

# KAN. G. P. AGIUS DE SOLDANIS

## Half Yearly Examinations

2007 - 2008

DOCTRINAM  
PIETATE  
ALERE

Subject: **PHYSICS**  
Form: **3 Sec**  
Time: **1 hr 30 min**

NAME: _____
CLASS: _____ INDEX NO: _____

### Instructions to Candidates

Answer ALL questions.

ALL WORKING MUST BE SHOWN

### Information to Candidates

Calculators may be used.

The following is a set of equations and some data that you may find useful.

$\rho = \frac{m}{V}$	$P = \frac{F}{A}$
$P = h\rho g$	Total pressure = $h\rho g$ + atmospheric pressure
$W = mg$	Moment = force $\times$ distance
$W = m \times 10$	Total length = original length + extension
Acceleration due to gravity, $g = 10 \text{ m/s}^2$	

Question	1	2	3	4	5	6	7	8	Total Exam	Practical	Final Mark
Marks											

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## Section A: This section carries 40 marks

1. Complete the following table:

(6 marks)

Physical Quantity	SI Unit
length	metre (m)
mass	
force	
pressure	
density	
time	
energy	

2. The following is a diagram of a spring when loaded:

i. What is the length of the spring without any load?

(2 marks)

\_\_\_\_\_

ii. What is the length of the spring with a load of 9 kg?

(2 marks)

\_\_\_\_\_

iii. Calculate the extension of the spring.

(3 marks)

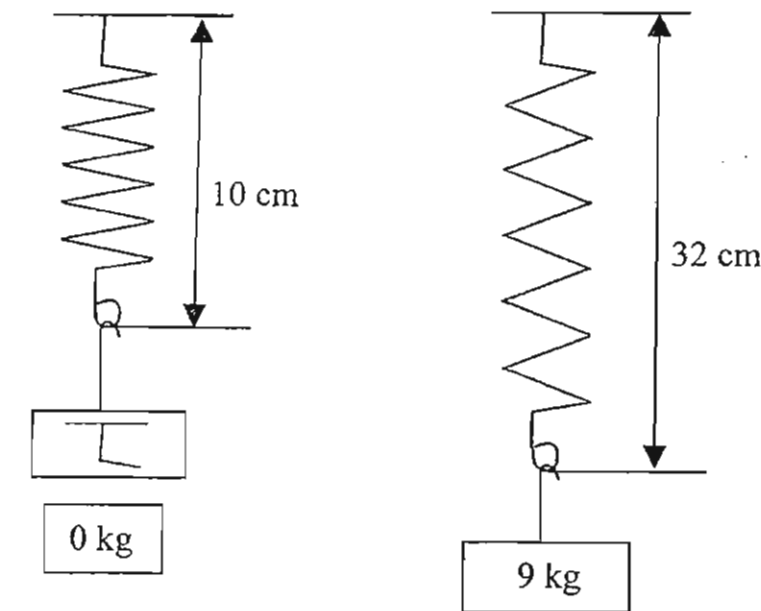
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iv. What is the length of the spring when the extension is 30 cm?

(3 marks)

\_\_\_\_\_



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3. A block of sides 1 m, 0.75 m and 1 m has a mass of 2700 000 g. (2 marks)

i. Find the volume of the block in  $m^3$ . (2 marks)

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ii. What is the mass of the block in kg? (2 marks)

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iii. Calculate the density of the block. (3 marks)

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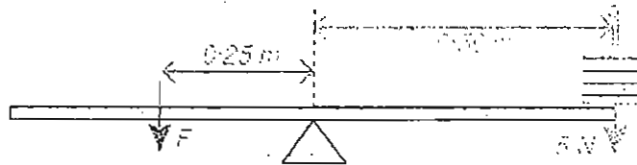
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iv. Water has a density of  $1000 \text{ kg/m}^3$ . Would the block sink in water? (1 mark)

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4. The following is a diagram of a balanced system:



a. Which force will turn the system clockwise? (1 mark)

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b. Which force will turn the system anticlockwise? (1 mark)

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c. Calculate the clockwise moment. (2 marks)

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d. What is the anticlockwise moment? (1 mark)

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e. Find the value of force F. (3 marks)

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5. This question is about energy

- (a) Solar, oil, natural gas, coal, wind, hydroelectric, tidal and nuclear are eight energy sources. 4 of these are renewable and the other 4 are non-renewable. (2 marks)
- i. Which of the above are renewable sources?

\_\_\_\_\_

\_\_\_\_\_

- ii. Which of the above are non-renewable sources? (2 marks)

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(b) Fill in the following using these words (4 marks)

(elastic potential, light, electrical, gravitational potential, chemical, heat, kinetic, sound)

- i. A match transfers \_\_\_\_\_ energy to \_\_\_\_\_ and \_\_\_\_\_ energy.
- ii. A loudspeaker changes \_\_\_\_\_ energy to \_\_\_\_\_ energy.
- iii. A falling bucket transfers \_\_\_\_\_ energy to \_\_\_\_\_ energy.
- iv. A stretched rubber band stores in it \_\_\_\_\_ energy.

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**Section B: This section carries 45 marks**

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6. This question is about Hooke's law

A spring 53 cm long was loaded and the following are the results obtained from the experiment.

Load / N	0	1	2	3	4	5	6	7	8	9
Extension / cm	0	2	4	6	8	10	12	14.8	19.6	27.2

- (a) Plot a graph of extension (y-axis) against load (x-axis). (8 marks)
- (b) Mark the elastic limit on the graph. (1 mark)
- (c) Using your graph find the load supported by the spring when its extension is 11 cm. (2 marks)
- \_\_\_\_\_
- (d) Using your graph, find the extension of the spring when a load of 3.5 N is supported by the spring. (2 marks)
- \_\_\_\_\_
- \_\_\_\_\_

- (e) Which part of the graph obeys Hooke's Law? (2 marks)
- \_\_\_\_\_
- \_\_\_\_\_

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(c) The fish now swims at the surface of the water.

i. What is the pressure made by the water on the fish at the surface of the water?

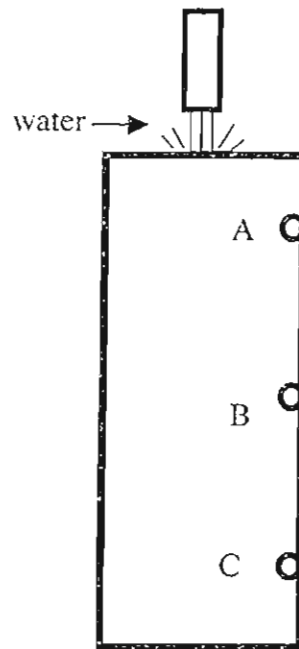
\_\_\_\_\_ (1 mark)

ii. What is the total pressure on the fish at the surface of the water?

\_\_\_\_\_ (2 marks)

(d) The diagram shows a can filled with running water. The can has three holes A, B and C. Draw the paths taken by the water as it flows out from the holes.

(6 marks)



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only

7. This question is about pressure

(a) A rectangular block measures 10 cm by 5 cm by 2 cm, and has a mass of 2.5 kg.  
i. Find the weight of the block in N? (3 marks)

\_\_\_\_\_

ii. What is the area of the largest face of the block in  $\text{cm}^2$ ? (2 marks)

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iii. Find the pressure in  $\text{N/cm}^2$  exerted by the block when resting on its largest face? (3 marks)

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iv. The block now rests on its smallest face. Find this area. (2 marks)

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v. Find the pressure in  $\text{N/cm}^2$  exerted by the block when resting on its smallest face? (3 marks)

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vi. For the same weight as area decreases, pressure \_\_\_\_\_. (2 marks)

8. This question is a about pressure in liquids.

A fish is swimming at a depth of 25 m: The density of sea water is  $1100 \text{ kg/m}^3$ .

(a) Find the pressure made by the sea water on the fish. (3 marks)

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(b) The fish swims to a different depth and the pressure made on it is 165 000 Pa.  
At what depth is the fish swimming? (3 marks)

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