Mark Scheme (Results)

January 2023

Pearson Edexcel International GCSE
in Physics (4PH1)
Paper 2PR

Question number	Answer	Notes	Marks
1 (a)	A (absolute magnitude); B is incorrect because apparent magnitude is how bright the star appears on Earth, regardless of distance C is incorrect because the H-R diagram requires a specific scalar magnitude D is incorrect because the H-R diagram requires a specific magnitude		1
(b)	P: white dwarfs; Q: main sequence; R: red giants;	reject if more than one given reject if more than one given reject if more than one given	3
(c)	idea of the left-hand side; idea that blue/white stars are hottest / hotter than red/orange stars;	allow 'blue' allow use of letter P to indicate left side ignore 'white' allow white dwarfs are hottest	2

Total for Question 1 = 6 marks

Question number	Answer	Notes	Marks
2 (a)	violet;	reject purple, ultraviolet, UV	1
(b)	idea that UV causes mutations/damage (in cells); (leading to) (skin) cancer/blindness;	allow kills cells/tissue, sunburn, burns skin	2
(c) (i)	speed = frequency × wavelength;	allow standard symbols and rearrangements e.g. $f = v/\lambda$ allow c, v for speed	1
(ii)	substitution OR rearrangement; evaluation; e.g. $300\,000\,000 = f \times 15$ OR $f = v/\lambda$ (f =) 20 000 000 (Hz)	-1 for POT error accept 20 MHz, 20 million (Hz), 20×10^6 (Hz), $2(.0) \times 10^7$ (Hz)	2

Total for Question 2 = 6 marks

Question number	Answer	Notes	Marks
5 (a)	output voltage is less than input voltage; output current is greater than input current;	allow voltage decreases allow current increases	2
(b)	any attempt to calculate a power; correct calculation of either input or output power; indication that the input and output power are (approximately) equal; e.g. input power = 230 × 0.067 input power = 15(.41) 15(.41) ≈ 15(.5)	allow either product of voltage and current allow idea of calculating an efficiency (percentage) and showing it is (approximately) 100% output power = 5.0 × 3.1 output power = 15(.5) 15(.5)/15(.41) = 1.0… or 100%	3
(c) (i)	$N_p/N_s = V_p/V_s$;	allow any correct rearrangement allow "i(nput) and o(utput)" or "1 and 2" for "p(rimary) and s(econdary)" allow correct word equation ignore 'P' for 'N' condone 'T', 't' or 'n' for 'N' condone 'coils' for 'turns'	1
(ii)	substitution; rearrangement; evaluation to 2 s.f. or more; e.g. $1500/N_s = 230/5.0$ $(N_s =)$ 1500 / (230 / 5.0) $(N_s =)$ 33	 32 scores 2 marks only allow 32.6, 32.608…	3

Total for Question 5 = 9 marks