Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

(a) State what is meant by the Hubble constant.

_____

_____

(1)

(b) The recessional velocity of a galaxy 8.0×10^8 ly from Earth is measured to be 1.8×10^4 km s^{-1}.

Show that this suggests a value for the Hubble constant of 73 km s^{-1} Mpc^{-1}.

(2)

(c) (i) Using the value for the Hubble constant given in part (b), estimate the age of the Universe.
Give your answer in years.

age of the Universe _____ years

(3)

(ii) State **one** assumption that must be made to justify the estimate made in part (i).

_____

_____

(1)
(Total 7 marks)

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Q2.

(a) Define the term absolute magnitude.

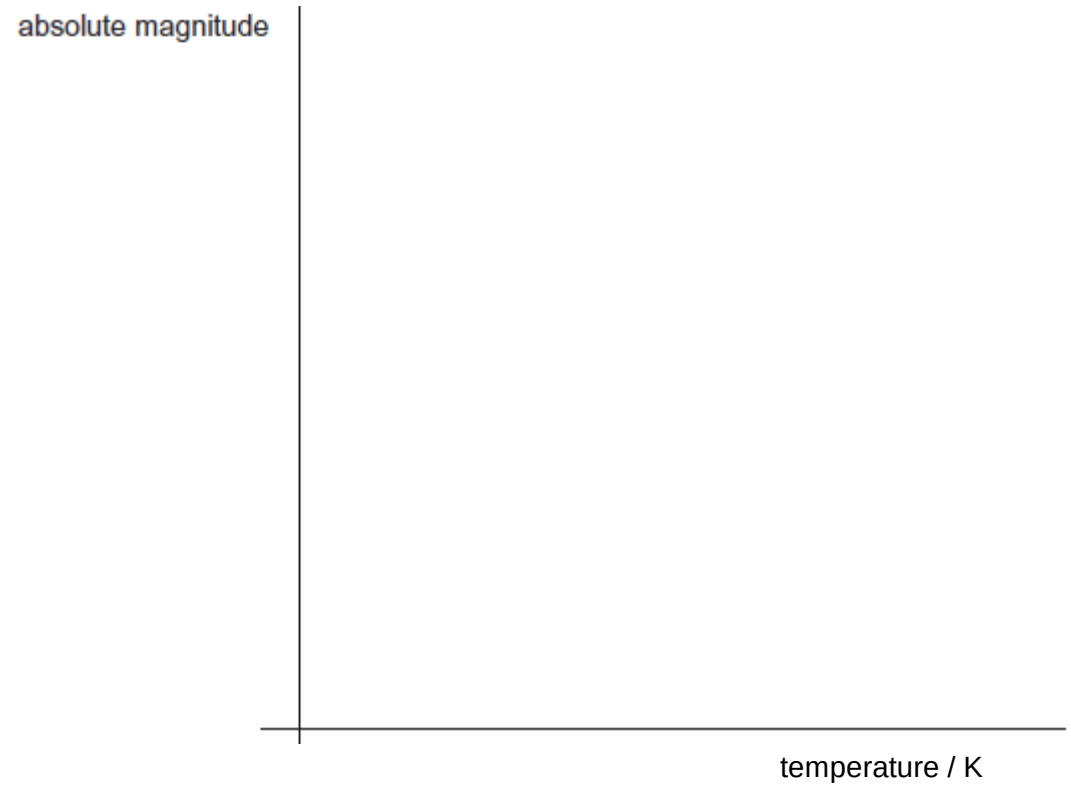
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(1)

(b) The figure below shows the axes of a Hertzsprung-Russell diagram.

Mark suitable scales on the absolute magnitude and temperature axes.



(2)

(c) Label a possible position of each of the following stars on the diagram above:

(i) the Sun

(1)

(ii) star W, which has the same intrinsic brightness as the Sun, but has a significantly higher temperature

(1)

(iii) star X, which has a similar spectrum to the Sun, but is significantly larger

(1)

(iv) star Y, which is significantly larger than the Sun and has prominent absorption lines of neutral atoms and titanium oxide (TiO) in its spectrum.

(1)

(d) How does the diameter of star W, in part (ii), compare with the diameter of the Sun? Explain your answer.

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_____

(3)

(Total 10 marks)

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