

Name of the Student: _____

Max. Marks : 22 Marks

Time : 22 Minutes

Mark Schemes

Q1.

- (a) suitable calculation using a pair of values of x and corresponding t to give an average of 2.2 m s^{-1} ($\pm 0.05 \text{ m s}^{-1}$) **(1)**
 valid reason given **(1)**
 (e.g. larger values are more reliable/accurate
 or use of differences eliminates zero errors)

2

- (b) (i) column D (y/t (cm s^{-1}))
 186
 210
 233
 259
 284
 307

all values correct to 3 s.f. **(1)**

- (ii) graph: chosen graph gives a straight line (e.g. y/t against t) **(1)**
 axes labelled correctly **(1)**
 suitable scale chosen **(1)**
 minimum of four points correctly plotted **(1)**
 best straight line **(1)**

- (iii) u (= y - intercept) = 162 cm s^{-1} ($\pm 4 \text{ cm s}^{-1}$) **(1)**
 gradient = 495 cm s^{-2} ($\pm 25 \text{ cm s}^{-2}$) **(1)**
 k = gradient (= 495 cm s^{-2}) **(1)**

9

- (c) (i) u : initial vertical component of velocity **(1)**

- (ii) k : = $\frac{1}{2} g$ **(1)**

2

- (d) $v^2 = u^2 + 2.2^2$ **(1)**
 gives $v = (1.62^2 + 2.2^2)^{1/2} = 2.7 \text{ m s}^{-1}$ ($\pm 0.1 \text{ m s}^{-1}$) **(1)**

2

[15]**Q2.**

- (a) ray diagram to show:
 rays reflected at concave mirror **(1)**
 2 rays reflected at convex mirror **(1)**
 rays crossing in front of eyepiece **(1)**

3

- (b) different focal points for rays at different distances from axis **(1)**
shortest focal length for paraxial rays **(1)**

2

- (c) light of different wavelengths refracted to different foci **(1)**
diagram showing refraction with blue focal length closest to lens **(1)**

max 2

[7]