Lab Physics

105 & 125



ثمرة
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@q8dynamics

Q1. If you are given 5 samples of a particular substance; their measured densities are : 6.65 g/cm³, 6.81 g/cm³, 6.54 g/cm³, 6.63 g/cm³, 6.72 g/cm³. Then the standard deviation & standard error respectively are
(2 Points)

- ○ 6.67, 0.1
- ✓ 0.1, 0.045
- ○ 6.67, 0.0905
- ○ 0.1, 0.0905

$$\sigma_x = \sqrt{\frac{1}{n-1}\sum_{i=1}^{i=n}(x_i - \bar{x})^2} \quad = 0.1 \qquad \sigma_{\bar{x}} = \frac{\sigma_x}{\sqrt{n}} = 0.045$$

$$\bar{X} = \frac{6.65 + 6.81 + 6.54 + 6.63 + 6.72}{5} = 6.67 \text{ g/cm}^3$$

Q2. In the figure shown, the reading for the vernier caliper is
(2 Points)



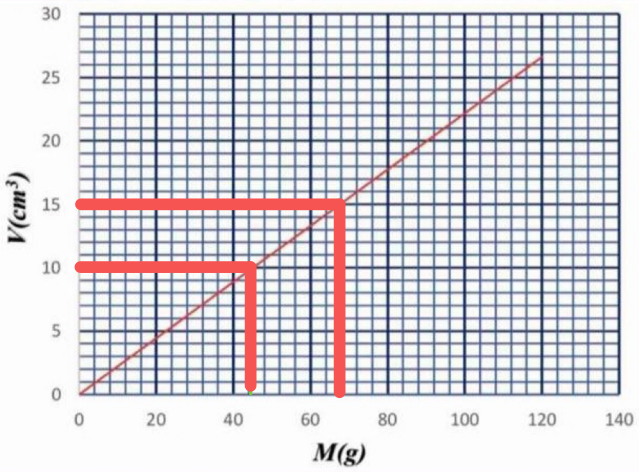
- 0.55 *cm*
- 0.655 *cm*
- 0.95 *cm*
- 0.855 *cm*

Q3. In the figure, a micrometer with -2 zero error is shown. The reading of the micrometer is
(2 Points)



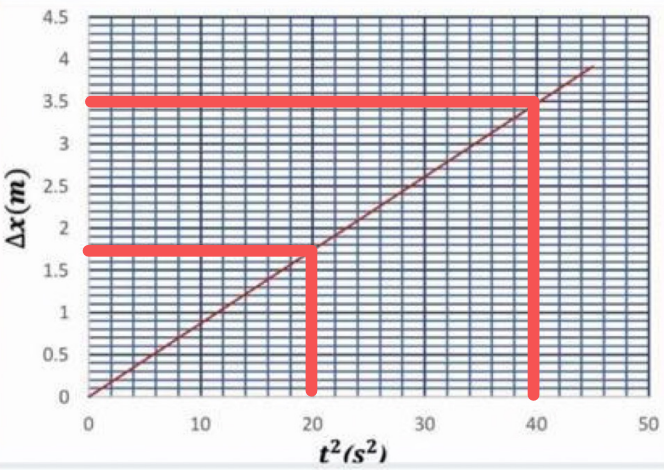
- 16.02 *mm*
- 16.07 *mm*
- 16.17 *mm*
- 16.69 *mm*

Q4. A student measures the mass & volume for some samples from the same substance, he plotted a graph of Volume Vs. mass which is shown in the figure. The density ρ of this substance is
(2 Points)



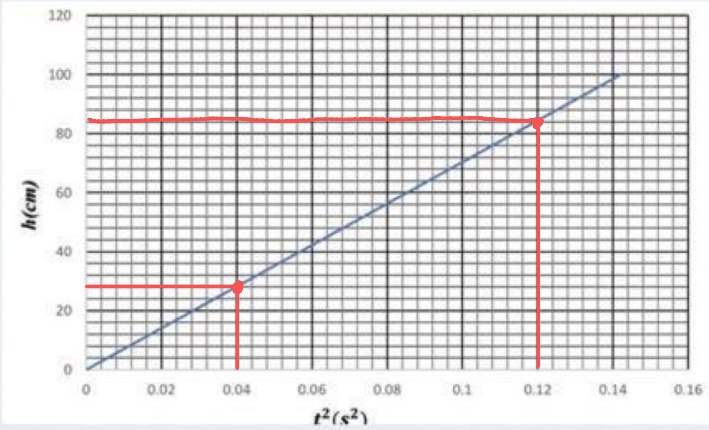
- $4.5\ g/cm^3$
- $0.22\ g/cm^3$
- $11.33\ g/cm^3$
- $2.65\ g/cm^3$

Q5. A glider starts moving from rest down a smooth inclined air track. The figure illustrates the relation between the displacement (Δx) and the square of the time (t^2).(Where t is the time needed for the glider to pass from x_1 to x_2). The acceleration of motion 'a' equals
(2 Points)



- $0.09\ m/s^2$
- $0.17\ m/s^2$

Q6. A student did the experiment of Free Fall on the surface of a planet, he took measurements for different heights (h) with their corresponding time of fall (t) and plotted a graph for this experiment which is shown in the figure. From the graph the acceleration due to gravity on this planet is
(2 Points)



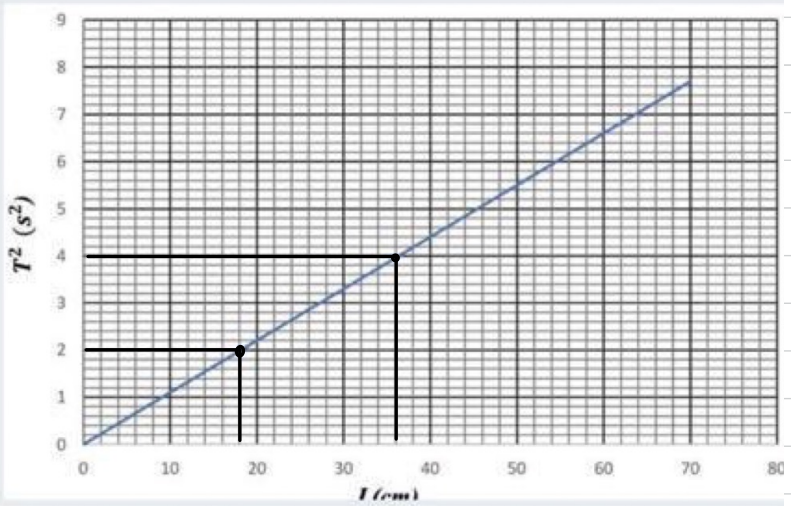
- ○ $3.53\ m/s^2$
- ○ $7.06\ m/s^2$
- ○ $14.1\ m/s^2$
- ○ $0.29\ m/s^2$

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Q7. Suppose the experiment of the simple pendulum is done on the surface of the moon where g = 1.62 m/s². Then the frequency 'f' of the pendulum that corresponds to L = 0.64 m equals
(2 Points)

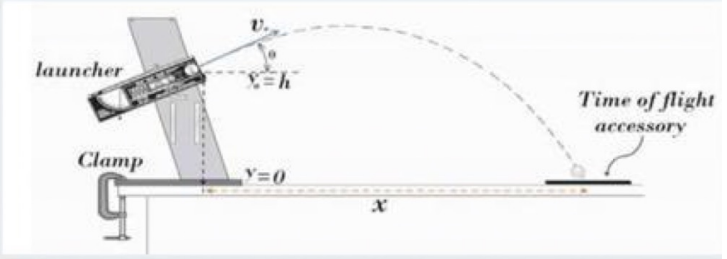
- ○ $3.949\ Hz$
- ○ $16.2\ Hz$
- ○ $0.253\ Hz$
- ○ $15\ Hz$

Q8. Experiment of simple pendulum is done on the surface of the earth. The relation between the square of the period and the length of the pendulum is illustrated below. From the graph the length 'L' of the pendulum when its period equals 2 sec is
(2 Points)



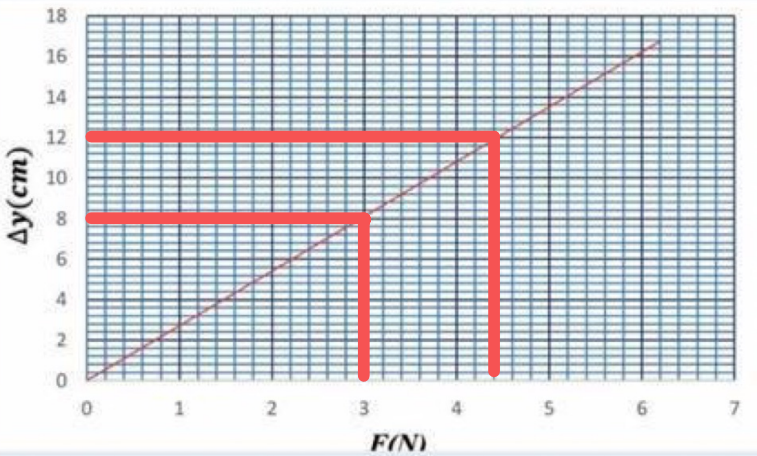
- 18 *cm*
- 33 *cm*
- 25 *cm*
- 36 *cm*

Q9. In the experiment of projectile motion, if the distance between the two photogates is 0.08 m, $\Delta t = 0.02$ s. Then the time of flight for a projectile that is fired from an initial launching angle θ = 65° and covered a horizontal distance of 150 cm is
(2 Points)



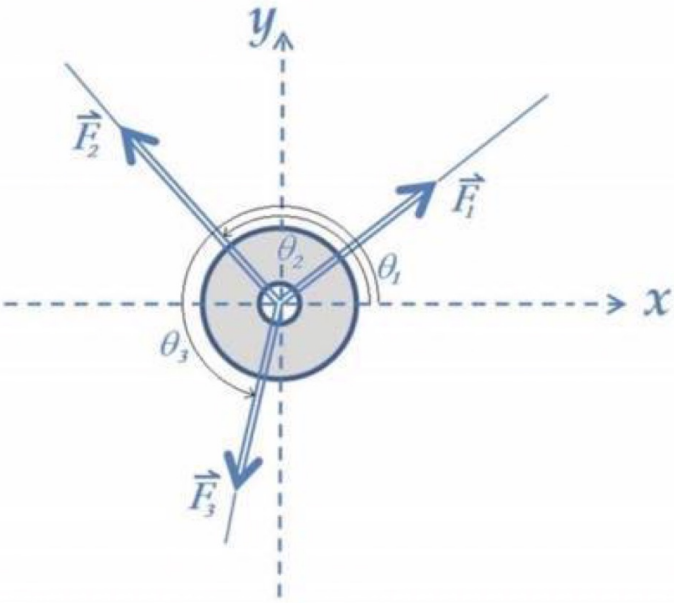
- 0.41 *s*
- 0.89 *s*
- 1.125 *s*
- 8.8 *s*

Q10. A student measured the extensions of a spring for different applied forces, the relation between the applied force F and the extension Δy is shown in the figure. From this graph the force constant k of the spring equals
(2 Points)



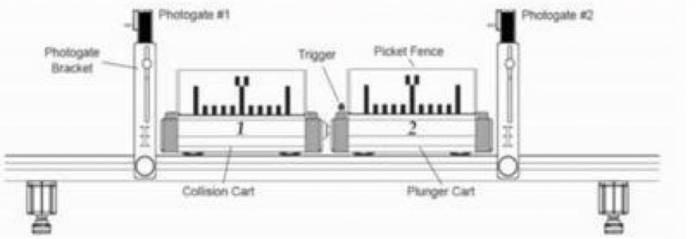
- ◯ 0.37 N/m
- ◯ 37 N/m
- ◯ 2.7 N/m
- ◯ 27 N/m

Q11. Three forces are applied on a ring as shown in the figure. The ring is in static equilibrium. If F_1 = 1.1 N, F_2 = 0.95 N, F_3= 1.39 N, Θ_1=30° and Θ_2= 125°, Then Θ_3 =
(2 Points)



- ◯ 60°
- ◯ 55°
- ◯ 253°
- ◯ 287°

Q12. In the explosion experiment (shown in the figure). The missing values for the vectors V2f and P1f shown in the table below respectively are
(2 Points)



M_1 (kg)	M_2 (kg)	$\vec{v}_{1f}$ (cm/s)	$\vec{v}_{2f}$ (cm/s)	$\vec{P}_{1f}$ (kg m/s)	$\vec{P}_{2f}$ (kg m/s)
0.48	**0.63**	**-28**			**0.1344**

- ◯ $21.33\ cm/s,\ 0.1344\ kg\ m/s$
- ◯ $-21.33\ cm/s, -0.1344\ kg\ m/s$
- ◯ $21.33\ cm/s, -0.1344\ kg\ m/s$
- ◯ $28\ cm/s,\ 0.1344\ kg\ m/s$

Q13. From Q.12 above, the final momentum of the system (cart1 & cart2) is
(2 Points)

- ◯ *zero*
- ◯ $0.1344\ kg\ m/s$
- ◯ $0.2688\ kg\ m/s$
- ◯ $-0.2688\ kg\ m/s$

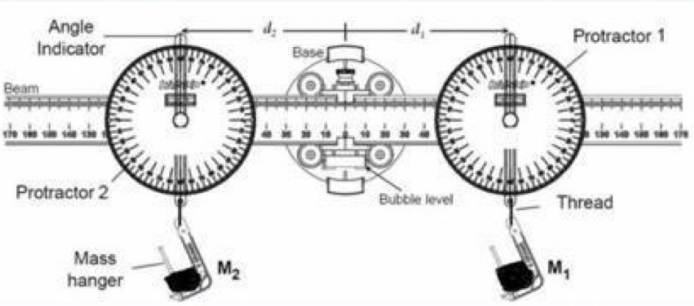
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Q14. If there is a car1 of mass M_1= 12 kg moving in the +x-axis with a speed of 25 m/s; collides with another car2 of mass M_2= 26 kg which is at rest. If the collision is elastic. Then car1 after collision will
(2/2 نقطة)

- rebound in the - x axis.

$$\left(\frac{1}{2}m_1v_1^2+\frac{1}{2}m_2v_2^2\right)_i=\left(\frac{1}{2}m_1v_1^2+\frac{1}{2}m_2v_2^2\right)_f$$

Q15. From the figure, a beam that is in equilibrium, carrying two masses M_1 & M_2 for the case of parallel forces. If F_1 = 1.88 N, d_1 = 12.5 cm & d_2 = 8.7 cm. Then F_2 =
(2 Points)

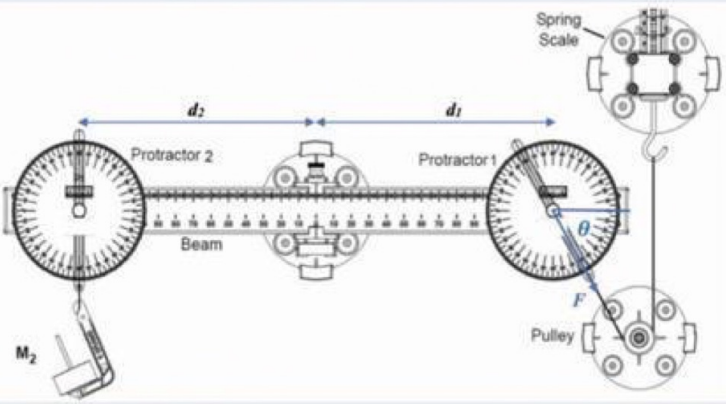


- 2.7 N
- 27 N
- 18.8 N
- 1.25 N

Q16. In Q.15 The direction of τ_2 is
(2 Points)

- To the left
- To the right
- out of the page
- into the page

Q17. In the figure, a beam that is in equilibrium for the case of a non-parallel forces. If τ_2 = 0.122 Nm, d_1 = 11 cm, Mp_1 = 10 g, F_1 = 3.5 N. Then Θ = (2 Points)

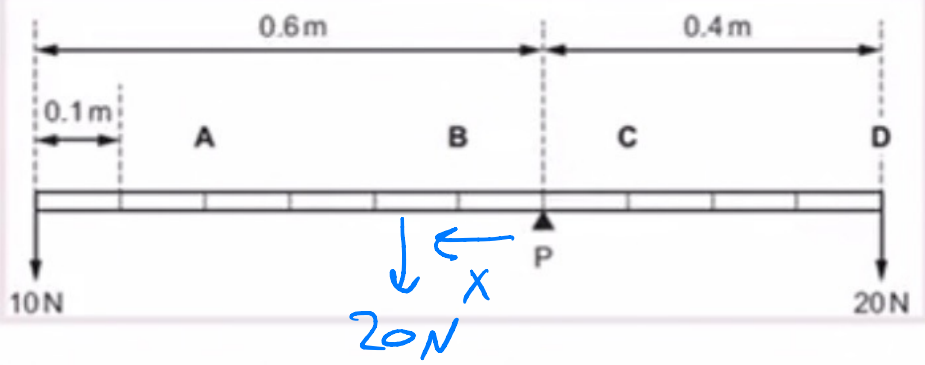


- 16.75 º
- 35 º
- *zero*
- 60 º

Q18. In the figure of Q.17; if the net torque is not equal to zero, then (2 Points)

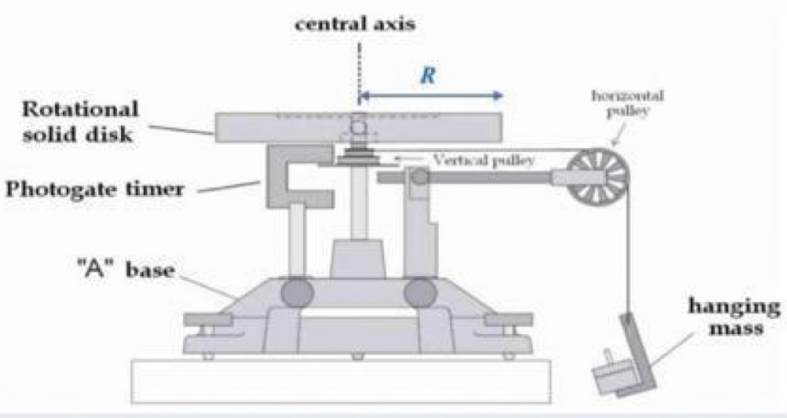
- The beam will stay in place.
- The beam will rotate.
- The beam will fall downward.
- None of the above is correct.

QUESTION-7) A beam is pivoted at P as shown. Weights of 10 N and 20 N are attached to its ends. The length of the beam is marked at intervals of 0.1 m . At which point should a further weight of 20 N be attached to achieve rotational equilibrium?
(Assume that beam has no mass for the purpose of calculation).
(2 Points)



- 0.2 m to the right of P
- ✓ 0.1 m to the left of P
- 0.1 m to the right of P
- 0.3 m to the left of P

Q19. If there is a disk of Mass M = 1400 g, and moment of inertia I = 0.07 kg.m² starts rotation from rest with an angular acceleration α = 0.65 rad/s². Then the torque that is applied to the disk is
(2 Points)



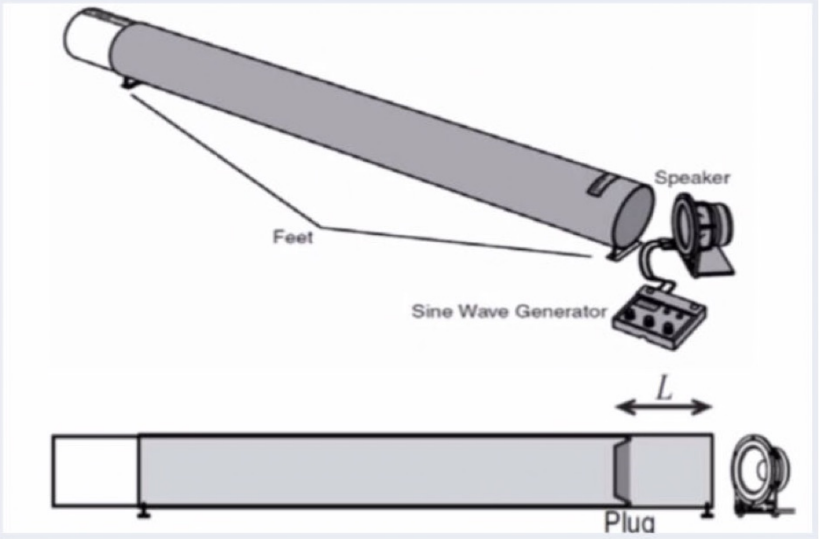
- 0.098 $N.m$
- 0.7 $N.m$
- 0.0455 $N.m$
- 0.107 $N.m$

Q20. From the previous question Q.19, the radius of the rotating disk is
(2 Points)

- 0.1 m
- 3.16 m
- 31.6 cm
- 0.05 m

Q19) The speed of sound was measured at certain temperature using a closed-end tube. The frequency of the sine wave generator was adjusted to 290 Hz. If the measured length of the air column L_1 of the 1st resonance is 25 cm, while the end correction is 4.3 cm. Then the speed of sound in air is

(2/2 نقطة)



- 340 m/s