

Maria Regina College Girls' Secondary School Mosta Half -Yearly 2011		
Physics	Form 4	Time - 1 ½ h

Practical Exam (15)	Written Paper (85)	Test (100)

Name & Surname _____

Index No. _____

Class _____

Teacher _____

The use of a scientific calculator is allowed in this paper.

Where necessary $g = 10\text{m/s}^2$

These equations might help you.

$$F = ma$$

$$a = \frac{v-u}{t}$$

$$\text{Magnification} = \frac{\text{Height of image}}{\text{Height of object}}$$

$$S = \frac{1}{2}gt^2$$

$$V = u + at$$

$$S = \frac{(u+v)t}{2}$$

$$\text{Magnification} = \frac{\text{Image distance}}{\text{Object distance}}$$

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

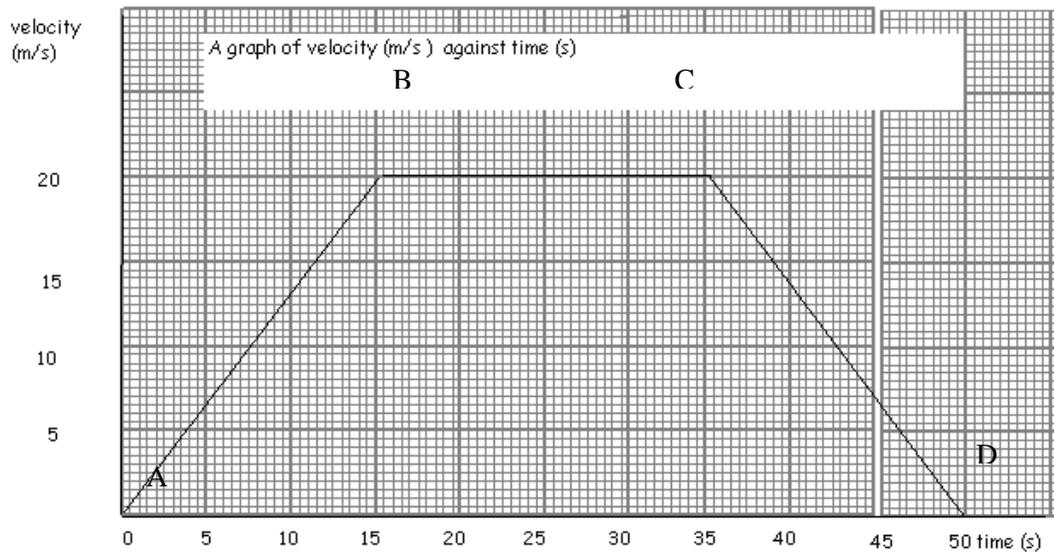
Section A. Answer all questions. This section carries 55 marks.

1. Complete the following table.

<i>Basic Quantity</i>	<i>Symbol</i>	<i>SI Unit</i>	<i>Scalar or Vector</i>
Mass		kg	scalar
Final velocity	v		
acceleration		m/s^2	

[5]

2. The velocity time graph below shows how the velocity of a cyclist changes with time.



a. Describe the motion of the cyclist at points

- i. AB _____
- ii. BC _____
- iii. CD _____

[3]

b. For how much time did the cyclist travel at constant velocity?

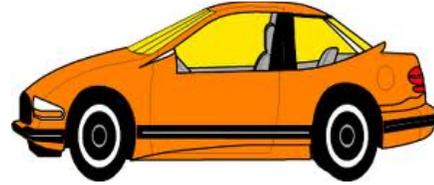
[1]

c. What was the maximum velocity of the cyclist? _____ [1]

d. Calculate the acceleration of the cyclist. [3]

e. Find the distance travelled by the cyclist for the first part of the journey ie. for the part AB. [2]

3. This question is about the stopping distance of a car.



A car of mass 1200kg is travelling in a straight line. The driver is moving at a velocity of 40m/s. Suddenly, a cat runs across the street. The driver has a reaction time of 0.6s.

a What is the thinking distance travelled by the car? [2]

b Name two factors that affect the thinking distance of the car. [2]

c Explain why the use of a mobile is not allowed while driving. [1]

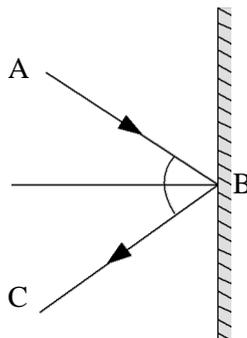
d. The same car travels a braking distance of 44 m before it stops.

i. What is meant by the term braking distance? [2]

ii. Name one factor that affects the braking distance of a car? [1]

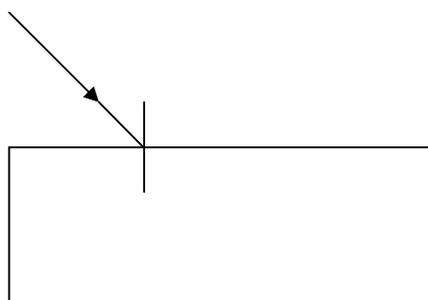
iii. Calculate the total stopping distance of the car. [2]

4. This question is about reflection of light.



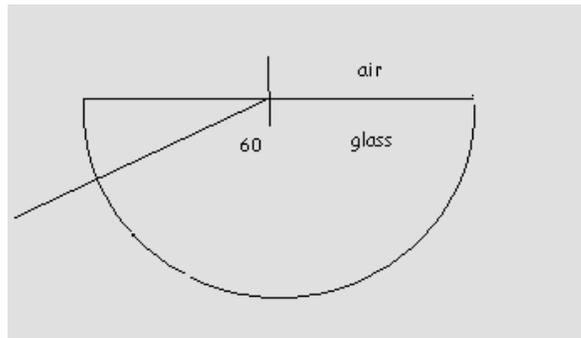
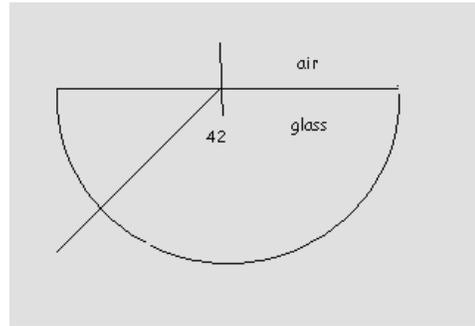
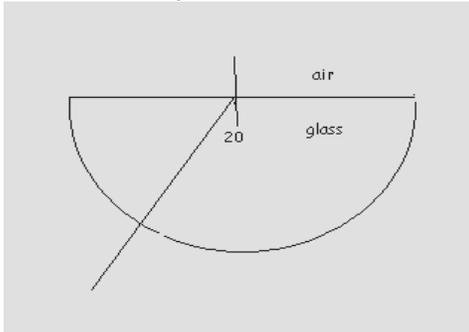
- Name the rays of light
 AB = _____ BC = _____ [2]
- What can you say about the value of the angle of incidence and the value of the angle of reflection? _____ [1]
- If the object distance is 5m, what is the image distance? _____ [1]
- If the height of the girl is 1.50m, how high does her image appear to be? _____ [1]
- Is the image real or virtual? _____ [1]
- On her shirt, she has the word 'STAR.' How does the word 'STAR' look in the mirror? _____ [1]

g. This part is about refraction. The diagram below shows a rectangular glass block. Complete and label the rays of light . Mark the angle of incidence and the angle of refraction.



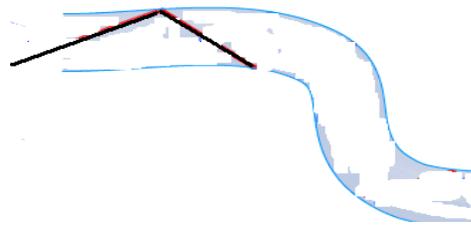
[3]

5. This question is about one of the properties of light.



- a. Complete the diagrams to show how light travels. The critical angle of glass is 42° . Label the rays of light [4]

The diagram shows part of the fibre optic cable.



- i. On the above diagram continue the path taken by the incident ray. [2]
- ii. State the two conditions that are needed for total internal reflection to take place. [2]

iii. Name two practical uses of total internal reflection in daily life. [2]

6. This question is about lenses.

A student places an object 5 cm in front of a convex lens of focal length 3 cm.

a. Draw a scale diagram below to show how an image is formed.

[4]

b. Write down three properties of the image produced [3]

c. Measure the image distance. [1]

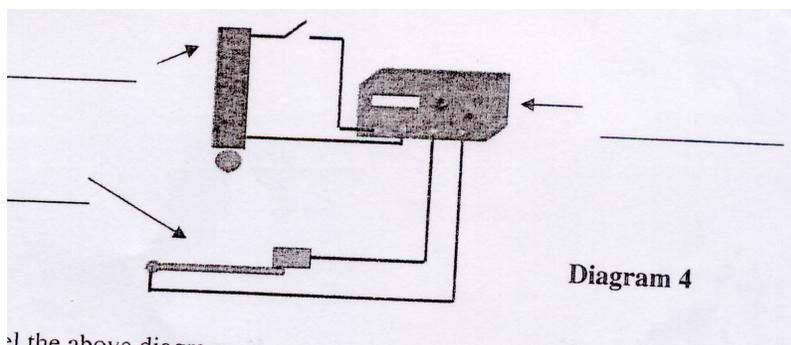
d. Calculate the magnification of the image formed [2]

Section B . This question carries 30 marks

7. This question is about the measurement of the acceleration due to gravity.

Rita and Maria dropped a rubber ball from the balcony which is 4.25 m high.

- a. What was the initial velocity of the ball?_____ [1]
- b. What was the acceleration of the ball? _____ [1]
- c. How could Maria and Rita measure the distance?
-----[1]
- d. If instead of rubber ball they dropped a metal ball, will the time of fall increase, decrease or stay the same ? Give a reason for your answer.-----[2]
- e. This was the set up of the apparatus that is used to find the acceleration due to gravity



- i. Label the above apparatus as indicated [4]
- ii. Describe how the time of fall 't' is measured [2]

iii. Describe how the distance 'h' is measured. [1]

iv. If the distance 's' is 1 m and the time of fall is 0.45 s, calculate the value of the acceleration due to gravity. [3]

8. This question is about Newton's laws of motion.



a. Name and draw two forces acting on the car. [4]

b. The car accelerates uniformly along the road.

i. Complete the table below by working the resultant force acting on the car. [1]

Force A / (N)	800	1000	1500	2100	3000	3700	4500	6000
Force B / (N)	800	700	1000	1300	2000	2500	3100	4300
Resultant force / (N)	0	300						
Acceleration / (m/s ²)	0	0.6	1.0	1.6	2.0	2.4	2.8	3.4

ii. Plot a graph of resultant force (y-axis) against acceleration (x-axis) [5]

iii. What is the relationship between the resultant force and the acceleration _____ [2]

iv. From your graph find the resultant force when the car's acceleration is 3m/s² _____ [1]

v. Mention 2 safety features present in a car.

 ----- [2]

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