GET BETTER AT PHYSICS · MARK SCHEME

Luminosity & Black-Body Radiation: tiered multiple choice

Edexcel IAL Physics · Unit 5 (WPH15) · Specification points 161–164 · 5 questions · 5 marks

1 mark per correct letter

Worked reasoning for every question

How students did = from Pearson examiner reports, where available

Answer key

Q1	Q2	Q3	Q4	Q5
B	C	C	A	D

Easy

Questions 1–5

1 **B**

Peak wavelength as a metal bar cools · Edexcel IAL January 2021 · Unit 5 · Q4

Wien's law: $\lambda_{max}T$ = constant. As the bar cools, T decreases, so λ_{max} increases (the glow shifts from white towards red and then into the infrared).

How students did: 81% of students got this right in January 2021.

2 **C**

Comparing the intensity received from two stars · Edexcel IAL January 2021 · Unit 5 · Q6

$I = L/(4\pi d^2)$. $I_V/I_A = (L_V/L_A) \times (d_A/d_V)^2 = 5 \times (1/1.5)^2 = 5/2.25 \approx 2$.

How students did: 79% of students got this right in January 2021.

3 **C**

Luminosity of stars with the same temperature · Edexcel IAL January 2021 · Unit 5 · Q8

Stefan–Boltzmann law: $L = \sigma 4\pi r^2 T^4$. With equal temperatures, $L \propto r^2$. X's radius is 1.25 times Y's, so $L_X/L_Y = 1.25^2 \approx 1.6$.

How students did: 72% of students got this right in January 2021.

4 **A**

Two stars of equal luminosity · Edexcel IAL June 2025 · Unit 5 · Q8

X's peak is at a shorter wavelength, so by Wien's law X has a higher surface temperature. The two stars have the same luminosity, but more radiation from X reaches Earth (its curve is higher), so by $I = L/(4\pi d^2)$ X must be closer.

5 **D**

Temperature from black-body curves · Edexcel IAL January 2024 · Unit 5 · Q9

Wien's law: $\lambda_{max}T$ is constant. X peaks at a shorter wavelength, which is a higher frequency, so X has the higher surface temperature: $T_X > T_Y$.

How students did: Examiners reported that at least 60% of students got this right in January 2024.

End of mark scheme. Answers from Pearson's published mark schemes; explanations written for this pack. Pearson Edexcel material is © Pearson Education Ltd. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**

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