degrees Celsius (KK) b) Degrees Fahrenheit (F)Allow in your notebook:9. (Unifesp 2005) The thermometer is enclosed inside a glass lamp where the vacuum is made. Suppose the vacuum is perfect and the thermometer sets the room temperature at 25 degrees Celsius. After a while, the ambient temperature rises to 30 degrees Celsius. It is observed, then, that the thermometer marking:a) also rises, and is usually to achieve a thermal balance with the environment. b) stays at 25 degrees Celsius, regardless of room temperature. c) usually decreases continuously, regardless of room temperature. d) will grow, but never achieves a thermal balance with the environment. (e) Tends to reach the minimum thermometer scale.10. A mechanic measuring the engine temperature of an American tourist's car used a thermometer that had a digital reading of 92 degrees Celsius. In the way the tourist understood the temperature better, the mechanic had to convert the temperature unit Fahrenheit. What was the temperature of the post-transformation?1. (Ufmg 2006) John, the head of the mechanical workshop, must place a steel shaft in a brass ring, as shown in this figure: at room temperature the diameter of the shaft is larger than that of the ring hole. It is known that the thermal expansion factor higher than that of this, some of the procedures proposed to John, described in the following alternatives, to fit the shaft in the ring. Mark out an alternative that represents a procedure that prevents this installation. a) Only cool the shaft. b) Heat only the ring. c) Cool the shaft and ring. d) Heat the shaft and ring.12. When the metal lid of the marinated glass is too tight, you can remove it more easily after soaking the bottle for a few minutes in hot water, unswinding the lid with a cloth so as not to burn your hands. How does this object explain it?13. When we injected the mercury thermometer into the water container at a temperature well above the initial temperature of the thermometer, we immediately noticed that before the expected increase, the mercury column was reduced. Explain this fact.1. Meet some colleagues to do this. (a) Average temperature on the planets of the solar system, including the average temperature of the Earth. Also look for the average temperature of the sun. b) A study of average temperatures in some parts of the Earth, which indicates annual and daily heat amplitude.c) A study of average temperatures in three Brazilian states, indicating annual and daily thermal amplitudes. d) Study and provide an explanation of the phenomenon of seasons.2. A study of the life of The English Lord Willian Thomson Kelvin (1824-1907), the scientist who created a scale called the Kelvin scale or absolute scale. Try to find out the lowest temperature ever reached by scientists. Take the result of your work to class. Group 6- References, Marcos Jose. Physics in today's school, vol 2: Termology, Optics, Waves and Vibrations - Scipione 1987. (p. 7-19) HEWITT, Paul G. Conceptual Physics /Trad. Ricci, Triste Freire and Gravina, Maria Elena. 9.ed. Porto Alegre: Bookman, 2002. (p. 269-270) MORETTO, Vasco Pedro. Physics today: Termology, Optics and Waves; 2nd class - 4.ed. - Sao Paulo: Attica, 1989. (p. 9-30) Charlemagne A. TorresSao Paulo: Modern, 2005. Hairstyle, Pulo Cesar M. Fesca - Science and Technology / Paulo Cesar M. Penteado, Class of Physics by Class: Fluid Mechanics, Thermology, Optics / Claudio Xavier da Silva, Benigno Barreto Filho. – 1. Ed. - Sao Paulo : FTD, 2010. - (physical class class by class; art 2). JUNIOR, Francisco; FERRARO, Nicolau Gilberto; SOARES, Paulo Antonio de Toledo. The basics of physics. Ed. Modern. PORTAL DA FISICA CF (W.CURSODEFISICA.COM.BR) thermometer - Source: Wikipedia, free encyclopedia. MOJU NOVEMBER - 2011Page 2 Page 3 3 exercicios de termometria teoria