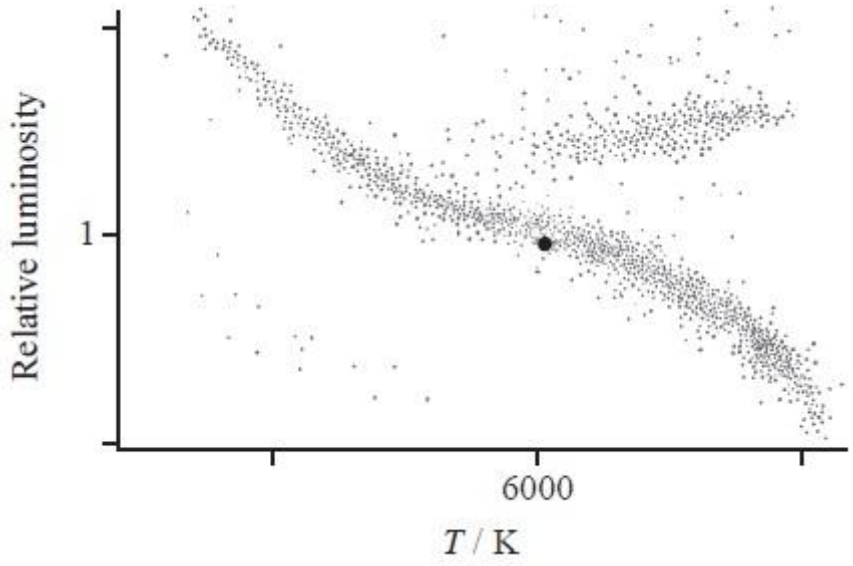
Practice Question Set For A-Level
Subject : Physics
Paper-2 Topic : 10_Space

Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

This Hertzsprung-Russell diagram is a plot of relative luminosity against temperature for a large number of stars.



The position of the Sun, at a surface temperature of about 6000 K and a relative luminosity of 1, is marked on the diagram.

(a) Complete the temperature and relative luminosity scales by adding values at the positions shown.

(2)

(b) The Sun is an example of a main sequence star.

(i) State the fusion process taking place in the core of all main sequence stars.

(1)

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(ii) Draw a circle where the most massive main sequence stars are located on the diagram and explain why they are found in this position.

(3)

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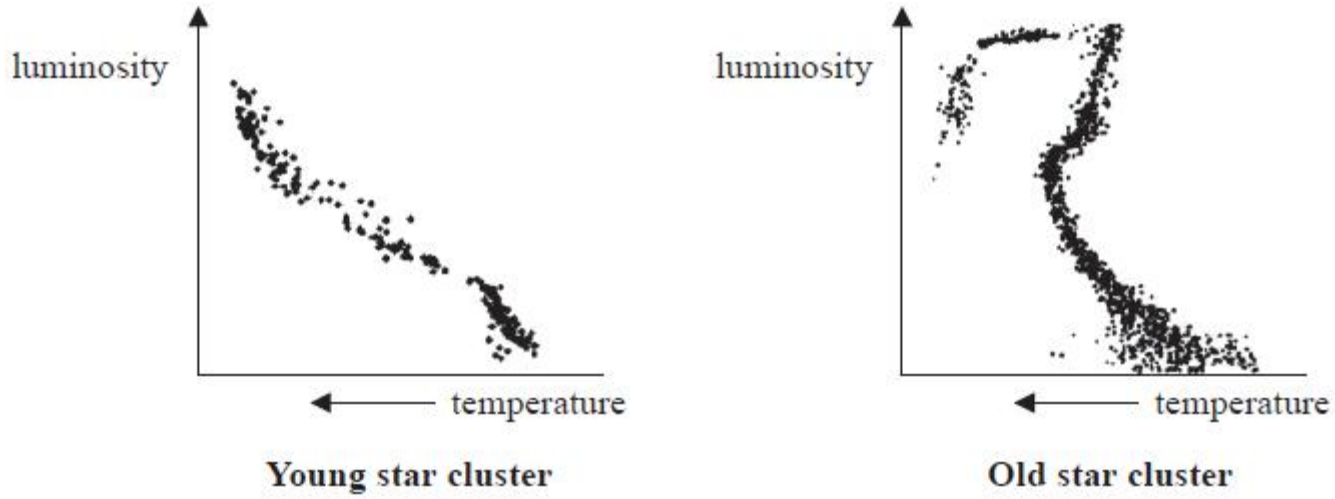
(Total for Question = 6 marks)

Q2.

(a) The Herzsprung-Russell (H-R) diagram is one of the most important tools in the study of stellar evolution.

The H-R diagrams below are for a young star cluster and an old star cluster.



Use the diagrams to describe and explain how the old star cluster is different from the young star cluster.

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(b) Trigonometric parallax is one way in which stellar distances can be measured.

Astronomers measure the parallax angle for two nearby stars. The parallax angle for star A is 3.74×10^{-6} rad and that for star B is 1.84×10^{-7} rad.

(i) Without calculation, state what can be deduced from this data about the relative distances of the two

stars.

(1)

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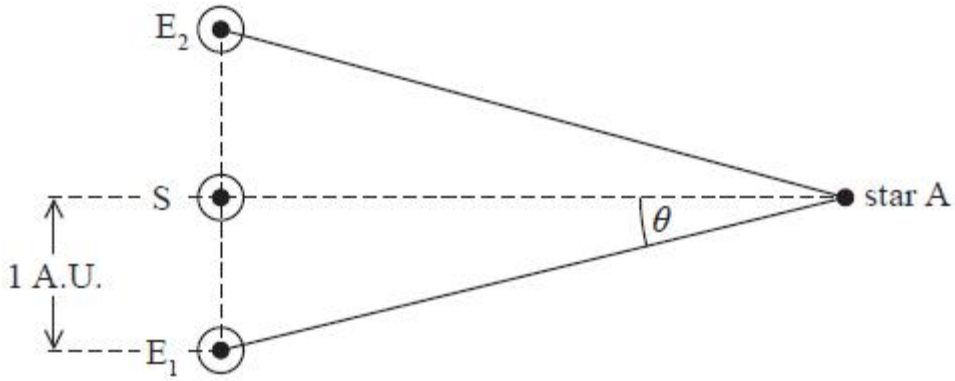
(ii) The diagram shows the parallax angle for star A.
Calculate the distance of star A from the Earth.
1 A.U. is 1.50×10^{11} m

(2)



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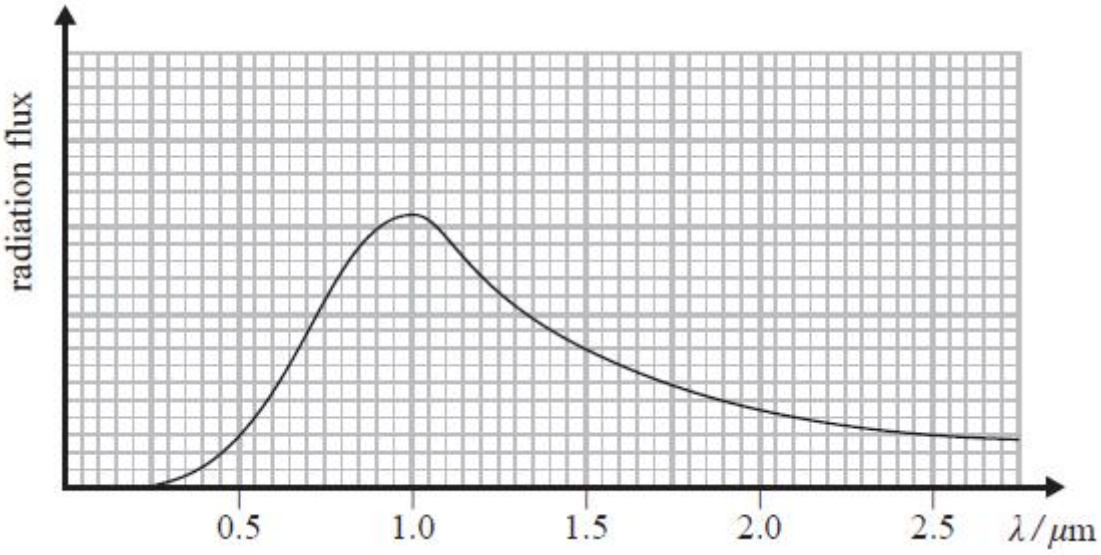
Distance = ...

(c) In addition to finding the distances to stars astronomers are interested in determining the temperatures of stars.

The spectrum of star A is shown below.



Use data from the graph to determine the surface temperature of star A.

(3)

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Temperature = ...

(Total for question = 12 marks)