NAME:-

_____STREAM:_____

COMPETENCY BASED ASSESSMENT

S.2 PHYSICS –LOWER SECONDARY

TERM I-2023

TIME: 2 HOURS

QUESTION 1 [5 marks]

Physics is a broad subject with branches such as heat, mechanics, modern, optics, electricity and magnetism among others, it leads students to various career opportunities and has led to our national development Look at the pictures below extracted from the application of physics and use them to answer questions thereafter.

Picture 1

Picture 2

Picture 3

a). State what is happening in each picture.

Picture1_____

Picture2_____

b). State the branch of physics depicted in each picture.

picture1_____

picture3_____

Question 2.

Define work and give its S.I unit [1mark]

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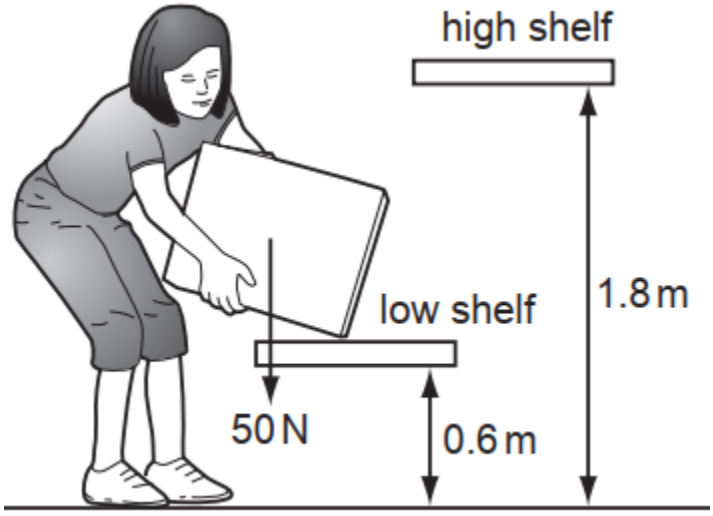
_____

S.I unit:_____[1mark]

The diagram shows a girl lifting a box of weight 50N from a low shelf to a high shelf.



How much work is done on the box?

[4 marks]

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If she spend 10 second to do the work, calculate her power.[3 marks]

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Question 3

(a) State the principle of conservation of energy.[1 mark]

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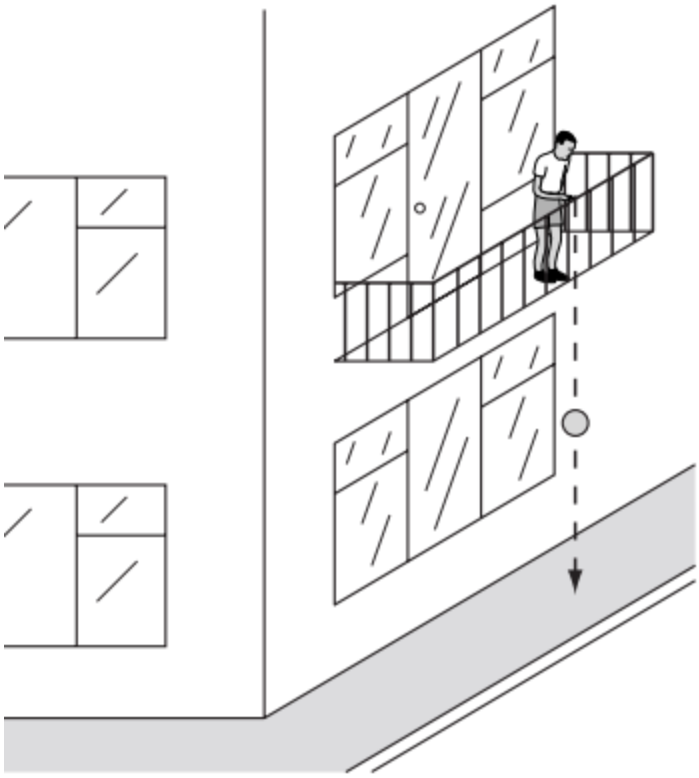

b) A young child holds a ball over the edge of a balcony. The ball has 4Kg and gravitational potential energy of 200J.The ball is then released. Calculate

i) Height of the balcony.[3marks]

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ii) The speed of the ball as it just hit the ground.[4marks]

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Question 4

a) Define temperature and its S.I unit. [2 marks]

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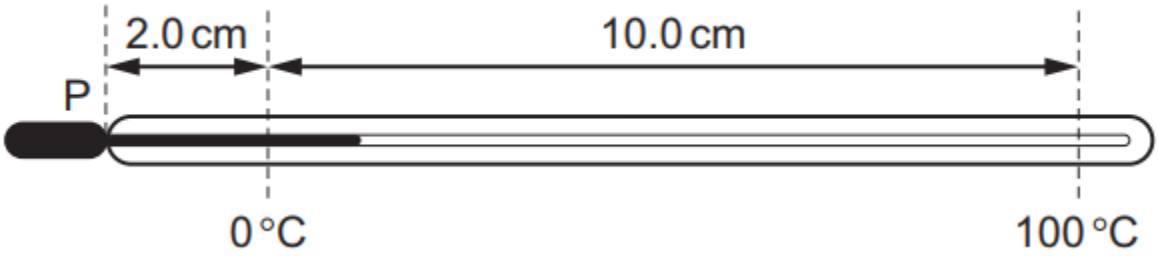
_____S.I unit_____

b) In a liquid-in-glass thermometer, the liquid column is 2.0cm long at 0°C and it expands 10.0cm when heated to 100°C.



What temperature will it read if the mercury column is at 6cm from point P.[4marks]

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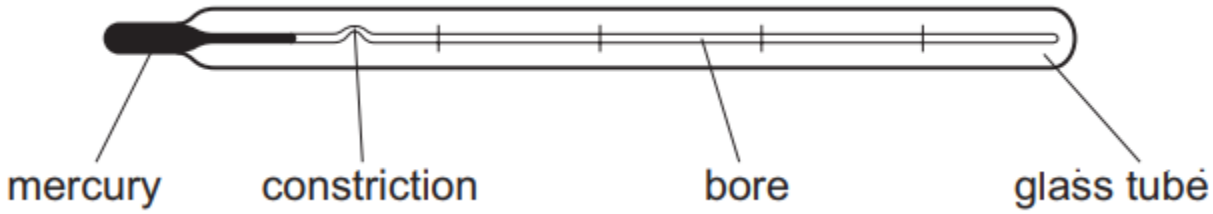
c) The diagram shows a clinical thermometer.



i) Give two reasons why mercury is used[2marks]

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ii) State the purpose of the constriction[1mark]

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iii) What measures should be taken to improve the sensitivity of the thermometer.[1mark]

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Question 5

a) Define density and give its S.I unit. [2marks]

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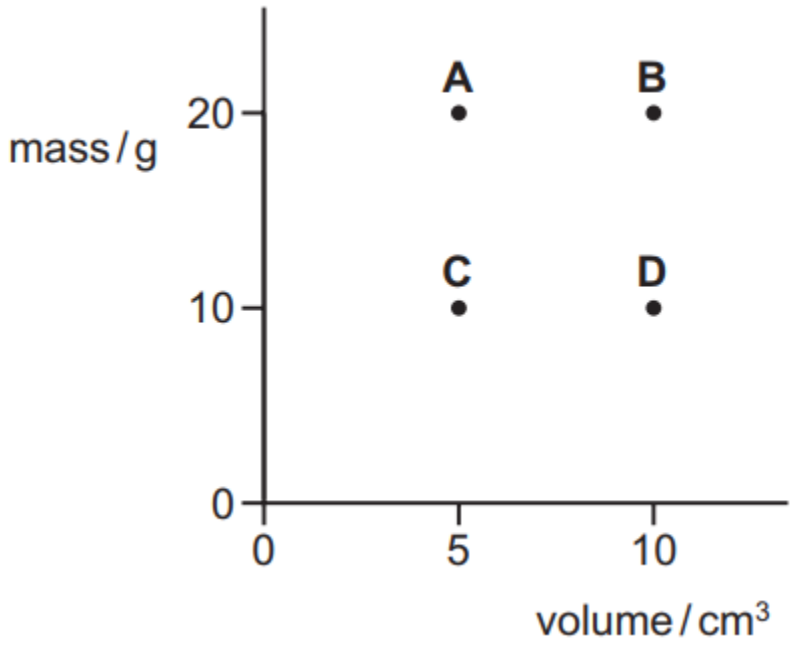
_____
_____S.I unit_____

b) The mass and volume of four different objects are plotted as shown.



Identify with a reason the object which will sink or float in a liquid of density $3gcm^{-3}$. Support your answer with numerical values.[6 marks]

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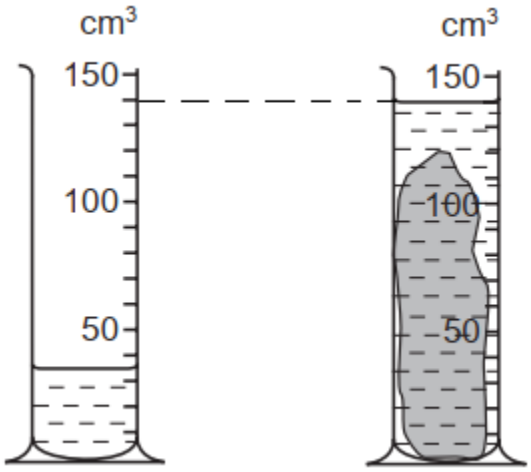
c) A lump of metal has a mass of 210 g. It is lowered into a measuring cylinder containing water. The level of the water rises from 35cm^3 to a new volume.



Identify the new volume:[1mark]

b) The density of the stone in gcm^{-3}[4marks]

d) The diagrams, A, B and C, show the particles in three states of matter

A B C

i) Write the letters in the boxes to give the correct order of density, from most to least dense.[3marks]

ii) Explain why you chose the order in d (i) [4marks]

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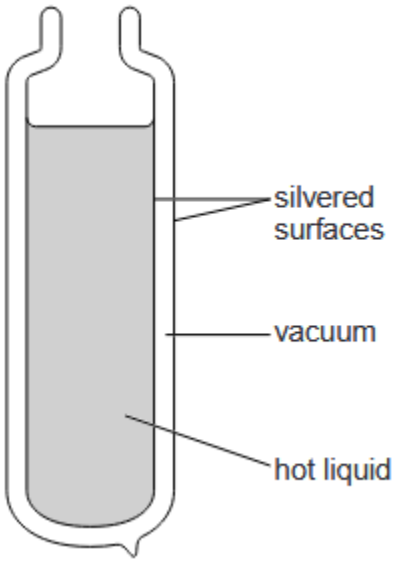
Question 6.

The figure below shows a cross-section of a double-walled glass vacuum flask, containing a hot liquid. The surfaces of the two glass walls of the flask have shiny silvered coatings.



(a) Explain

(i) why the rate of loss of thermal energy through the walls of the flask by conduction is very low,[2 marks]

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(ii) Why the rate of loss of thermal energy through the walls of the flask by radiation is very low[2marks]

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(ii) Suggest, with reasons, what must be added to the flask shown in figure in order to keep the liquid hot [2 marks]

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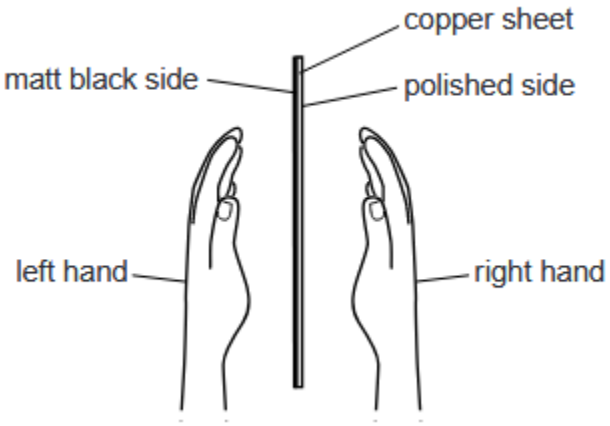
b) One side of a copper sheet is highly polished and the other side is painted matt black. The copper sheet is very hot and placed in a vertical position, as shown as in Figure below.



A student places her hands at equal distances from the sheet, as shown in Figure.
Explain
(i) why her hands are not heated by convection, [2marks]

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(i) Why her hands are not heated by conduction, [2 marks]

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(b) State and explain which hand gets hotter. [2 marks]

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Question 7

(a) State the laws of refection of light. [2marks]

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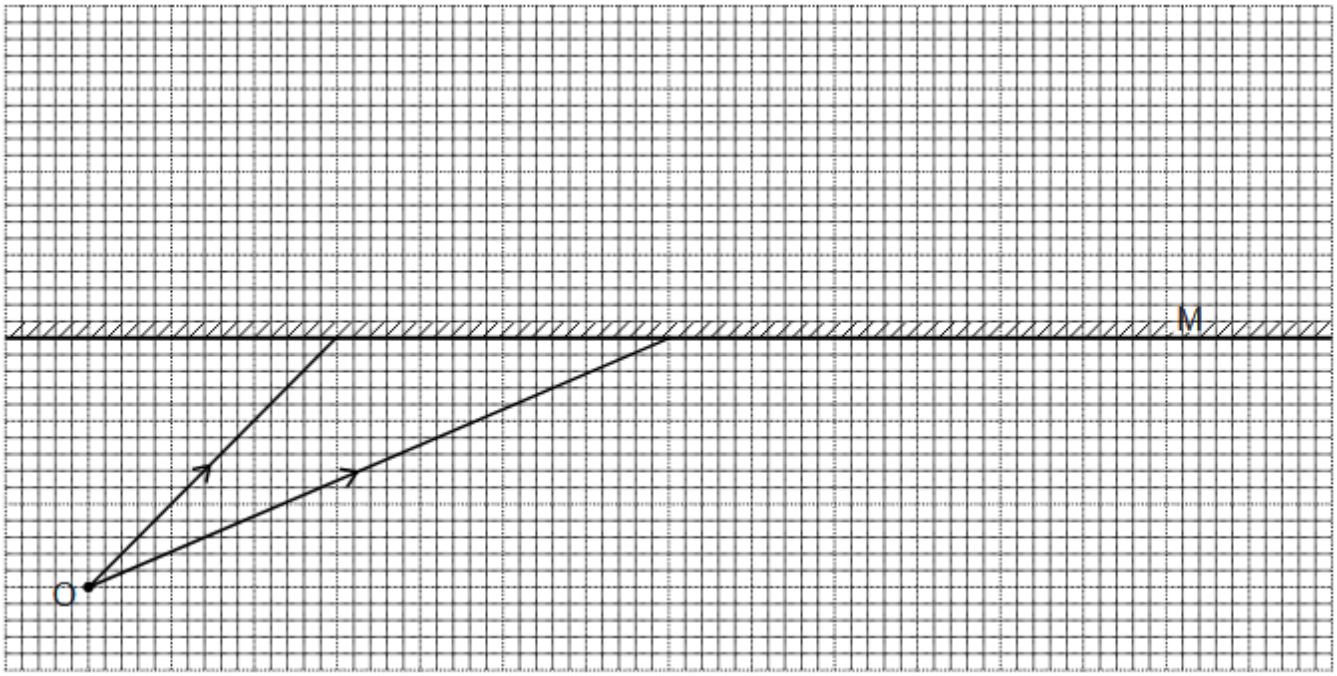
(b) Figure below shows an object O placed in front of a plane mirror M. Two rays from the object to the mirror are shown.



(i) On Figure, for one of the rays shown using a pen and ruler,

1. Draw the normal to the mirror, [1mark]
2. Mark the angle of incidence. Label this angle X. [1mark]

(ii) On Figure, draw

1. The reflected rays for both incident rays, [2marks]
2. Construction lines to locate the image of O. Label this image I [2marks]

END.