



# KAN. G. P. AGIUS DE SOLDANIS



## Half Yearly Examinations

2007 - 2008

---

Subject: **PHYSICS**  
Form: **3 Junior Lyceum**  
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.

$$\rho = \frac{m}{V}$$

$$P = \frac{F}{A}$$

$$P = h\rho g$$

$$\text{Total pressure} = h\rho g + \text{atmospheric pressure}$$

$$W = mg$$

$$\text{Moment} = \text{force} \times \text{distance}$$

$$W = m \times 10$$

$$\text{Total length} = \text{original length} + \text{extension}$$

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											

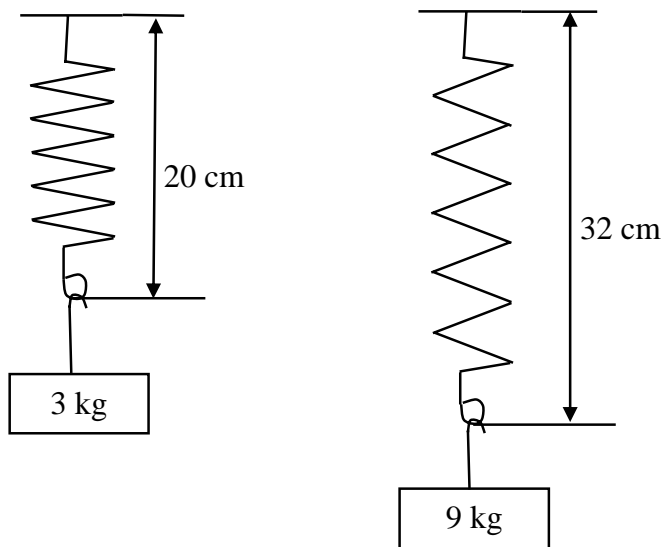
Use this margin  
for rough work  
only

## 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 with different masses:



i. What is the length of the spring without any load? (3 marks)

---

---

---

---

ii. What load will give an extension of 10 cm? (3 marks)

---

---

iii. What will be the total length of spring with a load of 5 kg? (3 marks)

---

---

iv. What is the weight on the spring when it is 20 cm long? (1 mark)

---

Marks in this page:

Use this margin for rough work only

3. A block of sides 100 cm, 75 cm and 1 m has a mass of 2700 000 g. (2 marks)
- i. Find the volume of the block in  $\text{m}^3$ . (2 marks)

---

---

---

- ii. What is the mass of the block in kg? (1 mark)

---

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

---

---

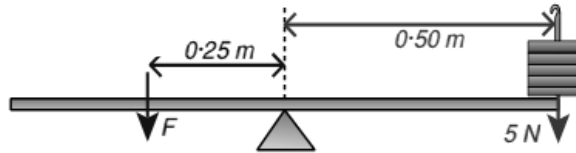
---

- iv. Water has a density of  $1000 \text{ kg/m}^3$ . Would the block sink in water? Why? (2 marks)

---

---

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



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

---

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

---

- c. Calculate the clockwise moment. (2 marks)

---

---

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

---

- e. Find the value of force F. (2 marks)

---

---

---

- f. Find the value of the upward force at the pivot, if the ruler is weightless. (1 mark)

---

Marks in this page:

Use this margin  
for rough work  
only

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.

i. Which of the above are renewable sources? (2 marks)

\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_

(b) Fill in the following: (4 marks)

i. A match transfers \_\_\_\_\_ energy to  
\_\_\_\_\_ and \_\_\_\_\_ energy.

ii. A light bulb changes \_\_\_\_\_ energy to  
\_\_\_\_\_ and \_\_\_\_\_ energy.

iii. A falling bucket transfers \_\_\_\_\_ energy to  
\_\_\_\_\_ energy.

---

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

---

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). (7 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. (1 mark)

\_\_\_\_\_

(d) With the help of the graph, find the **total length** of the spring when a load of 3.5 N is supported by the spring. (3 marks)

\_\_\_\_\_  
\_\_\_\_\_

(e) State Hooke's Law (2 marks)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(f) Which part of the graph obeys Hooke's Law? (1 mark)

\_\_\_\_\_  
\_\_\_\_\_

Marks in this page:

Use this margin for rough work 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. (1 mark)

\_\_\_\_\_

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

\_\_\_\_\_

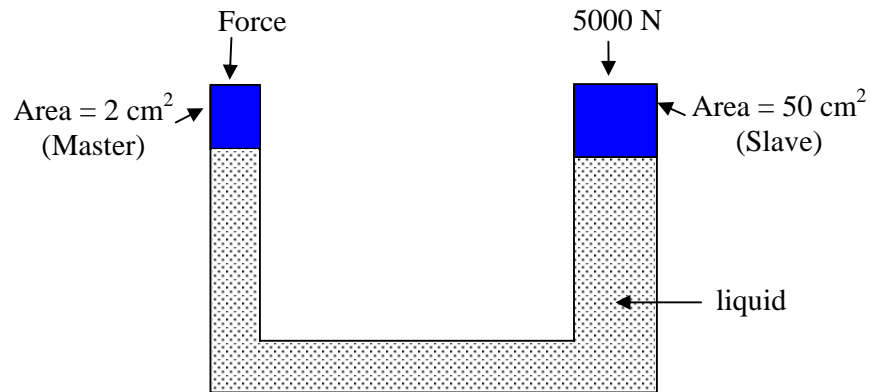
iii. Find the pressure in  $\text{N}/\text{cm}^2$  exerted by the block when resting on its largest face. (2 marks)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(b) The following is a diagram of a hydraulic machine:



i. Calculate the pressure on the slave piston. (2 marks)

\_\_\_\_\_

\_\_\_\_\_

ii. What is the pressure in the liquid? (1 mark)

\_\_\_\_\_

iii. What is the pressure on the master piston? (1 mark)

\_\_\_\_\_

iv. Suggest a suitable liquid. (1 mark)

\_\_\_\_\_

v. Calculate the force exerted on the master piston. (3 marks)

\_\_\_\_\_

\_\_\_\_\_

vi. Why is it important that we use a liquid in the cylinders? (2marks)

\_\_\_\_\_

\_\_\_\_\_

Marks in this page:

Use this margin  
for rough work  
only

8. This question is a about pressure in fluids.

An object is laying on the sea bed at a depth of 25 m. The density of sea water is  $1100 \text{ kg/m}^3$ , and atmospheric pressure is 101 kPa.

(a) Find the pressure exerted by the sea water on the object. (3 marks)

---

---

---

(b) What is the atmospheric pressure in Pa? (1 mark)

---

(c) Find the total pressure exerted on the object. (2 marks)

---

---

(d) The object was taken to a different point and the total pressure exerted on it was 266 000 Pa.

(i) What is the pressure due to the water alone? (1 mark)

---

---

(ii) What is the height of the water above the object? (3 marks)

---

---

---

(e) Draw a diagram and describe a simple experiment to show how pressure changes with depth in liquids. (5 marks)

---

---

---

---

---

---

Marks in this page:

Use this margin  
for rough work  
only