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232/1
PHYSICS
PAPER 1
Time: 2 Hours

MANG'U HIGH SCHOOL
MOCK EXAM

Instructions to candidates

- Write your name and index number in the spaces at the top of this page.
- Attempt **ALL** questions in the spaces provided
- All working **MUST** be shown
- Density of water = $1000kgm^{-3}$
- Density of mercury = $13600kgm^{-3}$
- Density of lead = $11300kgm^{-3}$
- Density of kerosene = $800kgm^{-3}$
- Atmospheric pressure = 1.05×10^5 pa
- Specific heat capacity of water = $4200J\ kg^{-1}\ K^{-1}$
- Specific latent heat of fusion of ice = $3.34 \times 10^5 J\ kg^{-1}$
- Acceleration due to gravity g = $10\ ms^{-2}$
- Specific latent heat of vapourisation of water = $22.6 \times 10^3 J\ kg^{-1}$
- Melting point of ice is 0°C
- Boiling poing of water is 100°C

For Examiner's use only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 - 12	25	
B	13	13	
	14	12	
	15	10	
	16	8	
	17	7	
	Total	80	

This paper consists of 6 printed pages.

Candidates should check the question paper to ensure that all the pages are printed as indicated and that no questions are missing.

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TURNOVER

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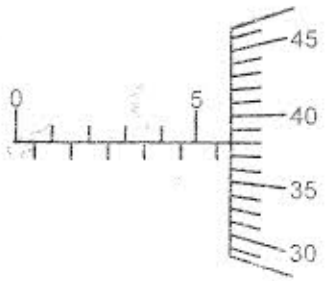
SECTION A [25 Marks]

Answer ALL the questions in the spaces provided

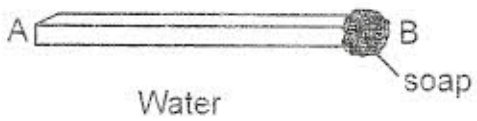
1. **Figure 1** below shows the reading from a micrometer screw gauge that has a zero error of –0.25. What is the actual length of the object being measured? (2 marks)

Fig. 1



2. **Figure 2** below shows a match stick soaped on one end and placed on the surface of water.

Fig. 2



The matchstick is observed to move in a certain direction. State the direction (A or B) and explain your answer . (2 marks)

Direction

Explanation

3. On a spoilt thermometer, the length between the lower and the upper fixed points is 2(What will the temperature be in °C if the mercury column level is 15cm above the low fixed point? (2 mark

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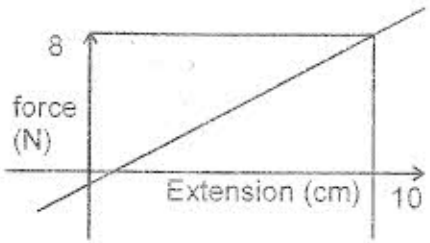
4. In an experiment to establish Hook's law using a spring, the results obtained were used to plot the graph shown in figure 3.

Fig. 3



Calculate the work done on the spring (3 marks)

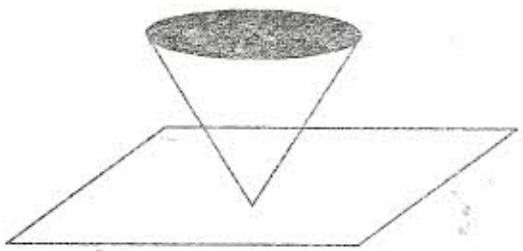
5. A tape attached to a moving trolley is run through a ticker tape timer with the vibrator switched on. **Figure 4** shows a section of the tape after running.

Fig. 4

If the frequency of the ticker timer is 50Hz, determine the acceleration of the trolley.
(4 marks)

6. **Figure 5** shows a solid cone on a horizontal surface

Fig. 5



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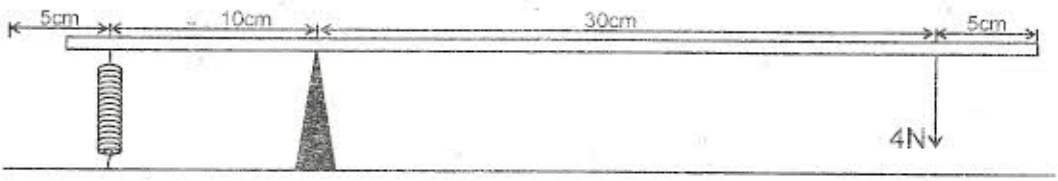
It is in unstable equilibrium. On the horizontal space shown below, sketch the cone in **NEUTRAL** equilibrium. (1 mark)

7. **Figure 6** shows a uniform half - meter rule balanced on a knife-edge using a block of weight 4N and a spring.

Fig. 6



Given that the tension in the spring is 18N, determine the mass of the rule. (3 marks)

8. Explain why a drop of methylated spirit placed at the back of the hand feels colder than a drop of water although they are at the same temperature. (2 marks)

9. State the kinetic theory of matter (1 marks)

10. State **one** way in which vehicle assembling companies enhance the stability of vehicles. (1 mark)

11. Water at a speed of 1m/s is pumped through a loose pipe of diameter 2 cm to a sprinkler having 30 holes each of diameter 2mm. What will be the speed of delivery of the water at the sprinkles? (3 marks)

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12. State one basic laboratory rule that a student working in a physics laboratory should observe. (1 mark)

SECTION B [55 Marks]

*Answer **ALL** the questions in the spaces provided*

13. (a) What is centripetal force? (1 mark)

(b) Name the type of force producing centripetal acceleration in:

(i) Moon moving round the earth. (1 mark)

(ii) Negatively charged particles moving round the nucleus of an atom (1 mark)

(c) The following table shows the results obtained from an investigation in circular motion.

Centripetal force F, (N)	0.10	0.15	0.20	0.25	0.3
Radius r, (cm)	8	12	16.5	20.5	25

(i) Plot a graph of centripetal force F against radius r in meters on the graph paper provided. (5 marks)

(ii) Calculate the gradient of the graph (2 marks)

(iii) Given that the mass of the body in the circular path is 150g. Use the graph to determine the angular velocity (ω). (3 marks)

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14. (a) (i) What is impulse? (1 mark)

(ii) Why are eggs packaged in a soft tray? (2 marks)

(b) (i) A train accelerates uniformly from rest for 30 seconds with an acceleration of 2ms-2. It then travels at a constant speed for 21/2 minutes before slowing down with uniform deceleration to rest of a further 15 seconds. Sketch a velocity-time graph of the motion. (5 marks)

Find:

(ii) The maximum speed (2 marks)

(iii) The acceleration while slowing down (2 marks)

15. (a) Show that pressure P in fluids is given by P = pgh (4 marks)
Where p = density of the fluid
g = gravitational acceleration
h = height of fluid column

(b) (i) State Pascal's principle of transmission of pressure in fluids (1 mark)

(ii) State two applications of Pascal's principle (2 marks)

(c) In a laboratory experiment, Agnes blew into one end of a U-tube containing water until the levels differed by 30cm. If the atmospheric pressure was $1.01 \times 10^5 Nm^{-2}$, calculate her lung pressure. (3 marks)

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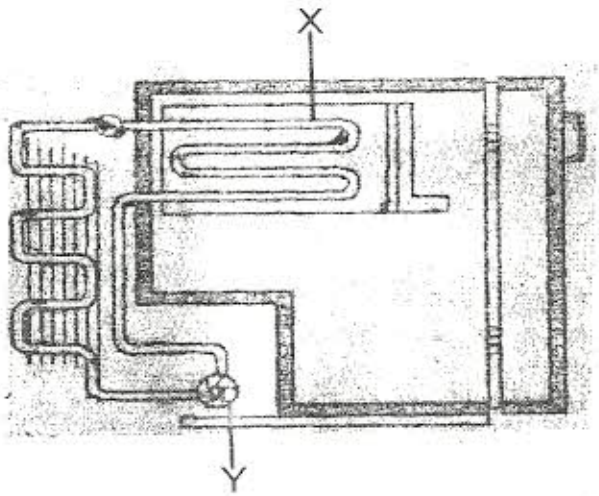
16. (a) Define specific heat capacity of a substance. (1 mark)

(b) A piece of iron of mass 200g and specific heat capacity $460Jkg^{-1}K^{-1}$ cools from 86^0C to 28^0C. Find the quantity of heat given out. (3 marks)

(c) **Figure 7** shows a domestic electric refrigerator

Fig. 6



(i) Label the parts,

X = (1 mark)

Y = (1 mark)

(ii) Explain the use of part X (1 mark)

(iii) Explain the use of part Y (1 mark)

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17. (a) State the law of floatation. (1 mark)

(b) A balloon of negligible weight and capacity $50m^3$ is filled with helium of density $0.18kgm^{-3}$. Calculate the lifting force of the balloon if the density of air is $1.2\ kgm^{-3}$. (Take the acceleration due to gravity, $g = 10Nkg^{-1}$) (3 marks)

(c) (i) Draw a well labelled diagram of a common hydrometer capable of measuring the density of a liquid in the range 1.0 to $0.7\ gm^{-3}$ (2 marks)

(ii) State **one** use of such a hydrometer (1 mark)

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