FEDERAL REPUBLIC OF SOMALIA

GRADE 12 EXAMS, 2015

PHYSICS

OFFICE OF EXAMINATIONS AND CERTIFICATION

SomExams

Name.....

School .....

Roll Number.....

Somali Federal Ministry of Education, Culture & Higher Education

Form Four National Standardized Examinations.

MAY / JUNE 2015

PHYSICS EXAMINATION

TIME 2 HOURS

INSTRUCTIONS:

- This paper consists of 16 printed pages
- There are 2 sections.

Part One: 20 Multiple Choice Questions **(40 marks)**
Part Two: 8 Structured Questions **(60 marks)**
TOTAL (100 marks)

- Answer all questions in the spaces provided
- No extra paper is allowed

Use this page for rough work. It will NOT be marked.

PART ONE: Multiple Choice (40 marks). Answer all questions. Circle the correct answer.

1. Asha uses the apparatus shown in the figure to heat up the water in the beaker. The heat at the bottom reaches the top mainly by

a) Conduction

b) Convection

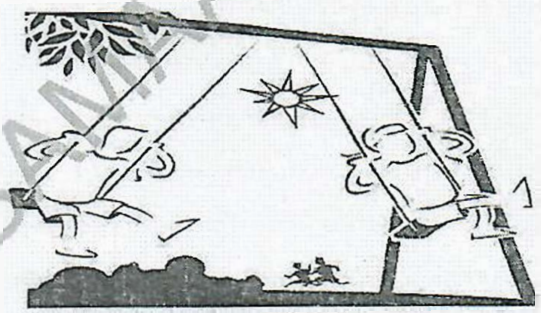
c) Radiation

d) Evaporation

2. A spring stretches by 2 cm when a force of 10 N is applied. What will be the extension when a force of 40N is applied?

a) 1 cm b) 2 cm c) 8 cm d) 0.5 cm

3. A child on a swing goes backwards and forwards 100 times in 5 seconds. What is the period of the oscillation?



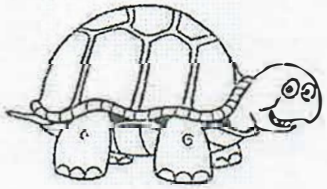
a) 20 sec

b) 20 sec

c) 0.0 sec

d) 0.02sec

4. The speed of a tortoise with a twisted ankle, shuffling 10m in 100 sec is



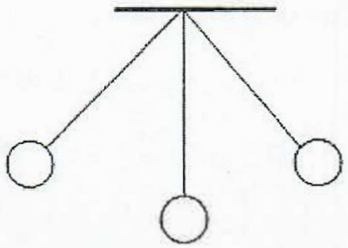
a) 10m/s

b) 0.0m/s

c) 0.2m/s

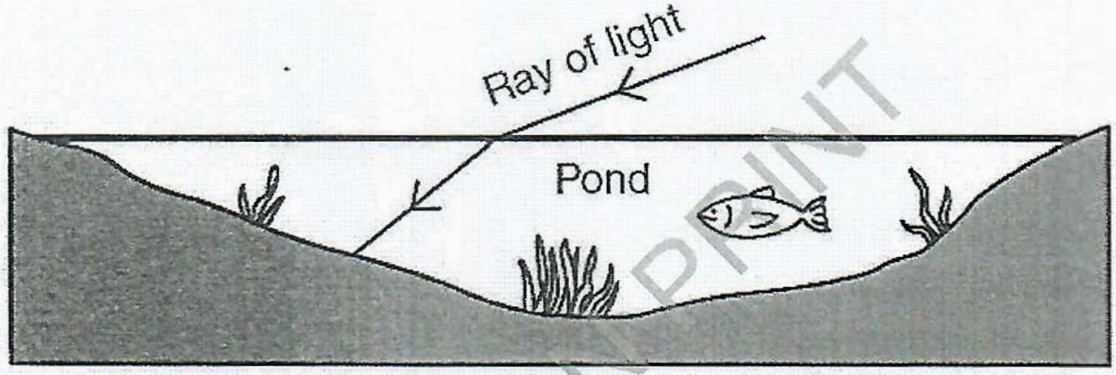
d) 0.1m/s

5. The period of a simple pendulum increases as



a) Length increases
b) Length decreases
c) Mass increases
d) Mass decreases

6. The diagram below shows what occurs when a ray of light strikes and enters a pond.



Which property of light is illustrated when the ray enters the pond?

a) Refraction b) Reflection c) Absorption d) Emission

7. Deeqa wants to measure the current flowing a circuit. She has to use

a) Voltmeter b) Ammeter c) Galvanometer d) Micrometer

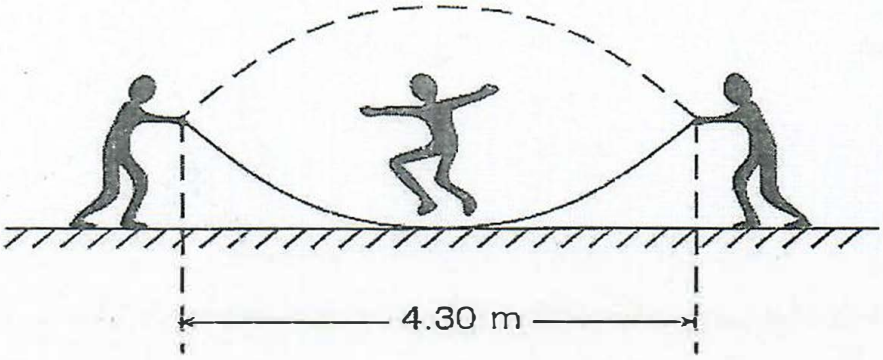
8. Sound waves cannot carry energy through

a) Water b) air c) a mirror d) a vacuum

9. 1 km/h = _____ m/s

a) $\frac{5}{18}$ b) $\frac{18}{5}$ c) $\frac{50}{3}$ d) $\frac{3}{50}$

10. While playing, two children in Muqdisho create a standing wave in a rope, as shown in the diagram below. A third child participates by jumping the rope.



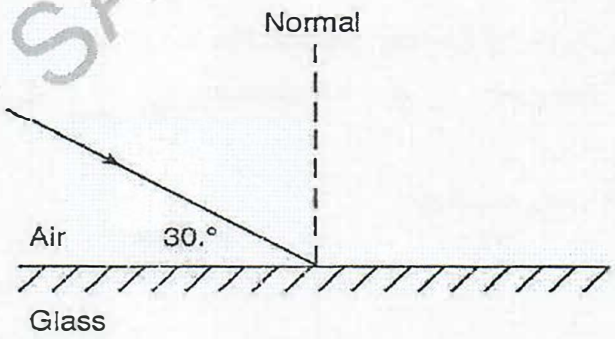
What is the wavelength of this standing wave?

a) 2.15 m b) 4.30 m c) 6.45 m d) 8.60 m

11. An echo is produced when sound waves are:

a) bent around corners of object.
b) transmitted by an object.
c) reflected back by an object.
d) absorbed by an object.

12. The diagram below represents a light ray striking the boundary between air and glass.



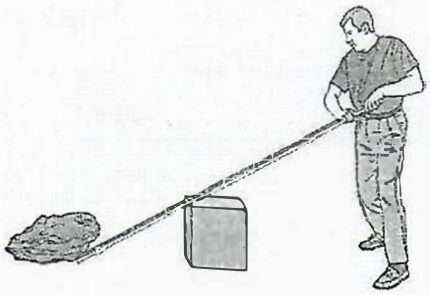
What would be the angle between this light ray and its reflected ray?

a) 30^0 b) 60^0 c) 120^0 d) 150^0

13. What unit is weight measured in?

a) g b) kg c) k/g d) N

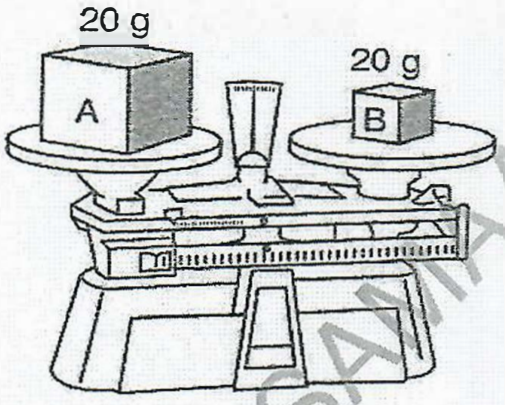
14 .The diagram below shows Mohamed using a simple machine to move a rock.



Which simple machine is Mohamed using?

a) pulley
b) wheel and axle
c) inclined plane
d) lever

15.The diagram below shows 20 grams of two different materials, A and B, on a laboratory balance.



Compared to material A, material B has a different

a) density
b) mass
c) phase
d) shape

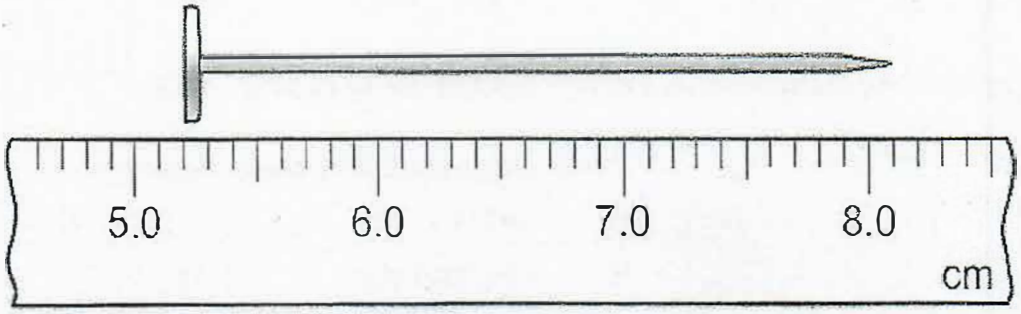
16. Layla raises 10kg mass of books from the ground and puts them on a shelf 5m high. The potential energy stored in the books is

a) 1000 J b) 700 J c) 500 J d) 300 J

17. The unit of frequency is the

a) decibel b) watt c) hertz d) Volt

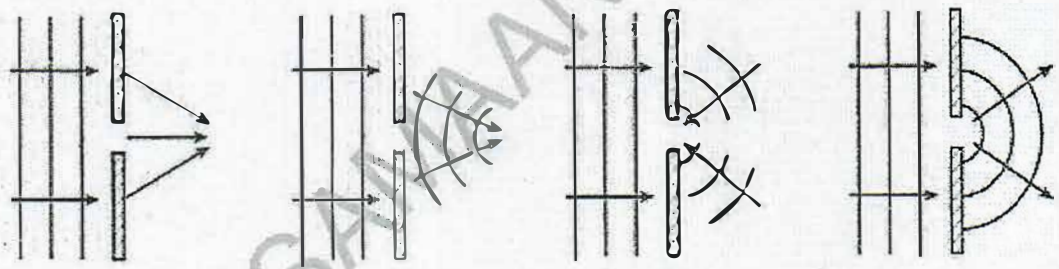
18. A ruler is used to measure the length of a nail.



What is the length of the nail?

a) 1.3 cm b) 2.9 cm c) 5.2 cm d) 8.1 cm

19. Which diagram best represents the shape and direction of a series of wave fronts after they have passed through a small opening in a barrier?



a) b) c) d)

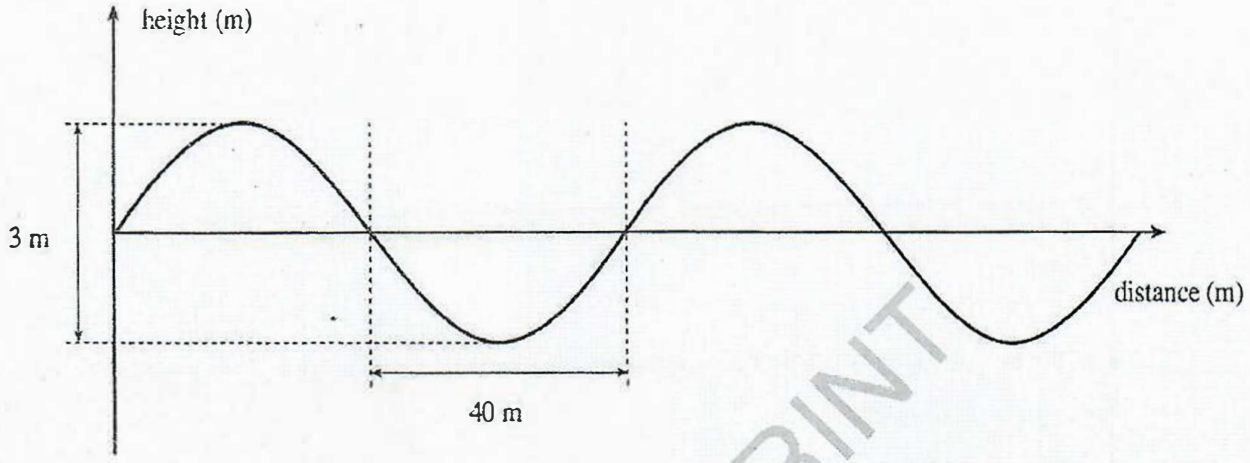
20. The half- life of radon is 1 minute. What mass of radon is still present from a sample of 8g after 3 minutes?

a) 4g b) 1g c) 2g d) 8g

PART 2: ANSWER ALL QUESTIONS

QUESTION 1: WAVES 8 Marks

The diagram represents a wave on the ocean.

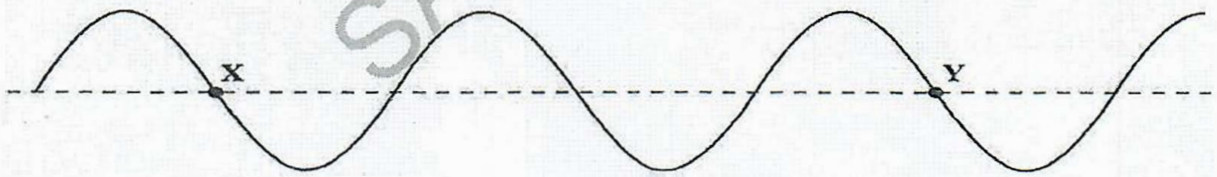


(a) Use the information given in the diagram to find:

(i) the wavelength of the wave: Wavelength = ... [2 mark]

(ii) the amplitude of the wave. Amplitude = ... [2 mark]

b). The diagram shows a wave travelling across the surface of water.



(a) How many complete waves are there between X and Y?

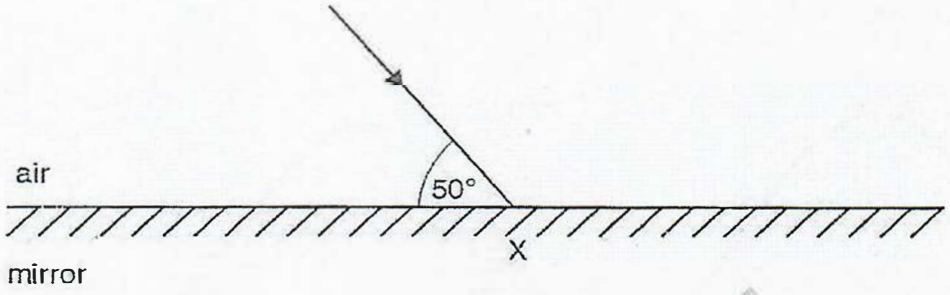
..... [2 mark]

(c) The frequency of the wave is 5Hz. What does this mean?

..... (2 mark)

QUESTION 2: REFLECTION AND REFRACTION OF LIGHT (10 marks)

a) The figure shows a ray of light incident on mirror at X. The incident ray makes an angle of 50^0 with the surface of the mirror.



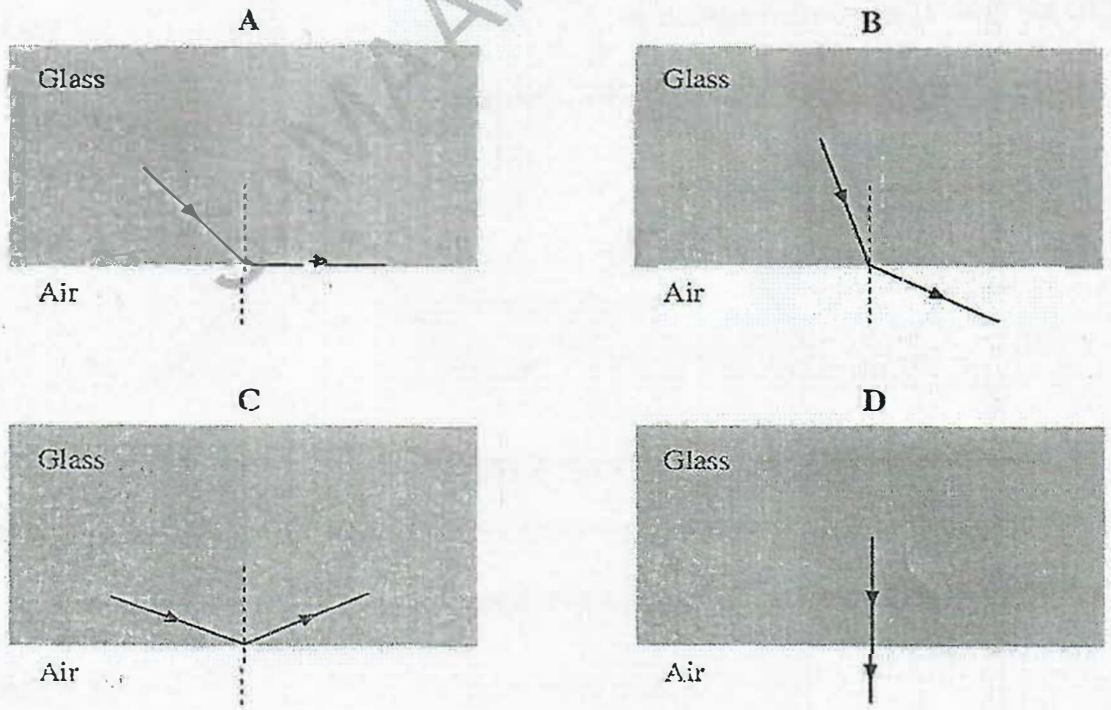
i) Complete the figure to show the normal and the reflected ray at X. (3 Marks)

ii) State the values of the

1. angle of incidence, ...

2. angle of reflection, ...(2 Marks)

b) The diagrams show a ray of light hitting a surface between glass and air.



i) Which diagram, A, B, C, or D shows a ray of light that is not refracted? .....

ii) Which diagram shows total internal reflection .....

iii) Which diagram shows a ray of light that is refracted at the critical angle? .....

iv) State one practical use of total internal reflection

.....

.....(1,1,1,2 Marks)

QUESTION 3: SOUND (9 Marks)

a) . Explain what is meant by a longitudinal wave.

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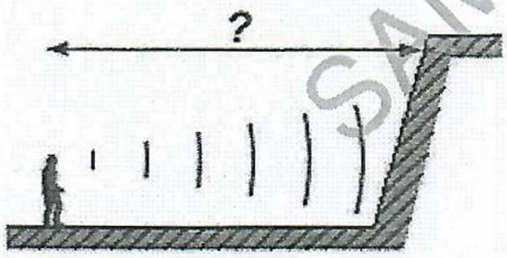
..... 2 marks

b) A man shouts loudly close to a high wall as shown in the diagram below.



He hears an echo. If the man is 40m from the wall, how long after the shout will the echo be heard? (Speed of sound in air = 330m/s)

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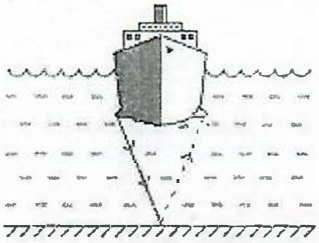
..... (3 Marks)

b). Ultrasound is used in sonar instruments to measure the depth of the sea. These instruments operate at a frequency of 50 000 Hz. The waves travel at a speed of 1500 m/s in water.



A wave is sent out from the boat to the sea bed and is received back 3 seconds later.

(i) State why ultrasound cannot be heard by humans.

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..... [1mark]

(ii) Use the equation: distance = speed × time, to calculate the depth of the sea. [2 marks]

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(c) State **one** other use of ultrasound.

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QUESTION 4: MODERN PHYSICS (6 Marks)

a) Use the following words to complete the following sentences. (4 marks)

infra-red,	microwaves,	radio waves,	ultra-violet,	visible light.

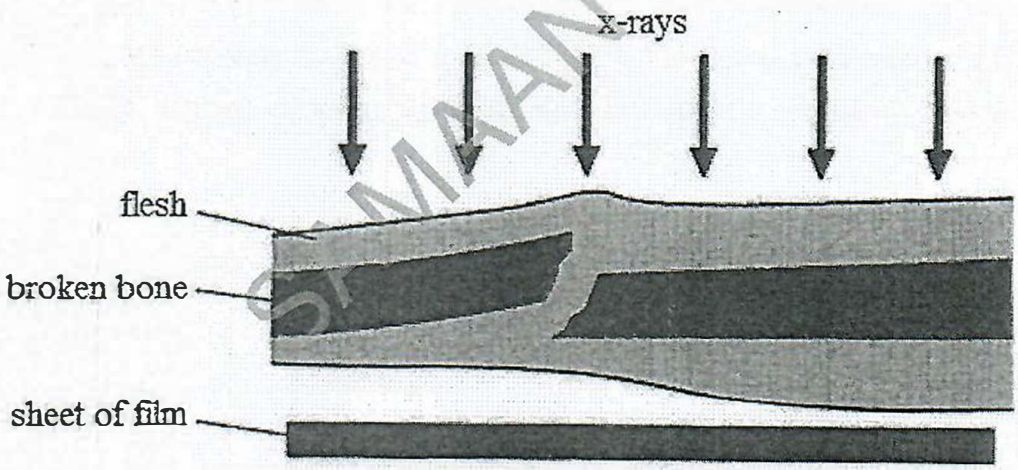
i) Food can be cooked using.....

ii) Thermometers can detect .....

iii) Photographs taken with ordinary camera use.....

iv) Skin cancer can be caused by .....

b) A hospital uses X-ray machines to take photographs of broken bones. A sheet of film is placed under the broken bone. The X-ray machine is turned on. An image of the broken one is produced on the film.



a) X-rays are dangerous. How does the X-ray operator protect himself from them?

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.....(2 mark)

QUESTION 5: NUCLEAR PHYSICS (6 marks)

a) Compete the following gaps with the words given below.

Alpha	*Beta*	*Gamma*

(i) Has the most penetration power .....1 mark

(ii) Carries positive charge .....1 mark

(iii) Is made up of electrons .....1 mark

(iv) Is not deflected by an electric field .....1 mark

(v) Has the most ionization power..... 1 mark

b) The activity of radioactive sample of Iodine-128 falls from 200 counts/second to 25 counts/second in 75 minutes. Calculate the half-life of this radioactive sample of Iodine.

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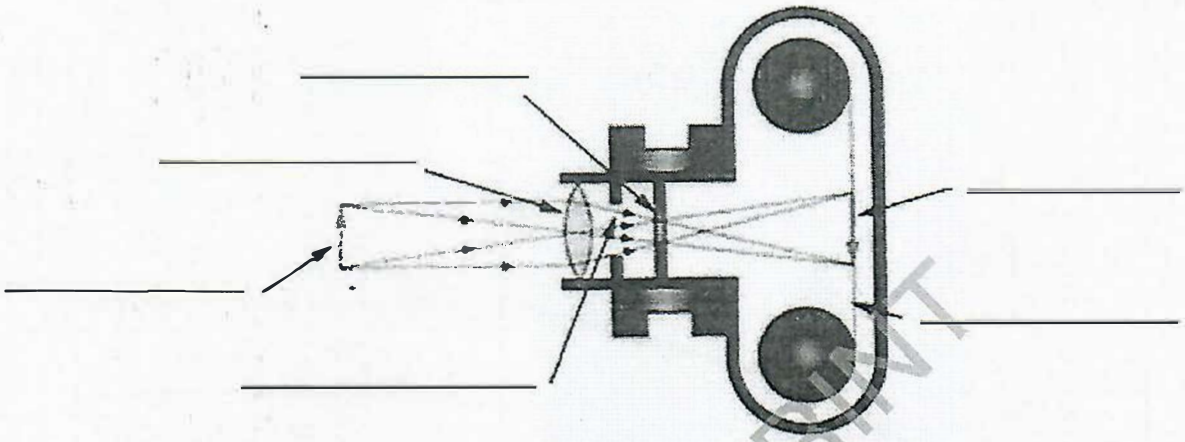
.... (2 marks)

QUESTION 6: PROPERTIES OF LIGHT (6 Marks)

Shutter	Object	Lens	Film	Aperture	Inverted Image

a) Use the above words to fill in parts of a camera (3 marks)



b) An object is 4.5m high in front of a pin-hole camera. If the width of the camera is 26cm and the size of the image is 1.8 cm, find the distance of the object.

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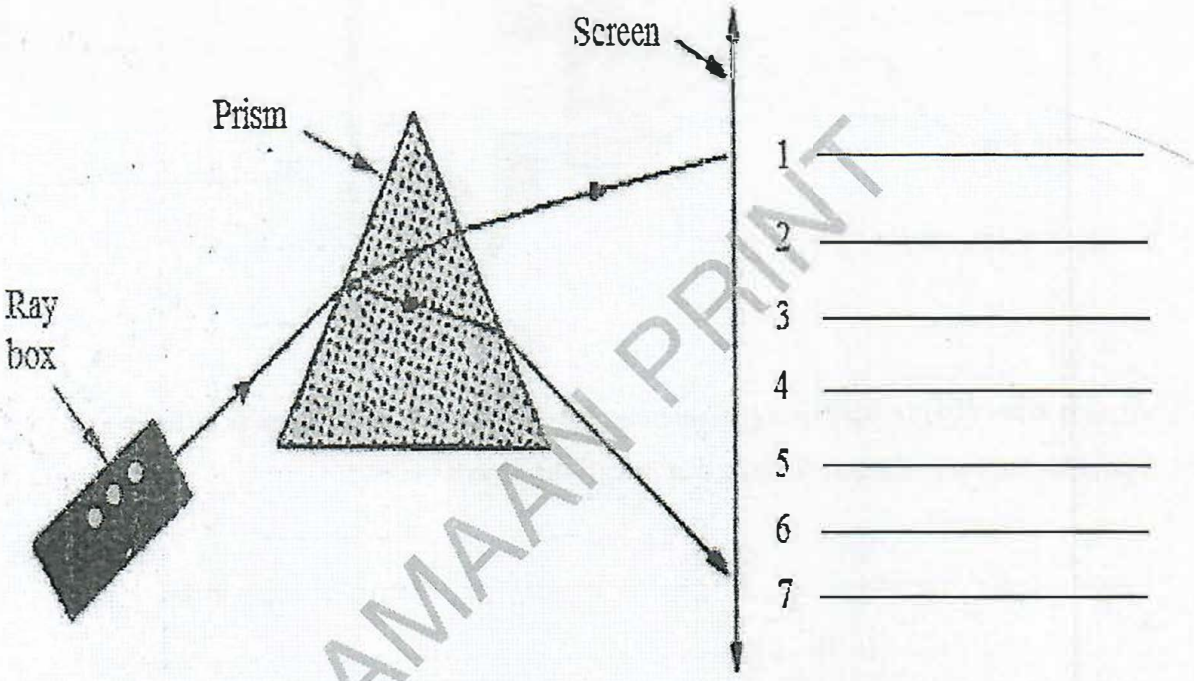
.....(3 mark)

QUESTION 7: DISPERSION OF LIGHT (6 marks)

a) A beam of white light passes through a triangular prism onto a white screen as shown below. The following colours are seen on the screen: **yellow, red, green, orange, blue, indigo, and violet.** Write down the colours as they appear on the screen from top to bottom on the diagram. (4 marks)



c) Explain what would happen if a red filter is placed in the path of the white light.

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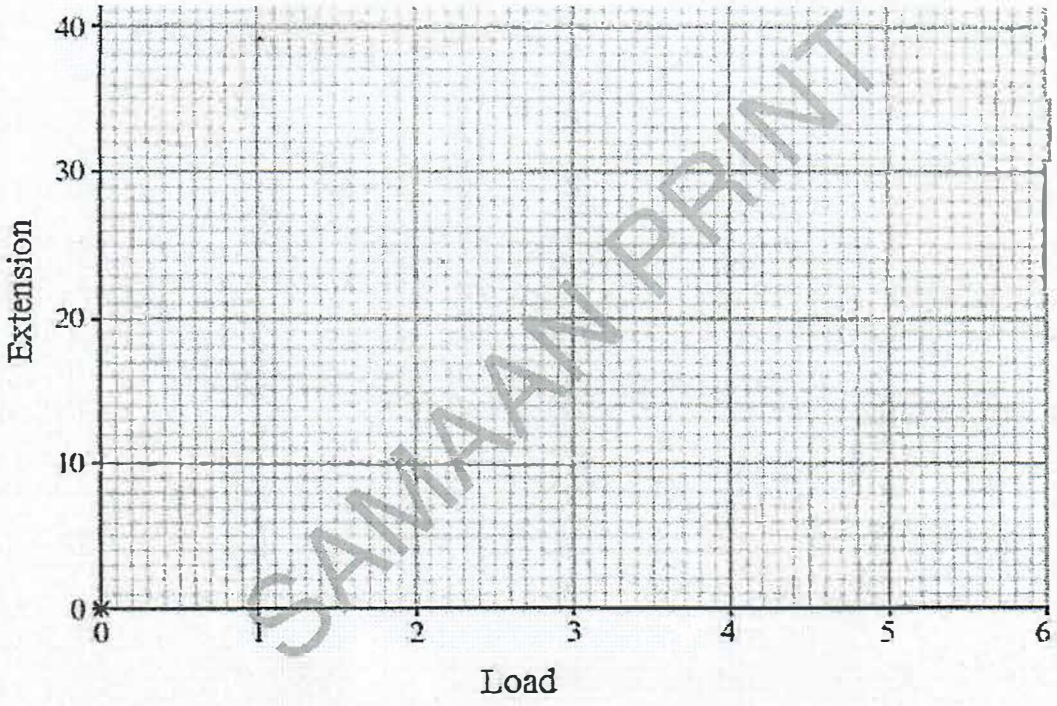
..... (2 marks)

QUESTION 8: OSCILLATORY MOTION (HOOKE'S LAW) (9 Marks)

1. The table below shown how a spring stretches when it has loads suspended from it.

Load (N)	0	1	2	3	4	5	6
Extension (mm)	0	5	10	15	20	25	35

a) Plot a graph of extension against load using the given data. (4 marks)



b) Find the extension when the load is 2.5 N..... (1mark)

c). Mark the elastic limit (E) or the above spring. (1 mark)

d) From the graph write down how extension and load are connected (3 mark)

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END