Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Mark Schemes

Q1.

(a) $P = \frac{1}{f} = \frac{1}{u} + \frac{1}{v} = \frac{1}{.25} + \frac{1}{-.64}$ ✔

= +2.4 ✔

D ✔

Must see positive sign in answer.

3

(b) Magnification = 2.6 ✔

1

(c) "Long sight ***OR*** hypermetropia" ✔

Accept presbyopia or non-spherical cornea.

1

(d) Cause: non-spherical cornea ✔

Effect: focus in one plane, out of focus in plane at 90° ✔

Correction: cylindrical (for correction lens) ✔

3

(e) 1 power ✔

2 axis of defect ✔

2

[10]

Q2.

(a) **The mark scheme gives some guidance as to what statements are expected to be seen in a 1 or 2 mark (L1), 3 or 4 mark (L2) and 5 or 6 mark (L3) answer. Guidance provided in section 3.10 of *the Mark Scheme Instructions* document should be used to assist marking this question.**

L3 5-6 marks	Both bullet points of the question are addressed in good detail. The answer includes at least 8 answer points from	The student presents relevant information coherently, employing structure, style and sp&g to render meaning

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	the list below.	clear. The text is legible.
L2 3-4 marks	The answer includes some discussion of both bullet points. The answer includes at least 5-7 answer points from the list below.	The student presents relevant information and in a way which assists the communication of meaning. The text is legible. Sp&g are sufficiently accurate not to obscure meaning.
L1 1-2 marks	The answer addresses one bullet point in some detail but the other may be neglected. There may be consideration of up to 4 answer points from the list below.	The student presents some relevant information in a simple form. The text is usually legible. Sp&g allow meaning to be derived although errors are sometimes obstructive.
0 marks	Little or no discussion of relevant content.	The student's presentation, spelling, punctuation and grammar seriously obstruct understanding.

The following statements could be present

Reference to temperature:

- *anode rotates*
- *spread heat load*
- *allows higher intensity*
- *allows longer use of tube*
- *larger mass*
- *mean temperature less for given heat energy transfer*
- *cooling arrangements provided*
- *good conductor*
- *high specific heat capacity.*

Reference to sharpness:

- *angled anode*
- *produces larger focal target area*
- *reduction of effective area of focal spot for x-ray emission.*

6

(b) ke = $1.6 \times 10^{-19} \times 82.5 \times 10^{3} = 1.32 \times 10^{-14}$ J ✔

Independent mark for 3 sig figs ✔

2

(c) energy = $1.6 \times 10^{-19} \times 75 \times 10^{3}$ ✔

$$\lambda = \frac{6.63 \times 10^{-34} \times 3 \times 10^{8}}{1.6 \times 10^{-19} \times 75 \times 10^{3}}$$ ✔

$\lambda = 1.7 \times 10^{-11}$ m ✔

3

[11]

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