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232/1 MS  
PHYSICS  
Paper 1  
MARKING SCHEME  
March 2021

THE KENYA NATIONAL EXAMINATIONS COUNCIL  
KENYA CERTIFICATE OF SECONDARY EDUCATION

PHYSICS

Paper 1

MARKING SCHEME  
(CONFIDENTIAL)

THIS MARKING SCHEME IS THE PROPERTY OF THE KENYA NATIONAL EXAMINATIONS COUNCIL AND IT MUST BE RETURNED TO THE KENYA NATIONAL EXAMINATIONS COUNCIL AT THE END OF MARKING

This marking scheme consists of 7 printed pages.

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Turnover

SECTION A (25 MARKS)

1.	Micrometer screw gauge.	1
2.	The level rises – cohesive forces become weaker on heating.	2
3.	It states that gases are made up of tiny (invisible) particles which are in constant random motion.	1
4.	a) 9.5 Pa b) Pressure	1
5.	a) Stable equilibrium b) Returns to original position after slight displacement.	1
6.	Sum of clockwise moments = Sum of anticlockwise moments $F_1 d_1 = F_2 d_2$ $4 \times x = 8 \times 30$ $4x = 240$ $x = 60\text{cm}$ Position of string = $60 + 20 = 80\text{cm}$ $= 0.8\text{m}$	3
7.	Forces of attraction between molecules of the same type.	1
	Container A It's a better heat conductor.	2
	Due to the shape, the wind at the top moves at a higher speed creating a region of lower pressure at the top. The pressure difference between the top and the inside produces an upward force causing the roof to be blown off.	2

deny broken  
deny matter

continuous random motion. molecules  
A slight displacement causes a skew in c.o.g. Vertical line through the c.o.g. falls within the base of the object. Slight displacement gives a slight push it doesn't topple over.  
 $F_1 d_1 = F_2 d_2$   
 $(x-20)4 = 8 \times 30$   
 $x = \frac{8 \times 30}{4} + 20$   
 $x = 80\text{cm} = 0.8\text{m}$   
Kind/Substance

Comparison is unjust.



SECTION B (55 MARKS)

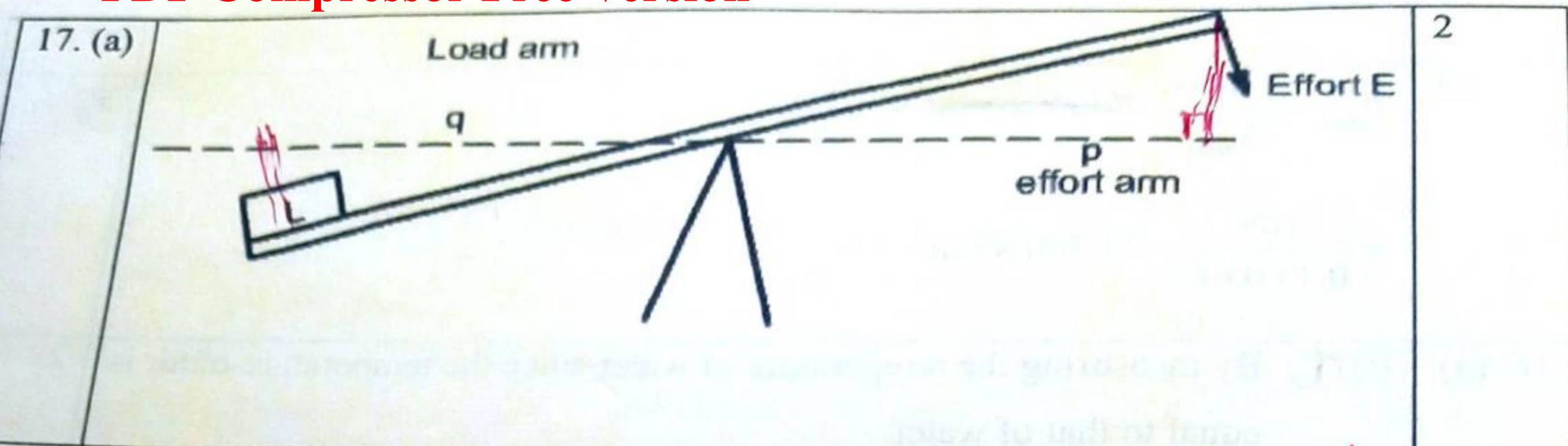
11/12/13

14. (a)	(i) - Weight of the bucket - Tension on the string	2	<i>Force of gravity / Gravitational force. Tension and weight</i>
	(ii) Part of the centripetal force required is provided by the weight, they both act in the same direction therefore the tension will be less.	2	<i>both tension and weight. Centripetal force is provided by both weight and tension</i>
	(iii) - Water is likely to pour out. - At a certain minimum speed, the centripetal force is less than what is required to keep the motion therefore some water spills out (T=0).	2	<i>the body is moving at a speed less than critical speed.</i>
(b)	$F = T = \frac{mv^2}{r}$ $= \frac{0.04 \times 12 \times 12}{1}$ $= 5.76N$	3	
15. (a)	(i) Upon sucking, the liquid flows in the delivery tube but stops on releasing because the sucking force is withdrawn.	2	
	(ii) The liquid fails to flow on release because there is no pressure difference to push the liquid up the tube without sucking, the level of the container is above the liquid level.	2	<i>liquid flows because of a pressure difference</i>
(b)	Upon squeezing the sides of the bottle, the pressure inside the bottle increases forcing more water to enter the test-tube. This increases the average density of the test-tube and its content hence it sinks.	3	<i>upthrust decrease</i>

(c)	$P_{\max} = \frac{F}{A_{\min}} = \text{(don't use } P = \frac{F}{A} \text{)}$ $= \frac{188}{0.1 \times 0.08} = 23,500 \text{ N/m}^2 \quad \checkmark \quad \underline{2.35 \text{ N/cm}^2}$	3
16. (a)	(i) <u>(I)</u> By measuring the temperature of water since the temperature of air is equal to that of water. $\checkmark$	2
	(ii) <u>(II)</u> By measuring the length of the air column. Volume of air is proportional to the <sup>air column</sup> length since the cross-sectional area is uniform. $\checkmark$	2
	(iii) Keeping the tube <sup>(vertical)</sup> vertical and open throughout the experiment. $\checkmark$	1
	(iv) - Obtain <u>(several)</u> values of volume V and Temperature T $\checkmark$ - Plot a <u>graph of volume against absolute temperature.</u> $\checkmark$ - A <u>straight line through the origin</u> is obtained showing that Charles' law is obeyed. $\checkmark$	3
	(v) Stirring water before taking and recording temperature and volume. $\checkmark$	1
(b)	$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \checkmark$ $V_2 = 2V_1 \quad \checkmark$ $T_2 = \frac{2V_1}{V_1} (20 + 273) = 586\text{K} \quad \checkmark$ $= 586 - 273 = 313^\circ\text{C}$	4

Vert  
 Verhicle  
 Verticle  
 Vertical  
 several min of  
 reject temp

586  
 273  
313



(b) (i) Effort distance = 2 × load distance  
 = 2 × 2  
 = 4m ✓

OR  
 2 + 2 = 4m

V.R =  $\frac{\text{Effort distance}}{\text{Load distance}}$   
 Effort distance = 2 × 2 = 4m.

\*Working is correct!

(ii) Work done  
 $F \times d$   
 = 5 × 10 × 2  
 = 100J

Accept Nm

(iii) PE = Work done  
 = 100J

Accept Nm | PE = Mgh = 5 × 10 × 2 = 100J  
 Accept T.E or worked out value

Must show working include the work done is not sufficient

(c) (i) Obtain the difference between the initial reading of the balance and the final reading of the balance.  
 (Mass = (Initial reading of the balances - Final reading at the))

(ii) E = 500t | Q = 500t  
 W = 500t

reject; E = Pt

(iii) Heat supplied = Heat gained by steam  
 500t = ML<sub>v</sub>  
 $L_v = \frac{500t}{m} \text{ Jkg}^{-1}$

Pt = ML<sub>v</sub>  
 Units is a must.

\*denying Q = ML<sub>v</sub>

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reject volume weight instead of mass

18. (a)	Matter is anything that occupies space and has mass.	1
(b)	As the temperature increases, the molecules of the liquid gain more kinetic energy. <del>This</del> increases the speed of motion of the molecules hence they move faster, travel further and increase in intermolecular distances causing increase in volume.	3
(c) (i)	To magnify the pollen grains for better visibility.	1
(c) (ii)	They are observed to move in random motion.	1
(c) (iii)	They are being hit by the invisible water molecules which are in constant random motion hence also move in random motion.	2
(c) (iv)	<ul style="list-style-type: none"> <li>- Rate of random motion of the pollen grains increases.</li> <li>- Increase in temperature of water increases the kinetic energy hence water molecules move with higher speed knocking the pollen grain faster.</li> </ul>	3

Enlarge

bombarded

Continuous

speed of pollen

Increases

water molecules

knocking/bombarding

more vigorously

Turnover