

READ THESE INSTRUCTIONS BEFORE YOU BEGIN

- Before you start the test, **WRITE YOUR NAME ON EVERY PAGE OF THE EXAM.**
- Calculators are permitted, but no notes or books are allowed
- **You must do problems 1-4 and do either problem 5 or problem 6. You must indicate which problem, 5 or 6, you want to be graded. If you do not indicate, the instructor will choose one at random.**
- **Make use of observations from class activities and homework in your explanations.**
- If you have ANY questions while taking the test, please be sure to ask me. The purpose of the test is not to give you trick problems to catch you in an error. The purpose is to give you an opportunity to "show what you know!"
- Partial credit will be given for correct steps shown, even if the final answer is wrong.
- Write clearly and logically so that I can understand what you are doing and can give you as much partial credit as you deserve. I cannot give credit for what you are thinking, only for what you show on your paper.
- If on a multistep problem you can't do a particular part, don't give up. Go on to the next part anyway. If necessary, define a variable name for the quantity you couldn't find and express your answer in terms of it.

Problem	Points Possible	Score
1	15	
2	15	
3	20	
4	15	
5 or 6	10	
Total	100	

Name _____

Problem 1. (15 points)

A metal object with a mass of 80 g is heated to 100 °C. The object is then placed into 100 ml of water that is at 15 °C. The final temperature of the water and metal is found to be 22 °C.

a. How much energy is gained by the water?

b. How much energy is lost by the metal?

c. What is the specific heat of the metal?

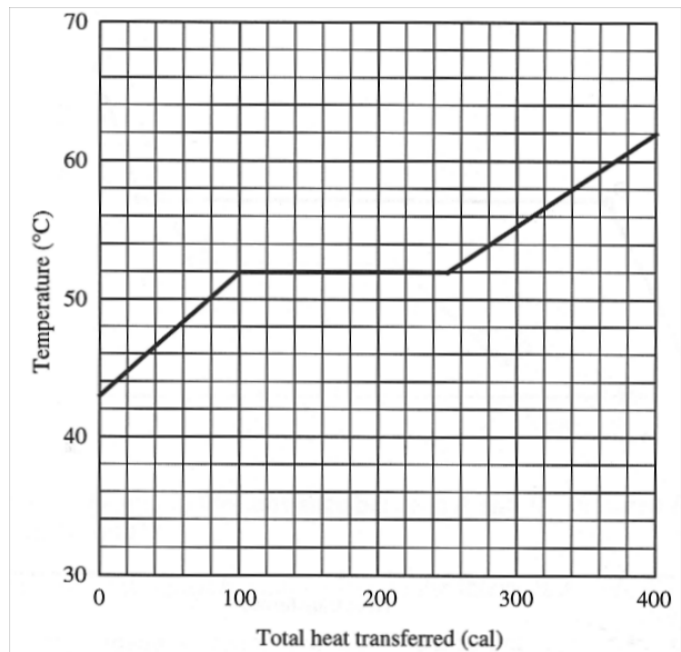
d. How much water at 100 °C would have to have been added to the 100 ml of 15 °C water to cause the same temperature change as the metal?

Name _____

Problem 3 (20 points)

A student heated a 50 g sample of a certain substance and recorded the temperature. During the experiment, the substance melted. The graph shows the temperature of the substance plotted against the amount of heat delivered to the substance.

A. Divide the graph into regions and describe what is happening in each region.



B. Why does the graph not go through the origin?

C. What is the latent heat of this substance? Tell how you obtained this information from the graph.

D. Tell as much as possible about the specific heat of this substance. Tell how you obtained your information from the graph. Consider both the solid and liquid phases.

Name _____

Problem 5 (10 points)

DO EITHER PROBLEM 5 OR PROBLEM 6. INDICATE WHICH SHOULD BE GRADED

How does a thermometer measure temperature? In particular, discuss the properties of a thermometer make it useful for measuring temperature and also discuss how a thermometer is calibrated.

Name _____

Problem 6 (10 points)

DO EITHER PROBLEM 5 OR PROBLEM 6. INDICATE WHICH SHOULD BE GRADED

Compare and contrast the ideas of heat and temperature. Include a discussion of the differences and similarities between your perceptions of heat and temperature and what you have learned from your experiences in class (include discussions of specific activities).

Group Celebration:

Do the Following

- a. With your group, come up with a detailed procedure for an experiment to determine how much energy it takes to melt one gram of ice.
- b. After you have a procedure, make a list of any equipment/supplies that you will need to carry out the investigation. Obtain the equipment from the instructor and carry out your investigation. If you find it necessary to alter your procedure once you have started, you should indicate what change was made and why.

Your response to this question should include the detailed procedure, equipment list, measurements taken, any calculations done, and the value you obtained. To demonstrate acceptance of the solution, all members of the group must sign the sheet to be turned in.

Bonus: Determine the uncertainty in the value that you report.

This must include an explanation and calculations to show how you determined the uncertainty.