EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCE – 2013/2014

FIRST SEMESTER (September/October – 2016)

PH 105 GENERAL PHYSICS

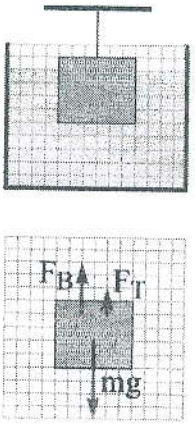
e: 01 hour

wer ALL Questions

. What is the difference between compressible fluid and incompressible fluid in fluid dynamics?

State the Archimedes Principle of buoyancy force.

A block of weight $mg = 45$ N has part of its volume submerged in a beaker of water. The block is partially supported by a string of fixed length that is tied to a support above the beaker. When 80% of the block's volume is submerged, the tension in the string is 5.0 N.



(a) What is the magnitude of the buoyant force acting on the block?

(b) Water is steadily removed from the beaker, causing the block to become less submerged. The string breaks when its tension exceeds 35 N. What percent of the block's volume is submerged at the moment the string breaks?

(c) After the string breaks, the block comes to a new equilibrium position in the beaker. At equilibrium, what percent of the block's volume is submerged?

2. State and describe the possible contributions to the internal energy of a system com of atoms or molecules.

Define the term *specific heat capacity* of a substance? Hence, describe the diffe between *latent heat of fusion* and *latent heat of vaporization* when a substance unde a phase change.

A student converts 50.0 g of ice at -20.0 °C into steam at 135.0 °C. Assume that th no loss of heat is taken place in any of the thermal processes.

Given that the:

Latent heat of fusion = 334.16 J g^{-1}

Latent hat of vaporization = 2259 J g^{-1}

Specific heat capacity for solid water (ice) = 2.06 J $g^{-1}K^{-1}$

Specific heat capacity for liquid water = 4.184 J g^{-1} K^{-1}

Specific heat capacity for gaseous water (steam) = 2.02 J g^{-1} K^{-1}

a. Clearly illustrate the thermal processes in a phase diagram when the ice is converte steam.

b. Calculate the amount of energy required to convert the whole ice into steam.