



ELIZADE UNIVERSITY

ILARA-MOKIN

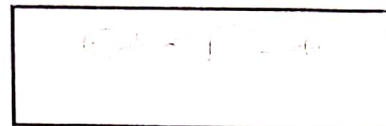
ONDO STATE

FACULTY: Basic and Applied Sciences
DEPARTMENT: Physical and Chemical Sciences
SECOND SEMESTER EXAMINATIONS
2017/2018 ACADEMIC SESSION (*Stream 1*)

COURSE CODE: PHY 106

COURSE TITLE: PROPERTIES OF MATTER

DURATION: 2 HOURS



HOD's SIGNATURE

TOTAL MARKS:

Matriculation Number: _____

INSTRUCTIONS:

1. Write your matriculation number in the space provided above and also on the cover page of the examination booklet.
2. This question paper consists of 2 pages with printing on both sides.
3. Answer all questions in the examination booklet provided.
4. Box your final answers.
5. Attempt any two (2) questions from section A and one (1) question from section B.

TABLE OF FORMULAS AND CONSTANTS

$g = 9.81 \text{ms}^{-2}$	$\pi = 3.142$	$P_{\text{atm}} = 101325 \text{Pa}$	$\rho_{\text{water}} = 1000 \text{kgm}^{-3}$	$\rho_{\text{oil}} = 790 \text{kgm}^{-3}$
$\rho_{\text{mercury}} = 13,600 \text{kgm}^{-3}$				

SECTION A

1. A metal wire 3.50m long and Young modulus 1.8×10^{11} Pa was given the following test. A load weighing 20N was originally hung from the wire to keep it taut. The position of the lower end of the wire was read on a scale as load was added.

Added load(N)	0	10	20	30	40	50	60	70
Increase in length(m)	0.0502	0.0507	0.0512	0.0517	0.0522	0.0527	0.0532	0.0627

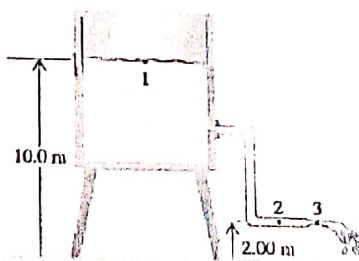
- (a) Graph these values, and determine the value of the diameter.
(b) The proportional limit occurred at 5.34cm. What was the stress at this point.

2. A Styrofoam slab has an area of 1.48m^2 and density 173kg/m^3 . When a 63.8kg swimmer is resting on it, the slab floats in fresh water with its top as the same level as the water's surface.

- (a) Find the thickness of the slab.
(b) If the swimmer leaves the slab, what percentage of the slab is above the water's surface?

3. Water flows steadily from an open tank as shown below. The elevation of point 1 is 10m, and the elevation of point 2 and 3 is 2m. The cross-sectional area at point 2 is 0.048m^2 ; at Point 3, it is 0.016m^2 . The area of the tank is very large compared with the cross-sectional area of the pipe. Assuming that Bernoulli's equation applies,

- (a) Compute the velocity of outflow from the tank (i.e. at point 3); and
(b) How much liquid will escape in 1 minute?



SECTION B

4. (a) Explain the following:
(i) Assumptions of kinetic theory of gases
(ii) Quantity of heat
(iii) Specific heat capacity
(b) A malaria patient has a body temperature of 39.60C . Convert this temperature to:
(i) $^{\circ}\text{K}$
(ii) $^{\circ}\text{F}$
5. (a) State zeroth law of thermodynamics.
(b) A 50Kg mass is placed on a frictionless piston fitted to a gas cylinder. If 149J of heat energy is supplied to the gas cylinder, increasing its internal energy by 100J. Calculate the height to which the mass on the piston is raised.