Practice Question Set For A-Level
Subject : Physics
Paper-3 Topic: Section B (Section 10_ Medical Physics)

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

(a) **Only** cones at fovea ✓
Allow centre for fovea

as you move away from fovea fewer cones more rods ✓

2

(b) three labelled curves blue, green, red in order from left to right ✓
roughly at correct height ✓ Green > Red >> Blue
each curve covers the correct range of wavelengths
Blue 375 to 500; Green 425 to 675; Red 475 to 725 (all + or − 30} ✓
Green>red>2 / 3 green Blue <1 / 4 green

3

(c) the two images fall on receptors with at least one (unstimulated) receptor between them ✓
Allow 'separated by at least 2 cell diameters'

1

(d) Cones used in bright light, rods used in dim light resolution in bright light better because size of cones smaller than size of rod: or resolution in dim light worse because several rods connected to 1 nerve (well away from fovea)
Do not accept, 'greater density of cones'

2

[8]

Q2.

(a) (i) longitudinal/pressure waves in the ear canal **(1)**

forces eardrum into mechanical vibrations **(1)**

(mechanical) vibrations (passed through middle ear) by a lever system/series of bones/named bones to the oval window **(1)**

sets up pressure waves in fluid in cochlea **(1)**

max 3

(ii) force increased by the action of the lever system/series of bones/named bones; value F × 1.5 **(1)**

area of oval window << area of the eardrum ; value A/20 **(1)**

effect of pinna in increasing intensity in ear canal **(1)**

max 2

Downloaded from www.merit-minds.com

(b) $46 = 10 \times \log (I/(1.0 \times 10^{-12}))$ **(1)**

$I = 4.0 \times 10^{-8}$ **(1)**

W m^{-2} **(1)**

3

(c) dBA scale is frequency dependent to match the response of the ear **(1)**
ear more sensitive (than I_o) for a range of frequencies between 1 and about 2 6 kHz **(1)**

2

[10]

Downloaded from www.merit-minds.com