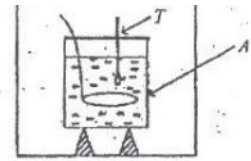


1997 A/L Structured Essay Question No (02)

2. Figure shows an experimental arrangement that can be used to determine the specific heat capacity of a liquid using the method of cooling.



- (a) Identify the vessel *A*. (one line)
- (b) What are the additional essential measuring instruments required for this experiment? (2 lines)
- (c) What are the physical factors of the vessel *A*, Which determine the rate of loss of heat to the surroundings? (3 lines)
- (d) In this experiment separate cooling curves are obtained for water and the liquid.
  - (i) What amount of liquid have to be used with respect to that of water? (one line)
  - (ii) Give the reason for your answer in d (i). (2 lines)
- (e) Draw sketches of the two cooling curves you may obtain in this experiment assuming that the heat capacity of water is greater than that of the liquid used. Clearly label the curves.
- (f) Two quantities have to be extracted from the curves in order to determine the specific heat capacity of the liquid. Show the necessary constructions on the diagram given in (e) in order to obtain these quantities.
- (g) If the heat capacity of *A* with the stirrer is  $W$ , masses of water and the liquid are  $m_w$  and  $m_l$  and specific heat capacities of water and the liquid are  $s_w$  and  $s_l$ , respectively, write down an expression relating these quantities with the quantities mentioned in (f). (3 lines)
- (h) Can you perform this experiment properly by filling the space between *A* and the outer vessel with water? Explain your answer. (2 lines)

