

ST. HENRYS'S COLLEGE KITOVU
END OF JUNE PHYSICS TEST 2004

S3

Time 1hr 30min.

Attempt all the questions;

SECTION A

- Which of the following best defines a vector quantity:
 - Quantity with magnitude only.
 - The product of force and its direction
 - Quantity with magnitude and direction
 - It's the weight of a body
- Calculate the increase in pressure, which a diver experiences when he descends 30m in sea water of density $1.2 \times 10^3 \text{kgm}^{-3}$
 - $3.0 \times 10^2 \text{Nm}^{-2}$
 - $1.2 \times 10^4 \text{Nm}^{-2}$
 - $3.6 \times 10^4 \text{Nm}^{-2}$
 - $3.6 \times 10^5 \text{Nm}^{-2}$.
- A blue copper sulphate crystal placed at the bottom of a beaker containing water is found to spread throughout the water after sometime due to;
 - osmosis
 - diffusion
 - capillarity
 - surface tension
- A strut is a girder placed in a structure to resist
 - twisting force
 - compression force
 - bending force
 - tensile force
- In a hydraulic press, the area of the piston on which the effort is applied is made small in order to;
 - obtain a pressure as large as possible.
 - Facilitate the movement of the piston downwards.
 - Transmit pressure equally throughout the liquid.
 - Transmit a force as large as possible to the load.
- Which of the following will make an object more stable?
 - making the base heavy.
 - Raising its center of gravity
 - Enlarging its base.
 - (ii) and (iii) only
 - (i) and (iii) only
 - (i) and (ii) only
 - (i),(ii) and (iii)
- The ball thrown vertically upwards returns to the point of projection 12s later, calculate the speed with which the ball was thrown.
 - 10ms^{-1}
 - 30ms^{-1}
 - 60ms^{-1}
 - 120ms^{-1}
- What is 730mmHg in Nm^{-2} ?
 - $\frac{13600 \times 1000 \times 10}{730}$
 - $\frac{13600 \times 730 \times 10}{1000}$
 - $\frac{13600 \times 730}{1000 \times 10}$
 - $\frac{13600 \times 10}{1000 \times 730}$

9. An Aluminium cube has a weight of 0.24N in air, 0.16N when fully immersed in water and 0.17N when wholly immersed in methylated spirit. The relative density of the methylated spirit is:

- A. $\frac{17}{24}$ B. $\frac{7}{8}$ C. $\frac{16}{17}$ D. $\frac{17}{16}$

10. A cylinder contains a liquid of density 1100Kg m^{-3} . the base area is 0.005m^2 and the height of the liquid is 5m.

Calculate the thrust exerted by the liquid on the base of the cylinder.

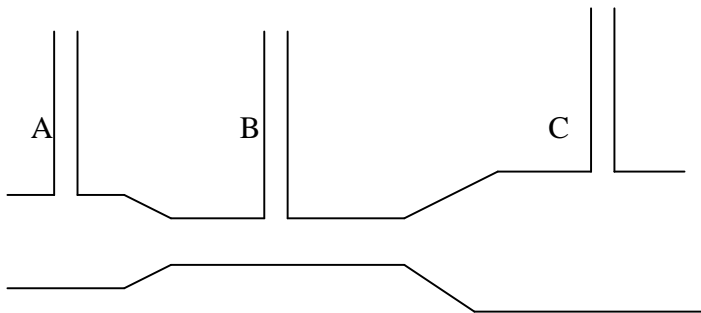
- A. 27.5N B. 55N C. 275N D. 4400N

SECTION B

1(a) (i) State Bernoulli's principle.

.....

(ii). The diagram below a non uniform section of a tube with three uniform manometer tubes A,B and C. Explain what will be observed inn this section when water is passed through this tube.



.....

(iii). What is meant by streamlining?

.....
.....
.....
.....

(b)(i) Distinguish between steady flow and turbulent flow.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

(c) Define the following terms.

Terminal velocity

.....
.....
.....
.....

Viscosity

.....
.....
.....
.....

(d) State any one factor that affect viscosity.

.....
.....

.....
.....
.....

(ii) Explain why water spreads on glass whereas mercury forms a spherical shape.

.....
.....
.....
.....
.....
.....
.....
.....
.....

©(i) Define capillarity;

.....
.....
.....

(ii) State any one application of capillarity.

.....
.....
.....

3.(a) Define friction.

.....
.....
.....

(ii) Distinguish between dynamic and static friction.

.....
.....
.....
.....
.....

(iii) State any three factors that affect friction.

.....
.....
.....
.....

(iv) Give any two applications of friction.

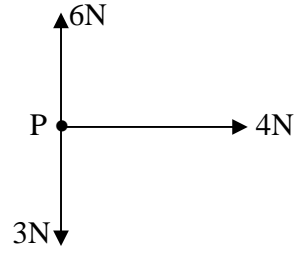
.....
.....
.....
.....

b(i) Distinguish between scalar and vector quantities;

.....
.....
.....
.....

(ii) Categorize the following as scalar or vectors;
pressure, momentum, velocity, temperature, energy, moment, displacement, volume;

(c). Three forces of 6N, 3N, and 4N are acting on a particle P as shown in the diagram below



calculate the magnitude of the resultant force on P.

.....
.....
.....
.....
.....

.....
.....
4a(i) Define the term pressure and give its SI units

.....
.....
.....
(ii) Describe an experiment to show that pressure in liquids increases with depth.

B(i) Describe how a simple barometer can be set up to measure the atmospheric pressure.

(ii) The barometer reading on a mountain is 720mmHg. Calculate the height at which the reading was taken. (density of mercury = 13600Kg m^{-3} , density of air = 1.25Kg m^{-3} , $g = 10\text{ms}^{-2}$)

.....
.....
.....
.....
.....
.....
.....

5(a) Define the following terms;

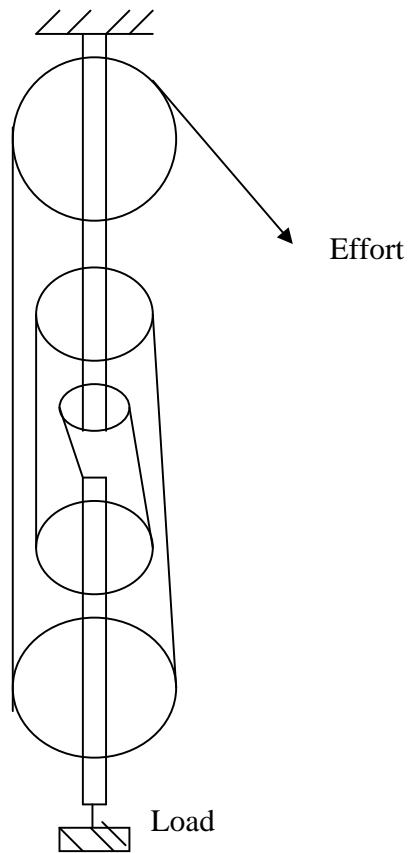
(i) mechanical advantage

.....
.....
.....

(ii) velocity ratio

.....
.....
.....

(b)



The diagram above shows a pulley system used to raise a load.

(i) What is the velocity ratio of the system?

.....
.....
.....
.....
.....

(ii) Find how far the load is raised if the effort moves down by 4m.

.....
.....
.....
.....
.....

(iii) Calculate the effort required to raise a load of 800N if the mechanical advantage of the system is 4

.....
.....
.....
.....
.....

(iv) Calculate the efficiency of the system.

.....
.....
.....
.....
.....

© Explain what happens to the efficiency of the system in b) above if the load is much

(i) less than 800N

.....
.....
.....

.....
.....

(ii) more than 800N

.....
.....
.....
.....
.....

(d) Draw a sketch graph to show how mechanical advantage of the system in (b) varies with the load

(e) Give two practical applications where pulley systems are used.

.....
.....

END