Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Mark Schemes

Q1.

(a) time elapsed = 8.5 ± 0.2 (ms) **(1)**
distance travelled = 3 (m) **(1)** (allow C.E. if d = 1.5 (m))

speed of sound = $\frac{3}{8.5 \times 10^{-3}}$ = 350 m s^{-1} (353) **(1)**

3

(b) connect oscilloscope <u>across</u> ac source (or diagram or ac to Y plates) **(1)**
adjust time base to give trace **(1)**
adjust voltage sensitivity **(1)**
sinusoidal trace shown **(1)**
how to measure T from trace **(1)**

$f = \frac{1}{T}$ **(1)**

max 5

[8]

Q2.

(a) (i) the Young modulus: tensile stress / tensile strain **(1)**

(ii) maximum force or load which can be applied without wire being permanently deformed
[or point beyond which (when stress removed,) material does not regain original length] **(1)**

2

(b) (i) graph: suitable scale **(1)**
correct points **(1)** **(1)**
best straight line followed by curve **(1)**

(ii) indication of region or range of Hooke's law **(1)**

(iii) (use of $E = \frac{Fl}{Ae}$)

values of F and e within range or correct gradient **(1)**

to give $E = \frac{67}{4 \times 10^{-3}} \times \frac{1.6}{8.0 \times 10^{-8}}$ **(1)**

= 3.3(5) × 10^{10} Pa **(1)**

8

(c) (i) work done = force × distance **(1)**

= <u>average</u> force × extension (= ½Fe) **(1)**

[or use work done = area under graph

area = ½ base × height]

(ii) energy stored = $\frac{67 \times 4 \times 10^{-3}}{2}$ **(1)**

= 13.(4) × 10^{-3} J **(1)**

4

[14]