

- M1.(a) (i) reverse ✓ 1
- (ii) use of $V = IR$ ✓
 $5 \times 10^{-9} \times 10^6 = 5 \times 10^{-3} \text{V}$ or 5mV ✓ 2
- (iii) use of current = sens × power ✓
 $6 \times 10^{-7} \text{A}$ or $0.6 \mu\text{A}$ ✓
voltage = $6 \times 10^{-7} \text{A} \times 10^6 = 0.6 \text{V}$ ✓ 3
- (iv) $T = RC$ $10^6 \times 10 \times 10^{-12}$ ✓ = 10^{-5}s or $10 \mu\text{s}$ ✓ 2
- (v) capacitance given at zero bias, reverse bias decreases diode capacitance / use of smaller resistance than stated in question ✓ 1
- (vi) Increase R ✓
use op-amp ✓ 2
- (b) Attenuation ✓ due to absorption ✓ and / or scattering of signal in fibre ✓
Radiation ✓ due to signal loss from tight bends or fibre misalignment ✓ 5

[16]