

OCR Physics A

Stars

Specification reference	Checklist questions	
5.5.1 a	Can you explain the terms planets, planetary satellites, comets, solar systems, galaxies, and the Universe?	<input type="checkbox"/>
5.5.1 b	Can you describe the formation of a star from interstellar dust and gas in terms of gravitational collapse, fusion of hydrogen into helium, radiation, and gas pressure?	<input type="checkbox"/>
5.5.1 c	Can you describe the evolution of a low-mass star like our Sun into a red giant and white dwarf?	<input type="checkbox"/>
5.5.1 c	Can you define a planetary nebula?	<input type="checkbox"/>
5.5.1 d	Can you describe the characteristics of a white dwarf; electron degeneracy pressure; and the Chandrasekhar limit?	<input type="checkbox"/>
5.5.1 e	Can you explain the evolution of a massive star into a red supergiant and then either a neutron star or black hole; and a supernova?	<input type="checkbox"/>
5.5.1 f	Can you describe the characteristics of neutron stars and black holes?	<input type="checkbox"/>
5.5.1 g	Can you understand the Hertzsprung–Russell (HR) diagram as luminosity–temperature plot?	<input type="checkbox"/>
5.5.1 g	Can you explain the main sequence, red giants, red supergiants, and white dwarfs?	<input type="checkbox"/>
5.5.2 a	Can you calculate the energy levels of electrons in isolated gas atoms?	<input type="checkbox"/>
5.5.2 b	Can you explain the idea that energy levels have negative values?	<input type="checkbox"/>
5.5.2 c	Can you describe emission spectral lines from hot gases in terms of transition of electrons between discrete energy levels and emission of photons?	<input type="checkbox"/>

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5.5.2 d	Can you demonstrate the equations $hf = \Delta E$ and $\frac{hc}{\lambda} = \Delta E$?	<input type="checkbox"/>
5.5.2 e	Can you explain that different atoms have different spectral lines, which can be used to identify elements within stars?	<input type="checkbox"/>
5.5.2 f	Can you describe continuous spectra, emission line spectra, and absorption line spectra?	<input type="checkbox"/>
5.5.2 g	Can you demonstrate the use of a transmission diffraction grating to determine the wavelength of light?	<input type="checkbox"/>
5.5.2 h	Can you understand the condition for maxima $d \sin \theta = n\lambda$, where d is the grating spacing?	<input type="checkbox"/>
5.5.2 i	Can you demonstrate the use of Wien's displacement law $\lambda_{\max} \propto \frac{1}{T}$ to estimate the peak surface temperature of a star?	<input type="checkbox"/>
5.5.2 j	Can you calculate the luminosity L of a star using Stefan's law $L = 4\pi r^2 \sigma T^4$, where σ is the Stefan constant?	<input type="checkbox"/>
5.5.2 k	Can you demonstrate the use of Wien's displacement law and Stefan's law to estimate the radius of a star?	<input type="checkbox"/>