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A Level Physics A

H556/01 Modelling physics

Question Set 19

1 **(a)** According to the Cosmological principle, the Universe is isotropic, homogeneous and the laws of physics are universal.

State what is meant by the term *homogeneous*. **[1]**

(b) Astronomers often use absorption spectral lines to determine the relative velocity of distant galaxies. The wavelength of a specific absorption spectral line observed in the laboratory is 280 nm.

The galaxy RXJ1242-11 is 200 Mpc away from the Earth and it has a massive black hole at its centre.

(i) Calculate in nm the wavelength λ of the same spectral line from RXJ1242-11 when **observed** from the Earth. Assume the Hubble constant is 68 $km\,s^{-1}\,Mpc^{-1}$.

λ = …….. nm **[3]**

(ii) State one of the characteristics of a black hole. **[1]**

(c) The Universe evolved from the Big Bang.

Describe the evolution of the Universe up to the formation of the first nuclei. **[4]**

Total Marks for Question Set 19: 9

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