

APOLLO

Experimentation Skills

FBISE Physics Class 12 (HSSC-II)

Domain N: Experimentation Skills

12 questions | questions

Original FBISE question crops. National Curriculum 2022-23 topic.

This question is about the experiment “Compare the emf of cells using potentiometer.”.

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- i. Draw circuit diagram to compare emfs of two cells by using potentiometer and label the components of circuit? (01+02)

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- ii. Table below shows some values obtained using the null deflection method. Copy and complete the missing entries in the given table. (02)

No. of Observations	Balancing Length For 1 st Cell of emf E_1 $l_1(\text{cm})$	balancing Length For 2 nd Cell of emf E_2 $l_2(\text{cm})$	$\frac{E_1}{E_2} = \frac{l_1}{l_2}$
1.	271	275	
2.	280	283	
3.	285	289	
4.	289	292	

- iii. Write a precaution that should be kept in mind while performing above experiment (01)

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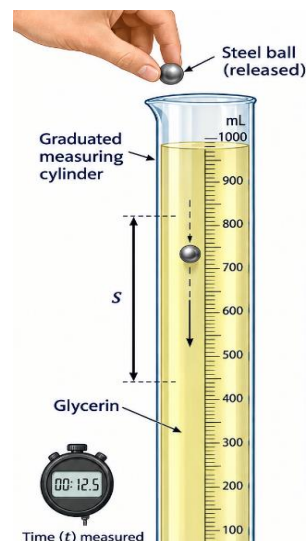
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- Write a precaution that should be kept in mind while performing above experiment. (01)
- The potentiometer wire must be long and have uniform thickness, why? (02)

Q.2 This question is about investigating the motion of a spherical steel ball falling through a viscous medium and determining the coefficient of viscosity of the fluid.

A steel ball is dropped in a long, transparent graduated measuring cylinder filled with glycerine. Students are asked to calculate terminal velocity of the steel ball and finally calculate coefficient of viscosity of glycerine using the data given below:

- Diameter of steel ball = 6 mm
- Density of steel ball, $\rho_s = 8000 \text{ kg m}^{-3}$
- Density of glycerin, $\rho_g = 1260 \text{ kg m}^{-3}$
- Acceleration due to gravity, $g = 9.8 \text{ m s}^{-2}$



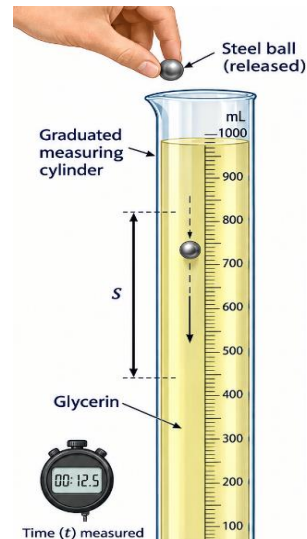
No. of observations	Distance of fall $S(\text{m})$	Time taken $t(\text{s})$	Terminal velocity $v = S/t \text{ (m/s)}$	$\eta = \frac{2r^2g(\rho_s - \rho_g)}{9v} \text{ (kgm}^{-1}\text{s}^{-1}\text{)}$
1.	0.15	0.9		
2.	0.20	1.4		
3.	0.30	2.4		

- Why do we allow the steel ball to fall some distance in glycerine before start taking measurement? (01)

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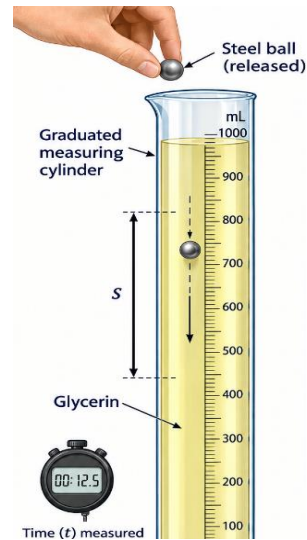
No. of observations	Distance of fall S(m)	Time taken t(s)	Terminal velocity $v = S/t \text{ (m/s)}$	$\eta = \frac{2r^2g(\rho_s - \rho_g)}{9v} \text{ (kgm}^{-1}\text{s}^{-1}\text{)}$
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iii. Why does net force on the steel ball become zero when it moves with terminal velocity? (02)

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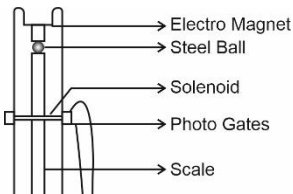
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iv. In this experiment, glycerine is replaced with kerosine oil; what will be effect on terminal velocity of the steel ball? (01)

SECTION-B (16 Marks)

Investigate the value of ‘g’ by free fall method using electronic timer.

With the help of electronic timer, students measure the distance and time of free fall by repeating procedures with same steel ball for different heights and recorded readings given in following table.

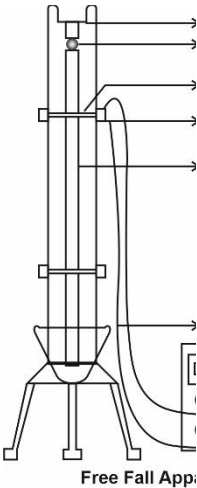


Q.4 Investigate the value of ‘g’ by free fall method using electronic timer.

With the help of electronic timer, students measure the distance and time of free fall by repeating procedures with same steel ball for different heights and recorded readings given in following table.

i. Copy and complete the table. (03)

No. of obs.	Height h (cm)	Time (s)		Average time t (s)	t ² (s ²)	g = 2h/t ² (cms ⁻²)
		t ₁	t ₂			
1	30	0.25	0.25			
2	45	0.28	0.29			
3	65	0.34	0.36			



- ii. Calculate the mean value of g. (01)
- iii. How do we magnetize steel ball in this experiment? (01)

Q 2: A student investigates the relationship between current passing through a tungsten filament lamp and the potential applied across it.

(i) Write down the apparatus needed for this investigation. [01]

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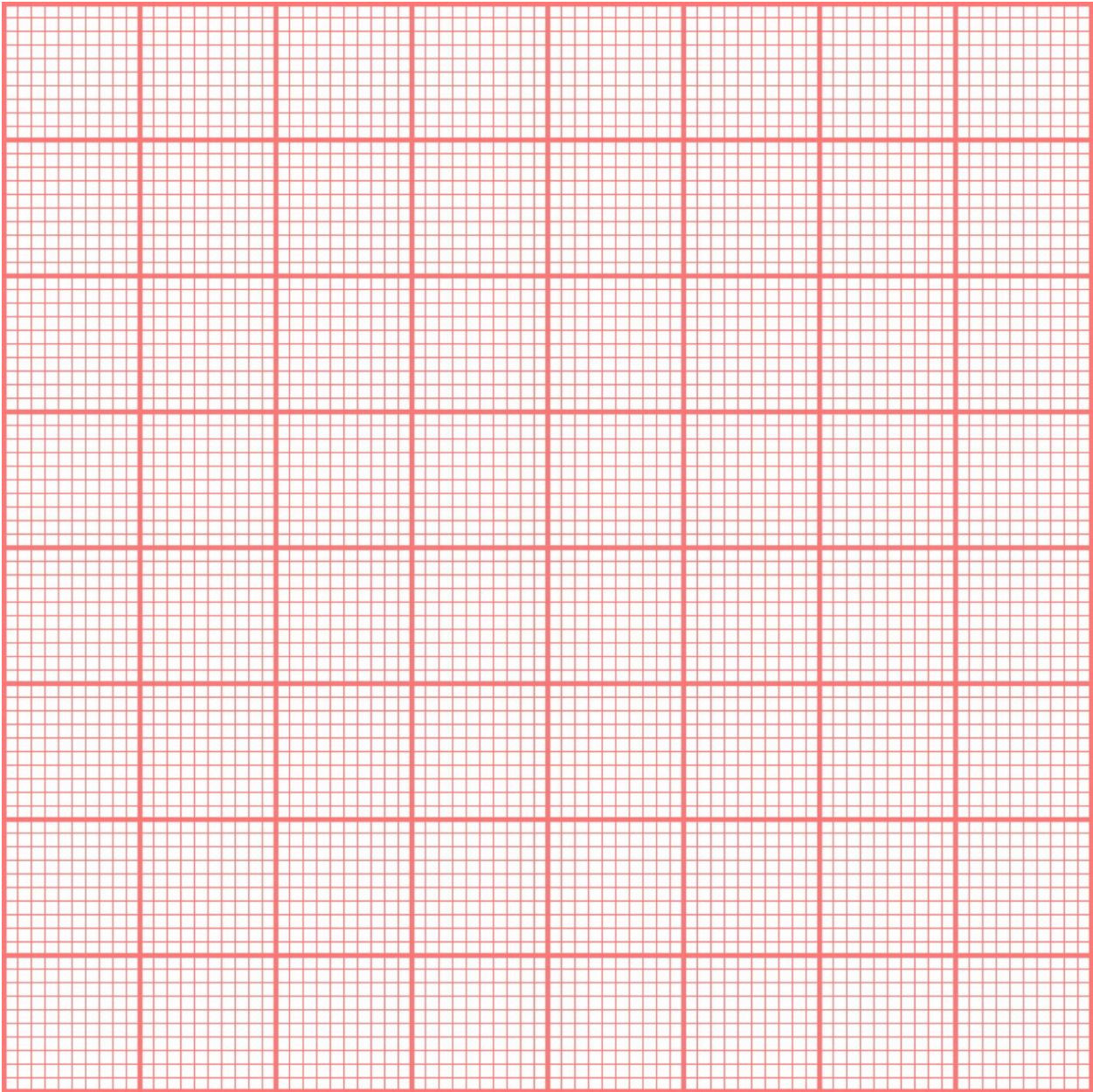
(ii) The student record reading of voltmeter and ammeter are given in table.

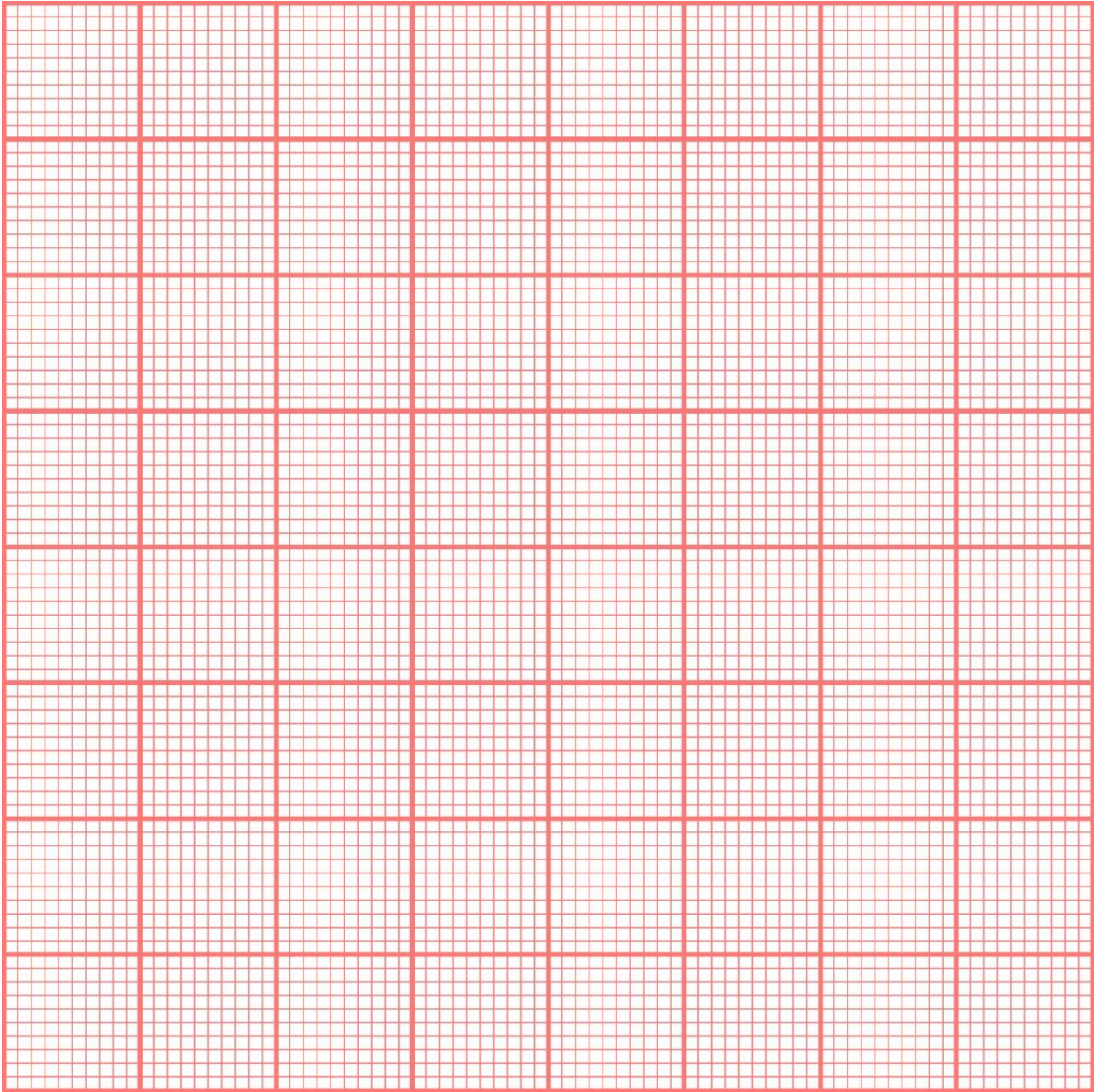
No of obs.	Ammeter reading I (ampere)	Voltmeter reading V (volt)
1	0	0
2	0.23	03
3	0.42	06
4	0.53	09
5	0.65	12
6	0.71	15

Tell which physical quantity is dependent variable and which one is independent variable. [01]

(iii) Plot the graph between current (I) and potential (V).

[03]





(iv) Discuss the behaviour of tungsten that can be deduced from the graph. [01]