

EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCE – 2016/2017

FIRST SEMESTER (REPEAT)

(AUGUST/SEPTEMBER 2018)

PH 105 GENERAL PHYSICS

Time: 01 hour

Answer ALL Questions.

01. Define the following terms of an elastic material when it is subjected to an external force:

(a) Elasticity (b) Plasticity (c) stress and (d) strain

Starting from the appropriate expressions of stress and strain, show how Hooke's law can be deduced for an elastic material.

Sketch a typical graph of extension versus load for a stretched spring. Clearly indicate and briefly describe the following in the graph:

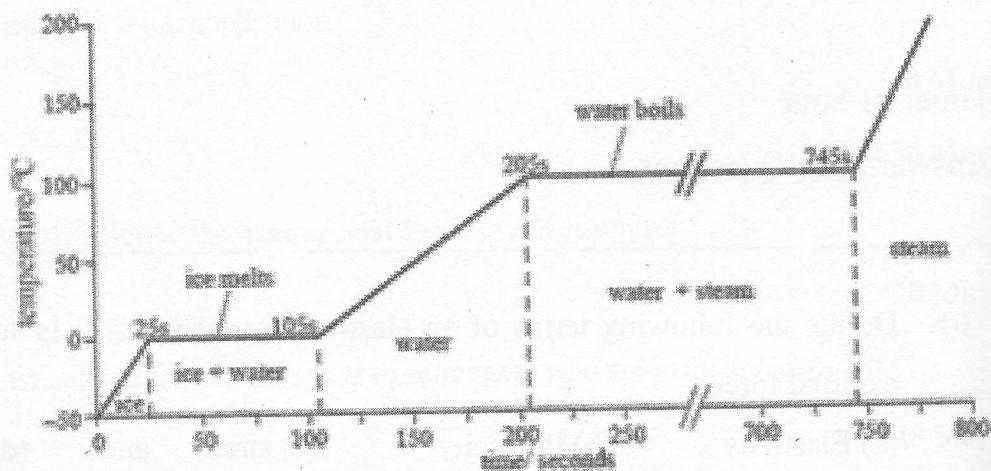
- i. validity region for Hooke's law
- ii. elastic limit and
- iii. plastic limit.

An elastic metal wire is found to be with 2.5 mm diameter and 2 m long. Upon applying a static force of 12 N to one end, it stretches by 0.3 mm. Determine the stress, strain and modulus of elasticity of the metal wire.

02. Differentiate between *latent heat of fusion* and *latent heat of vaporization*.

Briefly describe the three principle physical mechanisms by which heat energy can be transported.

The phase diagram of temperature versus time shows 1.1 kg of water is electrically heated at a constant rate of 2000 W at atmospheric pressure.



- Calculate the required energy in each state. State at least two assumptions you made in the calculations. The values in the figure and information given below may be useful.
- Calculate how much energy is required in total to change the ice at -50°C to steam at 100°C .

Given that

the specific heat for ice is $2100 \text{ J}/(\text{kg}^{\circ}\text{C})$

the specific heat for water is $4200 \text{ J}/(\text{kg}^{\circ}\text{C})$

the latent heat of fusion for ice is $3.34 \times 10^5 \text{ J}/\text{kg}$

the latent heat of vaporization for water is $2.26 \times 10^6 \text{ J}/\text{kg}$.