

Physics Department Second Term. 2015-2016 A CANADA CANADA

Time: 2 hours لتربية – الفرقة الاولى – سعبة الكمياء (حرارة) تشهيلة

Heat and Optics

Part I: Choose the right answer:

1- Heat has the same units as:

A. temperature <u>B. work</u> C. energy/time D. energy/volume

2- The principle of the Thermoelectric Thermometer depends on:

A. Stefan's lawB. Radiation effect.C. Seebeck effectD. Optical Pyrometer principle

3 - The coefficient of linear expansion of a certain steel is 0.000012 per C° . The coefficient of volume expansion, in $(C^{\circ})^{^{-1}}$, is:

A. $(0.00012)^3$ B. 3×0.000012 C. 0.000012D. depends on the shape of the volume to which it will be applied

4- In Platinum Thermometers, the copper wire is used to

A. Avoid the induction B. increase the variation of thermometer resistance with temperature C. reduce the lead contact resistance D. none of them

5- The rate of heat loss by the body to the surrounding is manly proportional to

A. thickness of the body	B. surface area of the body	C. thermal
conductivity of the body	D. specific heat of the body	

6- The amount of heat absorbs by the body will be high for the body with emissivity (ϵ)

A. $\varepsilon = 0.8$ B. $\varepsilon = 0$ <u>C. $\varepsilon = \text{Infinity}$ </u>. D. the absorbed heat independent on ε

7- The heat of fusion of water is 80 cal/g. This means 80 cal of energy are required to:

A. raise the temperature of 1 g of water by 1K B. turn 1 g of water to steam

C. raise the temperature of 1 g of ice by 1K	D. melt 1 g of ice

Part II: answer the following questions

8- Draw only the cooling curve for substance with phase change at 150 and 80 $^{\circ}$ C



9- The heat capacity of object B is twice that of object A. Initially A is at 300K and B is at 450 K. They are placed in thermal contact and the combination is isolated. What is the final temperature of both objects.

Ans: the final temperature is 400K

10- Define all of the following : thermal conductivity , Blackbody radiation and Coefficient of linear thermal expansion

Ans:

1- Thermal conductivity: is $H = \frac{dQ}{dT} = -KA \frac{dT}{dX}$

The rate of heat flow by conduction per unit area per unit temperature gradient

2- Blackbody radiation: is

blackbody is one that absorbs all incoming light and emitted all wave length when heated and its emissivity =1

Coefficient of linear thermal expansion : is

The ratio between the frictional change in length: dL/L_0 to the change in temperature dT, thus

 $\alpha = 1/L_{\rm o}$. dL/dT