Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

Question Number	Acceptable answers	Additional guidance	Mark
	• There is now a (greater) current in the voltmeter **(1)** • The current in the battery/circuit increases **Or** Energy/power is dissipated in the voltmeter **(1)** • Power/energy output from the battery increases **(1)** • Efficiency of the motor circuit decreases **(1)** (MP4 dependent on MP3)	Accept reference to the resistance in the circuit decreasing for MP1. Accept power input to circuit for MP3.	**4**

Q2.

Question Number	Acceptable answers	Additional guidance	Mark
	MAX 4 • The current increases (non-linearly) with p.d. **(1)** • The rate of increase of current (with p.d.) decreases **(1)** • The temperature of the bulb increases so the resistance increases **(1)** • Increasing the amplitude of lattice vibration **(1)** • The frequency of collisions between electrons and ions increases **(1)**		**4**

Q3.

Question Number	Acceptable Answer	Additional Guidance	Mark
	• increasing the current through the coil increases the heating effect (1) • this causes the resistance of the coil to increase (due to the collisions between conduction electrons and lattice ions) (1) • so for a given p.d. this would result in the current decreasing (1) • this would increase the focal length of the lens, hence the need to limit the current (1)	MP4 conditional mark, dependent on MP3 being awarded	**(4)**

Q4.

Question Number	Acceptable Answers	Additional Guidance	Mark
*	This question assesses a student's ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning. Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning. The following table shows how the marks should be awarded for indicative content. Indicative content: • (Maximum/Initial) current is equal to battery emf divided by *R* **Or** current as switch closed **Or** current as complete circuit **Or** current due to battery • Coil rotates • (movement of) coil "cuts/changes" (magnetic) flux (linkage) / field • Which induces an emf (according to Faraday's law) • Opposes original emf/current according to Lenz's law **Or** current reduced as effect opposes change • The faster the coil rotates the larger this (back) emf/effect the smaller the current	<table><tr><th>IC points</th><th>IC mark</th><th>Max linkage mark available</th><th>Max final mark</th></tr><tr><td>**6**</td><td>4</td><td>2</td><td>**6**</td></tr><tr><td>**5**</td><td>3</td><td>2</td><td>**5**</td></tr><tr><td>**4**</td><td>3</td><td>1</td><td>**4**</td></tr><tr><td>**3**</td><td>2</td><td>1</td><td>**3**</td></tr><tr><td>**2**</td><td>2</td><td>0</td><td>**2**</td></tr><tr><td>**1**</td><td>1</td><td>0</td><td>**1**</td></tr><tr><td>**0**</td><td>0</td><td>0</td><td>**0**</td></tr></table> ic3 needs a link to coil moving ic4 depends on ic3	6