Name .....Index no..... Adm no.....

232/1 - PHYSICS - PAPER 1

CLASS..... DATE..... SIGNATURE.....

FOCUS A365

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2019 TERM 1 ENTRY EXAMINATION

INSTRUCTION TO CANDIDATES

a) Write your name and index number in the spaces provided above.
b) Sign and write the date of examination in the spaces provided above.
c) This paper consists of **TWO** sections **A** and **B**.
d) Answer ALL the questions in section **A** and **B** in the space provided.
e) ALL working **MUST** be clearly shown in the spaces provided in this booklet.
f) Mathematical tables and non programmable silent electronic calculators may be used
g) This paper consists of 12 printed pages.
h) Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.
i) Candidates should answer the questions in English.

For Examiners Use Only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 14	25	
B	15	10	
	16	13	
	17	10	
	18	11	
	19	11	
	Total Score	80	

SECTION A: (25 marks)

*Answer **all** the questions in this section in the spaces provided.*

1. State the reason why an object on earth has a higher weight than on the moon. (1 mark)

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2. **Figure 1** shows the position of a students eye while measuring the length of a wooden block using a metre rule.

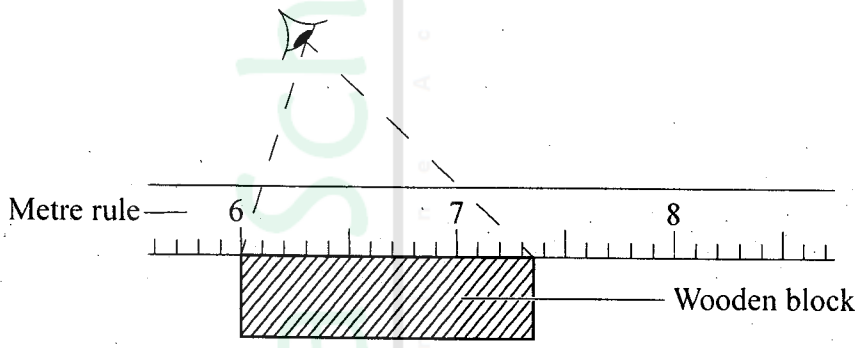

Figure 1

Determine the length of the block as viewed by the student. (1 mark)

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3. Describe how the knowledge of the oil drop experiment may be used to estimate the area of oil spillage from a ship in the sea assuming the surface water is not disturbed. (3 marks)

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4. **Figure 2** shows an instrument used to measure atmospheric pressure.

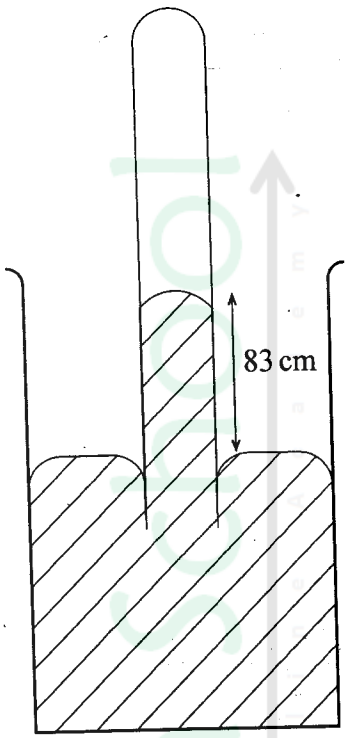

Figure 2

State with a reason the modification that would be required in a similar set up if mercury were to be replaced with water. (2 marks)

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5. It is observed that a drop of milk carefully put into a cup of water turns the water white after some time. State the reason for this observation. (1 mark)

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6. **Figure 3** shows the shape of a bimetallic strip after it was cooled below room temperature.

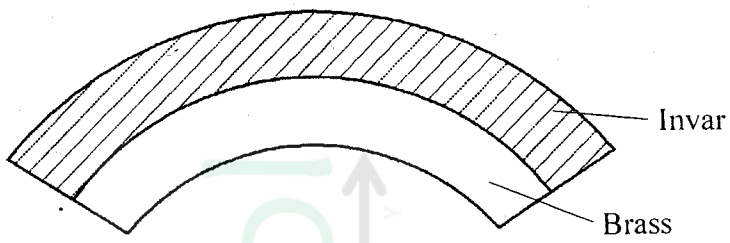

Figure 3

Explain why the strip curved as shown. (2 marks)

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7. A wooden cube of side 0.5 m floats in water fully submerged. Determine the weight of the cube. (*density of water = 1 gcm^{-3}*). (2 marks)

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8. **Figure 4** shows a stone whirled in a vertical circle.

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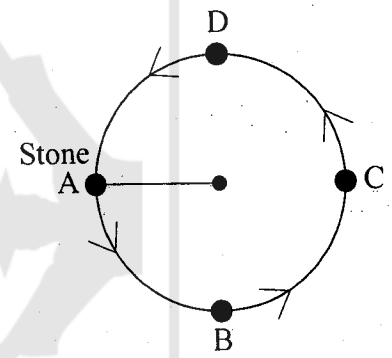
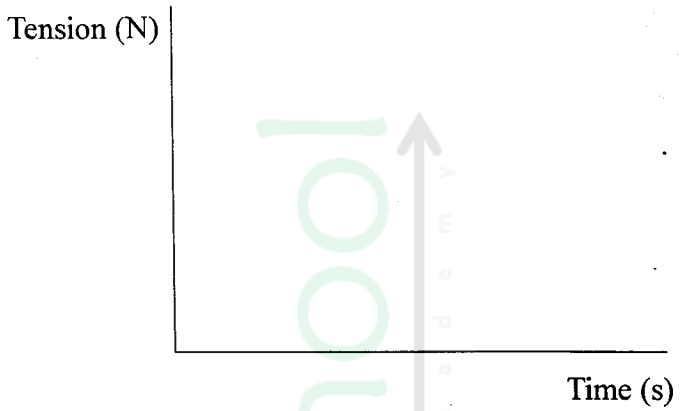


Figure 4

On the axes provided, sketch a graph of tension against time as the stone moves through point A, B, C and D. (3 marks)



9. **Figure 5** shows a ball spinning as it moves.

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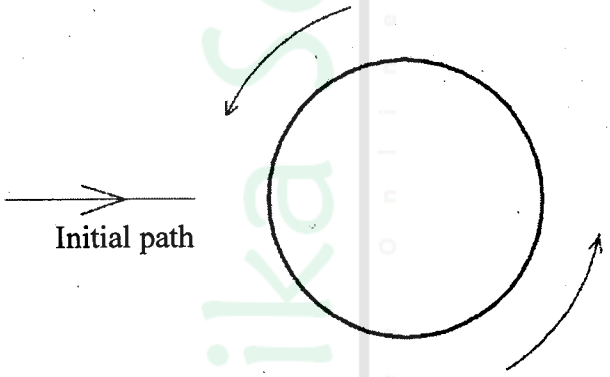

Figure 5

(a) On the diagram, sketch the path followed by the ball as it moves. (1 mark)

(b) Explain why the ball takes that path. (3 marks)

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10. **Figure 6** shows the relationship between volume and pressure for a certain gas.

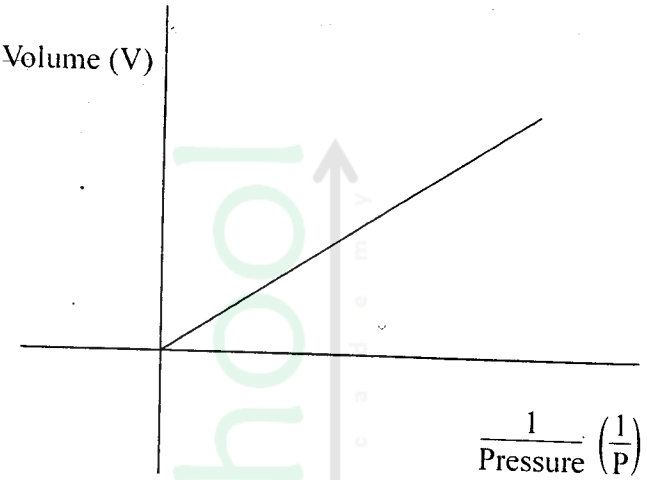

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Figure 6

Name the law that the gas obeys.

(1 mark)

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11. **Figure 7** shows an L-shaped wooden structure.

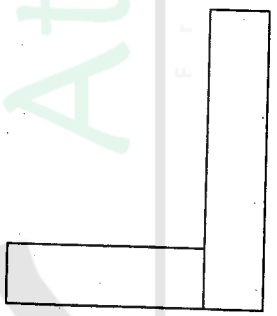

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Figure 7

On the diagram, construct appropriate lines to show the position of the centre of gravity for the structure.

(2 marks)

12. **Figure 8** shows the graph of extension against force for a certain helical spring.

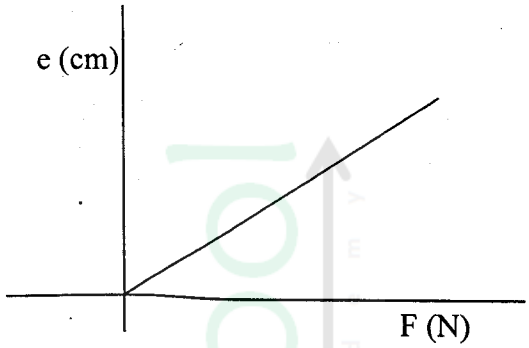

Figure 8

On the same diagram sketch the graph of extension against force for a spring with a lower value of spring constant. (1 mark)

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13. State **two** ways in which a mercury based thermometer can be modified to read very small temperature changes. (2 marks)

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SECTION B (55 marks)

*Answer **all** the questions in this section in the spaces provided.*

14. (a) State **two** differences between boiling and evaporation. (2 marks)

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(b) State **three** ways in which loss of heat by conduction is minimised in a vacuum flask. (3 marks)

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(c) In a certain experiment, 50 g of dry steam at 100 °C was directed into some crushed ice at 0 °C. (*Latent heat of vaporisation of water is* $2.26 \times 10^6\ Jkg^{-1}$, *latent heat of fusion for ice is* $3.34 \times 10^5\ Jkg^{-1}$ *and specific heat capacity of water is* $4.2 \times 10^3\ Jkg^{-1}$)

Determine the;

(i) quantity of heat lost by steam to change to water at 100 °C. (2 marks)

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(ii) quantity of heat lost by water to cool to 0 °C. (2 marks)

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(iii) mass of ice melted at 0 °C. (3 marks)

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15. (a) State Newton's first law of motion. (1 mark)

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(b) A wooden block resting on a horizontal bench is given an initial velocity u so that it slides on the bench for a distance x before it stops. Various values of x are measured for different values of the initial velocity. **Figure 9** shows a graph of u^2 against x.

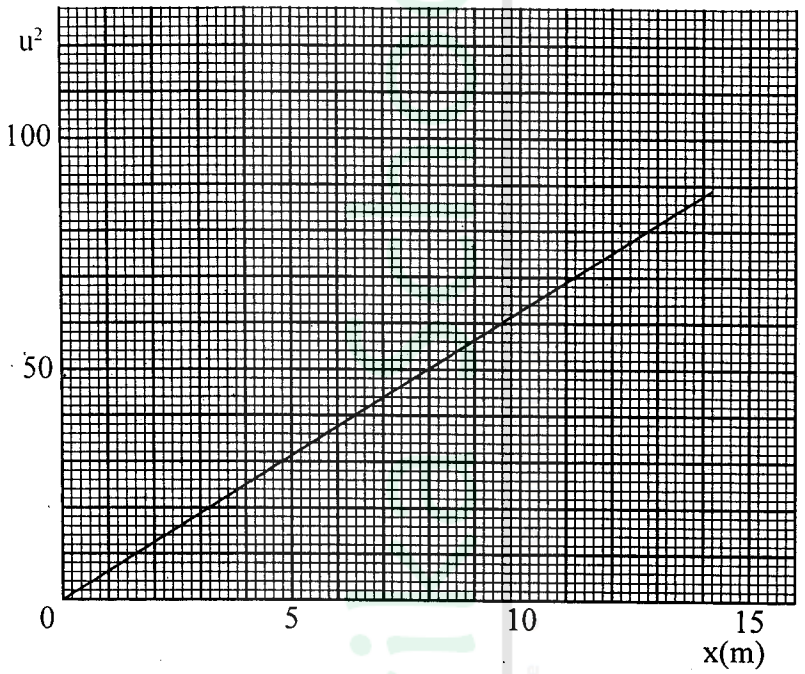

Figure 9

(i) Determine the slope S of the graph. (3 marks)

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(ii) Determine the value of **k** given that $u^2 = 20kX$ where **k** is a frictional constant for the surface. (2 marks)

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(iii) State with a reason what happens to the value of **k** when the roughness of the bench surface is reduced. (2 marks)

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(c) An object is thrown vertically upwards with an initial velocity of $30\,ms^{-1}$. Determine its maximum height (*acceleration due to gravity g is 10 ms^{-2}*). (3 marks)

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16. (a) An electric crane uses 8.0×10^4 J of energy to lift a load of 2.0×10^4 N in 4 s.

(i) Determine the;

I power developed by the crane, (2 marks)

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II height to which the load is lifted, (2 marks)

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III efficiency of the crane whose motor is rated 2.5×10^4 W. (2 marks)

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(ii) State **two** forms of energy transformation that lead to the crane's inefficiency. (2 marks)

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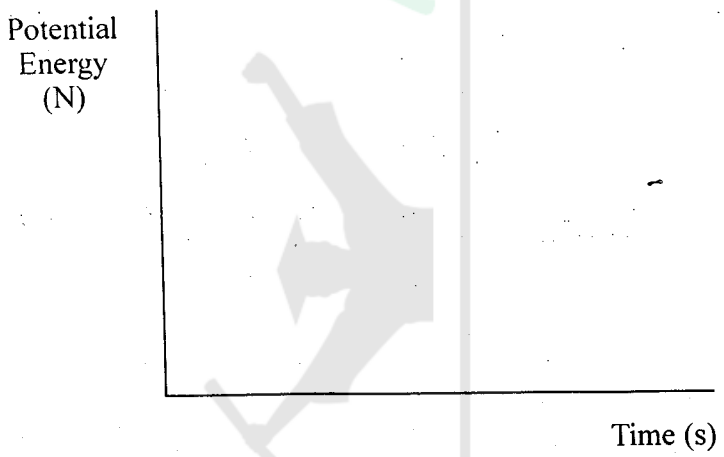
(b) A stone is dropped from the top of a building to the ground. On the axes provided, sketch a graph of potential energy against time for the stone. (1 mark)



17. (a) State Pascal's principle of transmission of pressure in liquids. (1 mark)

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(b) **Figure 10** shows heights of two immiscible liquids X and Y in a U-tube (drawn to scale).

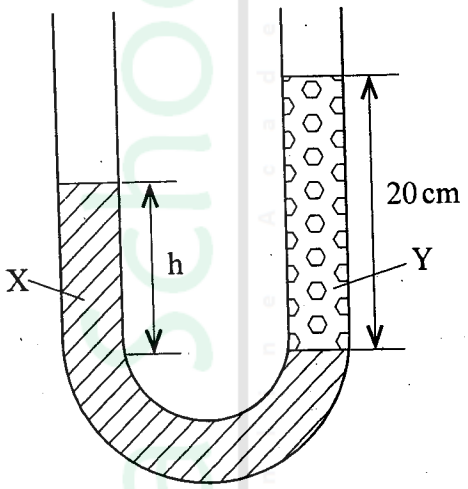

Figure 10

(i) State with a reason which of the two liquids X and Y has a higher density. (2 marks)

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(ii) Determine the value of **h**. (2 marks)

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(iii) Given that the density of liquid Y is **ρ**, write down an expression for the density **d** of liquid X in terms of **ρ**. (2 marks)

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(c) (i) With the aid of a diagram, describe how a liquid may be siphoned from one container to another using a flexible tube. (3 marks)

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(ii) State **one** application of the siphon. (1 mark)

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18. (a) State **two** quantities that must be kept constant in order to verify Boyle's law. (2 marks)

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(b) An air bubble at the bottom of a beaker full of water becomes larger as it rises to the surface. State the reason why;

(i) the bubble rises to the surface, (1 mark)

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(ii) it becomes larger as it rises. (1 mark)

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(c) State **two** assumptions made in explaining the gas laws using the kinetic theory of gases. (2 marks)

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(d) **Figure 11** shows an incomplete experimental set up that was prepared by a student to verify one of the gas laws.

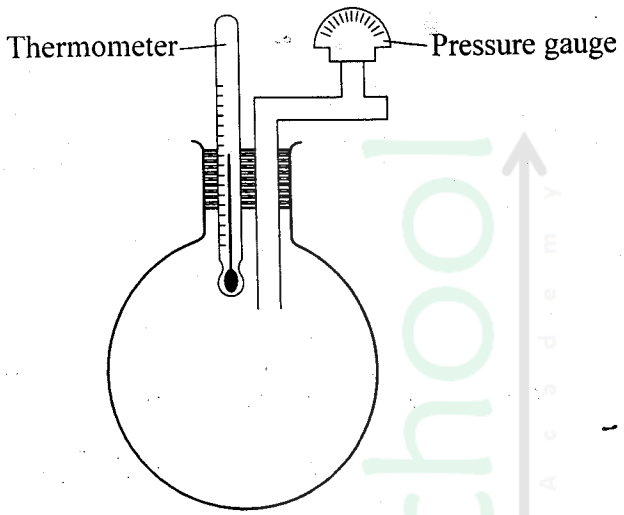

Figure 11

(i) State with a reason which one of the laws may be verified using the set up. (2 marks)

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(ii) State what the student left out in the diagram of the set up. (1 mark)

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(e) The volume of a fixed mass of a gas reduced from 500 cm^3 to 300 cm^3 at constant pressure. The initial temperature was 90 K. Determine the final temperature. (3 marks)

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