

1. VIKUNGU TMMAT

35 Copies only

A-2
H-2
VAR-3
EP-4
P-3
PD-3
DAI-4
DAI-3
MC-4
CAD-2

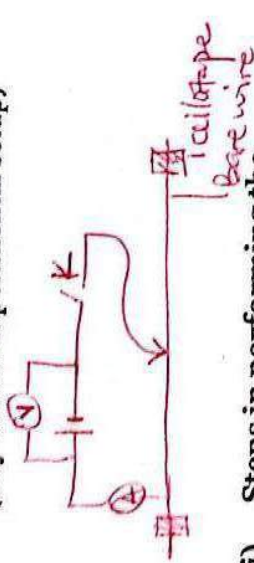
PHYSICS 535/2 MOCKS -2026 SUGGESTED MARKING SCHEME

ITEM ONE (1):

BASIS CODE	SUGGESTED RESPONSES	SUCCESS CRITERION	W.T
A Aim of the experiment	An scientific investigation to determine the internal resistance of cell to know if its lost voltage lies in the range of 0. 052V – 0. 468V, to suit the market quality.	Correct statement with quantity (value) and correct purpose/use. Only correct statement with quantity or only correct purpose.	5 <u>2</u>
VAR (Variables)	1. Independent variable; • Ammeter reading/current, I. • Length, l of the bare wire. 2. Dependent variable; • Voltmeter reading/voltage, V • Ammeter reading/current, I 3. Controlled variable; • Temperature of the bare wire. • Contact resistance. • Bare wire cross section	Writes all the three correct examples of the variables Writes any two of correct examples of the variables Writes any one correct example of the variables.	5 <u>3</u> 4 <u>2</u> 3 <u>1</u>
H (Hypothesis)	The lost voltage of the dry cell is in the range of 0. 052V – 0. 468V.	Writes correct statement/quantity with range/value.	5 <u>2</u>

TT=2
All three
Any two
Any one

30

P Procedure	(i) Experimental setup/diagram; (Any correct experimental setup)  (ii) Steps in performing the experiment; (a) The circuit was connected as shown in the diagram (b) The length/distance, l was measured from the metre rule such that $l = 10.0\text{cm}$, and the switch was closed. (c) The ammeter reading, I and voltmeter reading, V were read and recorded. (d) The steps (b) and (c) were repeated for different values of $l = 20.0, 30.0, 40.0, 50.0$ and 60.0cm (e) A graph of V against I was plotted. (f) The slope, s of the graph was determined which was the internal resistance of the cell. (g) The internal resistance $r = -s$. (h) The lost voltage of the cell was calculated from $V = -Ir$.	• Draws relevant experimental setup with key apparatus. • Writes all the necessary steps that are coherent. • Includes realistic values of independent variables. • States the use of apparatus/materials in the steps. • Draws relevant experimental setup with some key apparatus. • Writes some of the necessary steps that are coherent.
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6
T=3

6-9 → 3
3-5 → 2
1-2 → 1
0 → 0

				- Includes realistic values of independent variables. - States the use of apparatus/materials in the steps.									
				- Draws relevant experimental setup with some key apparatus. - Writes some of the necessary steps that are not coherent. - Includes unrealistic values of independent variables.	3								
EP (Errors and precautions)	<table><tr><th>S/N</th><th>Error(s)</th><th>Precaution(s)</th></tr><tr><td>1.</td><td>Parallax error in reading the scales from the ammeter and voltmeter</td><td>Viewing the scales perpendicularly or at right angle.</td></tr><tr><td>2.</td><td>Loose connection</td><td>Tighten the wires</td></tr></table>	S/N	Error(s)	Precaution(s)	1.	Parallax error in reading the scales from the ammeter and voltmeter	Viewing the scales perpendicularly or at right angle.	2.	Loose connection	Tighten the wires		States two relevant errors and the corresponding precautions.	3
		S/N	Error(s)	Precaution(s)									
1.	Parallax error in reading the scales from the ammeter and voltmeter	Viewing the scales perpendicularly or at right angle.											
2.	Loose connection	Tighten the wires											
			States one relevant error and the corresponding precaution.	3									
DP (Data presentation)	✓ any one column labelled correctly ✓ any five sets of data ✓ trend of the values ✓ any 3 sets ✓ at least 3 columns		- Presents organised data; independent and dependent variables corresponding. - Presents atleast 5 sets of independent and dependent variables. - closed table with atleast 2 columns	6									

$l(\text{cm})$	$I(\text{A})$	$V(\text{V})$
↓ increasing	↓ reducing	↓ increasing

Increasing trend	$l(\text{cm})$	$I(\text{A})$	$V(\text{V})$
	10.0	0.20	1.40
	20.0	0.40	1.30
	30.0	0.60	1.25
	40.0	0.80	1.05
	50.0	0.90	0.95
	60.0	1.00	0.80

- Writes at least 2/3 of the quantities and their corresponding units correctly.
- Records data in the expected trend.

$TT \pm 3$

3-4 → 3
2 → 2
1 → 1
0 → 0

- Presents organised data; independent and dependent variables corresponding.
- Presents 3 to 4 sets of independent and dependent variables.
- Writes at least 1/3 of the quantities and their corresponding units correctly.
- Records data in the expected trend.

Increasing
0.10 → 1.00

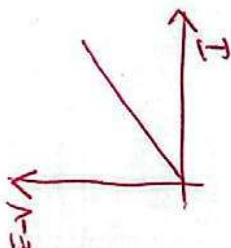
- Presents organised data; independent and dependent variables corresponding.
- Presents 1 to 2 sets of independent and dependent variables.

Checked from the table of results.

RD A
Recorded Data
Accuracy

$TT = 4$

4-6 → 4
3 → 3
2 → 2
1 → 1

DA I Data Analysis (Graph)	Check graph paper.	• Uses correct significant figures for calculated values.	
	A graph of $\epsilon - V$ against I The corresponding value of 0.524 on horizontal is read from the $\epsilon - V$ axis Conclusion depending on the obtained value on $\epsilon - V$ axis or: 	• Records 1 to 2 dependent variables within the expected range. • Records dependent variables with appropriate decimal places read from the instrument. • Uses wrong significant figures for calculated values.	3
		• Writes the title of the graph correctly • Draws both axes which are touching. • Labels both axes correctly with units when needed and without units when non-existent. • Uses uniform scales on both axes. • Plot atleast 5 points correctly. • Draws the line of best fit ; balancing the plotted point well. • Method of determining the slope	5
		• Writes the title of the graph correctly • Draws both axes which are touching. • Labels both axes correctly with units when needed and without units when non-existent. • Uses uniform scales on both axes.	4

5 FT = 3

6-9-3
3-5-2
1-2-1
0-0

		- Plot 3 to 4 points correctly. - Draws the line of best fit ; balancing the plotted point well. - Method of determining the slope or reading V on x-axis	3
DI / MC Data Interpretation.	$\text{Slope, } s = \frac{\text{change in } V}{\text{change in } I}$ Internal resistance : $r = -s$ Lost Voltage $= Ir$ The lost voltage is....., in the range of the hypothesis, so the hypothesis is valid/correct/accepted. OR; The lost voltage isout of range , so the hypothesis is invalid/wrong/rejected	- Writes the title of the graph correctly - Draws both axes which are touching. - Labels both axes correctly with units when needed and without units when non-existent. - Uses uniform scales on both axes. - Plot 1 to 2 points correctly.	5
		- Substitutes all the 4 values correctly in the slope formula. - Obtains correct value. - Writes correct unit when needed and no unit when non-existent. - Relates correctly the value obtained with what is being investigated (correct substitution conclusion)	4
		- Substitutes 2 to 3 values correctly in the slope formula. - Obtains correct value. - Writes correct unit when needed and no unit when non-existent. - Relates wrongly the value obtained with what is being	4

$IT = 4$
 correct answer with units ✓

		investigated conclusion)	(
CA ▷ Advise or Recommendation	The cell has the required lost voltage so it has an ideal quality and the consignment should continue to market. OR; The cell has more lost voltage and therefore, the consignment should not continue to market	Uses the value obtained to advise or recommend. ✓	$TT = 6$ $TT = 2$
TOTAL WEIGHTED SCORE		= 52	30

For both correct

uses value obtained and advice/recommend

ITEM TWO (2) :

BASIS CODE	EXPECTED/SUGGESTED RESPONSES	SUCCESS CRITERION	WT
A Aim of the experiment	An experiment to determine the focal length of the convex lens so as to ascertain if its power is in range 9. 52D – 10. 53D, for eye correction.	Correct statement with quantity(value) and correct purpose/use. Only correct statement with quantity or only correct purpose.	5 (2) 2 (1)
V Variables	Independent variable; - The distance of object, u, from lens Dependent variable; - The distance of image, V, from lens.	Writes all the three correct examples of the variables Writes any two of correct examples of the variables	5 (3) 4 (2)

TT = 2

TT = 3

	Controlled variable; • Light intensity. /Amount of light in the room.	Writes any one correct example of the variables.	3 (1)
H Hypothesis	The power of the convex lens is between 9.52D - 10.53D	Writes correct statement/quantity with range/value.	5 (2)

TT = 2

Both correct
→ 2

P Procedure	(iii) Experimental setup/diagram; (any correct experimental setup) <i>any point (3)</i> (iv) Steps in performing the experiment; (a) The apparatus were arranged as shown in the diagram. (b) The distance between the screen with wire gauze, u (distance of object) was adjusted from the metre rule such that u = 20.0cm (c) The white screen was moved forward and backwards until a clear, sharp image of the filament was formed on it. (d) The distance between the white screen and the convex lens, v (distance of image) was measured using the metre rule and recorded <i>(Repeat (b) to (d))</i> (e) The results were tabulated/entered in a table, including uv and (u+v). (f) The graph of uv against (u+v) was plotted. (g) The slope, f of the graph was determined which was the focal length of the lens. (h) F was converted to F in metres : $F = \frac{f}{100}$ (i) The power, p, was obtained as; $p = \frac{1}{F}$	• Draws relevant experimental setup with key apparatus. • Writes all the necessary steps that are coherent. • Includes realistic values of independent variables. • States the use of apparatus/materials in the steps.	6 TT = 3 <i>6 - 9 = 3</i> <i>3 - 5 = 2</i> <i>1 - 2 = 1</i> <i>0 = 0</i>
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						• Draws relevant experimental setup with some key apparatus. • Writes some of the necessary steps that are coherent. • Includes realistic values of independent variables. • States the use of apparatus/materials in the steps.	4												
						• Draws relevant experimental setup with some key apparatus. • Writes some of the necessary steps that are not coherent. • Includes unrealistic values of independent variables.	3												
EP Errors and precautions		S/N	Error(s)	Precaution(s)		States two relevant errors and the corresponding precautions.	5												
						States one relevant error and the corresponding precaution.	3												
DP Data presentation		<table><tr><th>U(cm)</th><th>V(cm)</th><th>UV(cm²)</th><th>(U + V)(cm)</th></tr><tr><td>20.0</td><td>20.6</td><td>412</td><td>40.6</td></tr><tr><td>30.0</td><td>16.2</td><td>486</td><td>46.2</td></tr></table>				U(cm)	V(cm)	UV(cm ²)	(U + V)(cm)	20.0	20.6	412	40.6	30.0	16.2	486	46.2	• Presents organised data; independent and dependent variables corresponding. <i>Minimum columns 2</i>	6
U(cm)	V(cm)	UV(cm ²)	(U + V)(cm)																
20.0	20.6	412	40.6																
30.0	16.2	486	46.2																

TT=4

TT=3

3-4=3

2=2

1=1

= At least 5 sets of data

 starting value
 ↓
 Reducing

	<table border="1"> <tr><td>40.0</td><td>13.6</td><td>544</td><td>53.6</td></tr> <tr><td>50.0</td><td>12.9</td><td>645</td><td>62.9</td></tr> <tr><td>60.0</td><td>12.3</td><td>738</td><td>72.3</td></tr> <tr><td>70.0</td><td>11.9</td><td>833</td><td>81.9</td></tr> </table> Maximum value $u > f = 100m$ last value of v not less than $f = 100m$	40.0	13.6	544	53.6	50.0	12.9	645	62.9	60.0	12.3	738	72.3	70.0	11.9	833	81.9	✓ Presents atleast 5 sets of independent and dependent variables. - Writes atleast 2/3 of the quantities and their corresponding units correctly. ✓ Records data in the expected trend.	
40.0	13.6	544	53.6																
50.0	12.9	645	62.9																
60.0	12.3	738	72.3																
70.0	11.9	833	81.9																
		- Presents organised data; independent and dependent variables corresponding. - Presents 3 to 4 sets of independent and dependent variables. - Writes atleast 1/3 of the quantities and their corresponding units correctly. - Records data in the expected trend.	4																
		- Presents organised data; independent and dependent variables corresponding. - Presents 1 to 2 sets of independent and dependent variables.	2																
RD A	Checked from the table of results.	Records atleast 3 dependent variables within the expected range.	4																

$$4 - 5 - 4 = 4$$

$$4 - 5 - 4 = 4$$

$$3 = 3$$

$$2 = 2$$

$$1 = 1$$

$$0 = 0$$

Recorded Data Accuracy	• Convert d.p.s or s.f.s. • Data enters at least 3 s.f.s	• Records dependent variables with appropriate decimal places read from the instrument. • Uses correct significant figures for calculated values.	
DA I Data Analysis (Graph)	Check graph paper.	• Records 1 to 2 dependent variables within the expected range. • Records dependent variables with appropriate decimal places read from the instrument. (1 d.p.) • Uses wrong significant figures for calculated values.	3
		✓ Writes the title of the graph correctly ✓ Draws both axes which are touching. ✓ Labels both axes correctly with units when needed and without units when non-existent. ✓ Uses uniform scales on both axes. ✓ Plot atleast 5 points correctly. ✓ Draws the line of best fit; balancing the plotted point well.	5
		• Writes the title of the graph correctly • Draws both axes which are touching.	4

$$\boxed{T = 3}$$

$$6 - 9 \rightarrow 3$$

$$3 - 5 \rightarrow 2$$

$$1 - 2 \rightarrow 1$$

$$0 - 0 \Rightarrow 0$$

		- Labels both axes correctly with units when needed and without units when non-existent. - Uses uniform scales on both axes. - Plot 3 to 4 points correctly. - Draws the line of best fit ; balancing the plotted point well.	3
DI Data Interpretation.	- Slope, f f in metres, F - power, P Power of the lens is in the range of 9. 52D – 10. 53D, so the hypothesis is valid/correct/accepted. OR; The power of the lens is (any value outside the range), so the hypothesis is invalid/wrong/rejected.	- Substitutes all the 4 values correctly in the slope formula. - Obtains correct value. - Writes correct unit when needed and no unit when non-existent. - Relates correctly the value obtained with what is being investigated (conclusion)	5 4

TT=4

		- Writes correct unit when needed and no unit when non-existent. - Relates wrongly the value obtained with what is being investigated (conclusion)	
CA Advise or Recommendation	The convex lens can be used for eye correction OR; The convex mirror can not be used for eye correction.	Uses the value obtained to advise or recommend. ✓	6 11-2
TOTAL WEIGHTED SCORE			
= 52			30