MARKING SCHEME
SMJK YU HUA PHYSICS TRIAL EXAMS 2014
PAPER 3

No 1

<table>
<tr><th>No</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1 (a) (i)</td><td>Manipulated Variable: Height of runway // h</td><td>1</td></tr>
<tr><td>(ii)</td><td>Responding Variable: Final velocity // length of ticker tape // v // s</td><td>1</td></tr>
<tr><td>(iii)</td><td>Fixed Variable: mass of trolley // m</td><td>1</td></tr>
<tr><td>(b)
(i)
(ii)
(iii)</td><td>Tabulate h, s, v and v ^{2} correctly in the table.
A Shows a table h, s, v and v ^{2}.
B State the correct unit of h, s, v and v ^{2}
C All values of s are correct
D All calculations v are correct
E All calculations v^2 are correct
F State s consisten 1 d.p.
G State v and v^2 consistent to either 1, 2 or 3 d.p

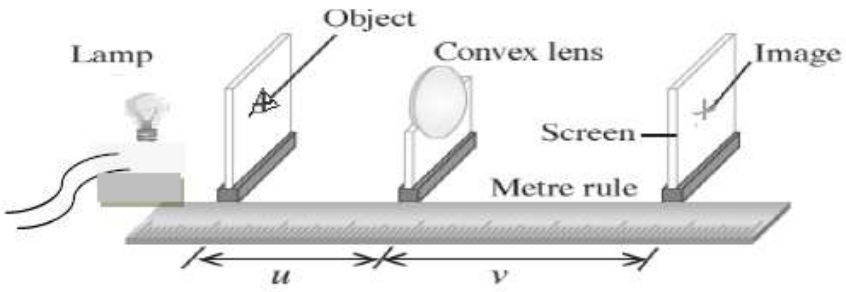
<table>
<tr><th>Height, h/cm</th><th>Length of ticker tape, s/cm</th><th>Final velocity v/ ms^{-1}</th><th>v^2 / m^{2}s^{-2}</th></tr>
<tr><td>10.0</td><td>8.0</td><td>2.00</td><td>4.00</td></tr>
<tr><td>20.0</td><td>9.7</td><td>2.43</td><td>5.90</td></tr>
<tr><td>30.0</td><td>11.3</td><td>2.83</td><td>7.98</td></tr>
<tr><td>40.0</td><td>12.6</td><td>3.15</td><td>9.92</td></tr>
<tr><td>50.0</td><td>14.0</td><td>3.50</td><td>12.25</td></tr>
</table></td><td>7</td></tr>
<tr><td>(c)</td><td>Draw the graph of v^2 against h .
A - Label y-axis and x-axis correctly
B - State the unit at the axis correctly
C - Both axes with the even and uniform scale:
D - 5 points correctly plotted:
E - a smooth best straight line
F - minimum size of the graph is 5 x 4 squares of 2 x 2 cm

<table>
<tr><th>No of ticks</th><th>Score</th></tr>
<tr><td>6</td><td>5</td></tr>
<tr><td>5</td><td>4</td></tr>
<tr><td>3-4</td><td>3</td></tr>
<tr><td>2</td><td>2</td></tr>
<tr><td>1</td><td>1</td></tr>
</table></td><td>5</td></tr>
<tr><td>(d)</td><td>State the relationship between v^2 and h
v^2 is directly proportional to h // v^2 is increasing linearly to h</td><td>1</td></tr>
<tr><td></td><td>TOTAL MARKS</td><td>16</td></tr>
</table>

No 2

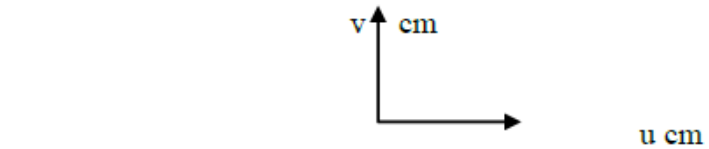
No	Answer	Marks
2 (a)(i)	I will reduce	**1**
(ii)	V will increase	**1**
(iii)	Show the extrapolation line V= 1.00 V	**1** **1**
(iv)	Electromotive Force (emf)	**1**
(b)	Show a big triangle drawn clearly on the graph Substitution: $m = \frac{0.50-1.00}{0.73-0.00}$ m = -0.685 Ω or -0.685 VA^{-1}	**1** **1** **1**
(c)	Internal Resistance of the battery	**1**
(d)	Equation in the form of y = mx + c V = -0.685I + 1	**1**
(e)	(i) Substitution V = -0.685 (0.90) + 1 Answer : V = 0.384 V or V = 0.38V	**2**

NO 3

No	Answer	Marks
3 (a)	**State suitable inference** The distance between the screen and glass depends on the distance between the lamp and the glass or The image distance depends on the object distance	1
(b)	**State a suitable hypothesis** If the object distance is shorter/decreased, the image distance will be longer/increases	1
(c)	**State the aim of the experiment** To investigate the relationship between the object distance, u and the image distance , v for a convex lens	1
	Suitable manipulated and responding variable variables 1. Manipulated variable: Object distance, u 2. Responding Variable: Image distance, v	1
	Constant Variable Focal length , f of convex lens *Reject: Type of lens*	1
	State complete list of apparatus and material Convex lens, bulb with holder, 12V ac power supply, white screen, cardboard with triangular hole fixed with cross wire, plasticine, meter rule	1
	Draw the functional arrangement of the apparatus  	1
	State method of controlling the manipulated variable, u A convex lens with a focal length of f=10cm is setup as shown in the diagram The distance between the cross wire and the convex lens, u (object distance) is set a 30 cm initially	1
	State the method to measure the responding variable v The power supply to the lamp is switched on. The white screen is moved back and forth until a sharp image is formed on the screen. The distance between the screen and lens, v is recorded	1
	Repeat the experiment at least 4 for times with the values The experiment is repeated with u=26.0 cm, 22.0cm, 18.0cm and 14,0 cm	1

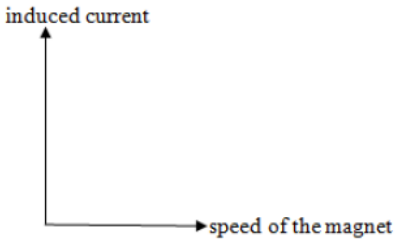
	State how the data is tabulated **Note: Range of values that can be used as u** **Must be greater than 10.0 cm**	1
	State how the data is analysed , Plot a graph of v against u *accept graph of* $\frac{1}{v}$ *against* $\frac{1}{u}$	1
	TOTAL MARKS	**12 MARKS**

Object Distance, u/cm	Image distance , v/cm
30.0	
26.0	
22.0	
18.0	
14.0	



No 4

4(a)	**State the suitable inference** The brightness of the lamp increases when the speed of the magnet in the coils(solenoid) increases// Induced current depend on the speed of magnet	1
(b)	**State a relevant hypothesis** The magnitude of the induced current increases when the speed of the magnet increases.	1
(c)	**State the aim of experiment** To study the relationship between the speed of a magnet in a coil and the magnitude of the induced current.	1
	State the suitable manipulated variables and responding variable (Quantity that can be measured) Manipulated variables : the height of the magnet fall Responding variables : Deflection/ reading of the galvanometer	1
	State the constant variable strenght of the magnet / number of the turns in the coils.	1
	State the complete list of apparatus and materials Bar magnet, cardboard tube, galvanometer, insulated copper wire, retort stand and metre rule.	1
	Draw the functional arrangement of the apparatus 	1
	State the method to control the manipulated variable 1. Make a solenoid of 50 turns by winding an insulated copper wire round a cardboard tube. Connect the ends of the wire to a galvanometer. 2. Hold a small bar magnet at a height of h = 5 cm above the top end of the solenoid.	1
	State the method to measure the responding variable 3. Drop the magnet into the solenoid into the solenoid and record the deflection of the galvanometer as the induced current.	1
	Repeat the experiment at least 4 times with the values 4. Repeat the eksperiment by changing the height h to 10 cm, 15 cm, 20 cm , 25 cm and 30 cm.	1

	State how the data tabulated with the title MV and RV Height of the magnet,h | Induced current I 5.0 10.0 15.0 20.0 25.0 30.0	1
	State how the data is analysed, plot a graph RV against MV  	1
	TOTAL MARK	12