**Name of the Student**:_____
**Max. Marks : 17 Marks** **Time : 17 Minutes**

Mark Schemes

## Q1.

(a) (i) **diffraction (1)**

(ii) **any 4 points from**

**interference** (fringes formed) **(1)**

where light from the two slits overlaps (or superposes) **(1)**

bright (or red) fringes are formed where light (from the two slits) reinforces (or interfere constructively/crest meets crest) **(1)**

dark fringes are formed where light (from the two slits) cancels (or interferes destructively/trough meets crest) **(1)**

the light (from the two slits) is coherent **(1)**

*either*
reinforcement occurs where light waves are in phase (or path difference = whole number of wavelengths) **(1)**

*or*
cancellation occurs where light waves are out of phase of 180° (in anti-phase)
(or path difference = whole number + 0.5 wavelengths) **(1)**
(not 'out of phase')

(iii) $\left(w = \frac{\lambda D}{s}\right)$ gives $\lambda = \frac{ws}{D}$ **(1)**

*w* (= 3.6/**4**) = 0.9(0) mm **(1)** (failure to /4 is max 2)

$\lambda \left(= \frac{ws}{D}\right) = \frac{0.90 \times (10^{-3}) \times 0.56 \times (10^{-3})}{0.80}$ **(1)** = $6.3 \times 10^{-7}$ m **(1)**

**9**

(b) central (bright) fringe would be white **(1)**

side fringes are (continuous) spectra **(1)**

(dark) fringes would be closer together (because $\lambda_{red}$ > average $\lambda_{white}$) **(1)**

the bright fringes would be blue on the side nearest the centre (or red on the side away from the centre) **(1)**

bright fringes merge away from centre **(1)**

bright fringes wider (or dark fringes narrower) **(1)**

**max 3**

**[12]**

## Q2.

(a) (i) particle vibration (or disturbance or oscillation) **(1)**
same as (or parallel to) direction of propagation
(or energy transfer) **(1)**

(ii) (particle vibration)
perpendicular to direction of propagation (or energy transfer) **(1)**

**3**

(b) variation in intensity between max and min (or light and dark) **(1)**
two maxima (or two minima) in 360° rotation **(1)**

**2**
**QWC 1**

**[5]**