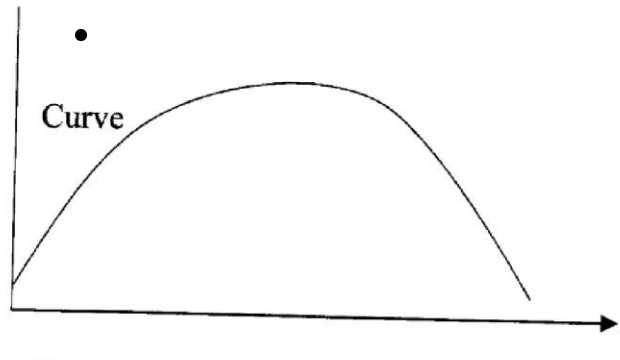


4.6 PHYSICS (232)

4.6.1 Physics Paper 1 (232/1)

SECTION A (25 MARKS)

1.	<ul style="list-style-type: none"> - The patch was monolayer. ✓ - The patch was a perfect cylinder. ✓ - Molecular diameter is uniform. - The patch is a perfect circle. <p>(Any two correct)</p>	(2 marks)
2.	$\text{Relative density} = \frac{70-55}{80-55} \checkmark$ $= 0.6 \checkmark$ <p>Density = 0.6×1000</p> $= 600 \text{ kgm}^{-3} \checkmark$ <p>OR</p> $\text{Volume of water} = \frac{25}{1} = 25 \text{ cm}^3 \checkmark$ $= \text{Volume of R.} = 25 \text{ cm}^3 \checkmark$ $\text{Mass of R} = 70 - 55 = 15 \text{ g} \checkmark$ $\rho = \frac{m}{v} = \frac{15}{25} = 0.6 \text{ gcm}^{-3} \checkmark$	(3 marks)
3.	Spaces between the water molecules are occupied by the alcohol molecules. ✓	(1 mark)
4.	The flask expands first before ✓ the liquid. Then the liquid expands more. ✓	(2 marks)
5.	The wooden bar remains in equilibrium. ✓ the weight remains the same on both sides. Hence turning effect is the same ✓ to the edge causing a bigger turning effect (moments). ✓	(2marks)
6.	To conserve mass - $(A_1V_1 = A_2V_2) \checkmark$ / ensure the volume flux is constant.	(1 mark)
7.	<p>P.E.</p> <p>✓</p>  <p>Time</p>	(1 mark)

8.	<p>Impulse = (Ft) = change in momentum</p> $Ft = mv - mu. \checkmark$ $F = \frac{mv - mu}{t} = \frac{m(v - u)}{t} \checkmark$ <p>but $\frac{v - u}{t} = a$</p> $F = m a. \checkmark$	(3 marks)
9.	The drop first rises \checkmark then falls \checkmark .	(2 mark)
10.	The gas is ideal gas	(1 mark)
11.	<p>Heat lost by hot water = heat gained by cold water \checkmark</p> $mc\Delta\theta \text{ (hot)} = mc\Delta\theta \text{ (cold)}$ $4 \times C \times (80 - t) = 6 \times C \times (t - 20) \checkmark$ $10t = 440$ $t = 44^\circ\text{C} \checkmark$	(3 marks)
12.	$20 \times 30 = 10 \times 50 + x \times 10 \checkmark$ $x = \frac{600 - 500}{10} \checkmark$ $= 10$ $= 60\text{cm mark.} \checkmark$	(3 marks)
13.	The weight of the body is such that the net position of the center of gravity in B is lower than in A, hence B is more stable \checkmark .	(1 mark)

SECTION B (55 MARKS)

14. (a)	<p>(i) (I) $V_a = \frac{d}{t} \checkmark, \quad t = \frac{1}{50} = 0.02 \text{ sec } \checkmark$</p> $= \frac{0.5}{0.02} \checkmark$ $= 25 \text{ cms}^{-1} \checkmark$ <p>(II) $V_b = \frac{d}{t}$</p> $= \frac{1.5}{0.02}$ $= 75 \text{ cms}^{-1}$ <p>(ii) $a = \frac{v_b - v_a}{t}$</p> $= \frac{75 - 25}{8 \times 0.02}$ $= 312.5 \text{ cms}^{-2}$	(4 marks)
(b)	<ul style="list-style-type: none"> - The spacing reduces \checkmark with time. - The trolley decelerates with time on a horizontal surface. \checkmark 	(2 marks)
15.	<ul style="list-style-type: none"> - Hung the spring on the stand and note the position of the pointer using the metre rule. - Suspend a mass on the spring and note the new position of the pointer. - Increase the load in steps and record the position of the pointer for each load. - Draw a table of weight against extension. - Plot a graph of force against extension. <p>(Correct steps 5 x 1)</p>	(5 marks)
(b)	<p>From the graph</p> <p>(i) $K = \text{gradient} \checkmark$</p> $= \frac{\Delta F}{\Delta e} = \frac{0.9 - 0.5}{7 - 4} = \frac{0.4}{(3 \times 10^{-2})} \checkmark$ $K = 1.33 \times 10^2 \text{ Nm}^{-1} \checkmark$	(3 marks)

	(ii) Load = 0.38N ✓	(1 mark)
(c)	$e = \frac{F}{K} = \frac{5}{100} = 0.05 \text{ m for each spring.} \checkmark$ <p>∴ lower spring = 0.05m</p> $\text{Upper springs} = \frac{0.05}{2} = 0.025 \checkmark$ $\text{Total} = 0.05 + 0.025$ $= 0.075 \text{ m} \checkmark$	(3 marks)
16. (a)	<p>(i) - Oil doesn't mix with water. ✓ - Oil is less dense hence floats on the water surface. ✓</p> <p>(ii) To show boundary of the oil patch clearly, for measurements to be taken. ✓</p> <p>(iii) - The oil drops is a perfect sphere. - The patch is monolayer. - The patch is a perfect circle. - Molecular diameter is uniform. (any two correct)</p> <p>(iv) - The oil breaks the surface tension ✓ making the patch to form a perfect circle. ✓</p>	<p>(2 marks)</p> <p>(1 mark)</p> <p>(2 marks)</p> <p>(2 marks)</p>
(b)	$\text{Volume of 1 drop} = \frac{15}{100} = 0.15 \text{ mm}^3 \checkmark$ <p>Volume of drops = Volume of oil patch.</p> $\frac{4}{3} \pi r^3 = \pi r^2 h = 15.0 \text{ mm}^3 \checkmark$ <p>•</p> $\text{Thickness of molecule } h = \frac{0.15}{8.0 \times 10^4}$ $= 1.875 \times 10^{-6} \text{ mm}$ $\cong 1.9 \times 10^{-6} \text{ mm} \checkmark$	(3 marks)

