Name of the Student:_____
Max. Marks : 25 Marks **Time : 25 Minutes**

Q1.

The table shows some properties of the four brightest stars in the constellation Canis Minor.

Name	Apparent magnitude	Absolute magnitude	Spectral class
Gamma A	4.46	–0.50	K
Gomeisa	2.89	–0.70	B
HD 66141	4.39	–0.13	K
Procyon	0.34	2.65	F

(a) Discuss, with reference to the Hipparcos scale, why many star maps show only two stars in the constellation Canis Minor.

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(3)

(b) State and explain which star in the table above has the most prominent Hydrogen Balmer absorption lines.

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(2)

(c) Deduce which star, Gamma A or HD 66141, has the larger diameter.

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(3)

(d) Astronomers recently used the radial velocity method to discover an exoplanet orbiting HD 66141.

Describe the main features of the radial velocity method in the detection of planets.

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(2)

(e) Calculate the distance from the Earth to Procyon.
Give an appropriate unit for your answer.

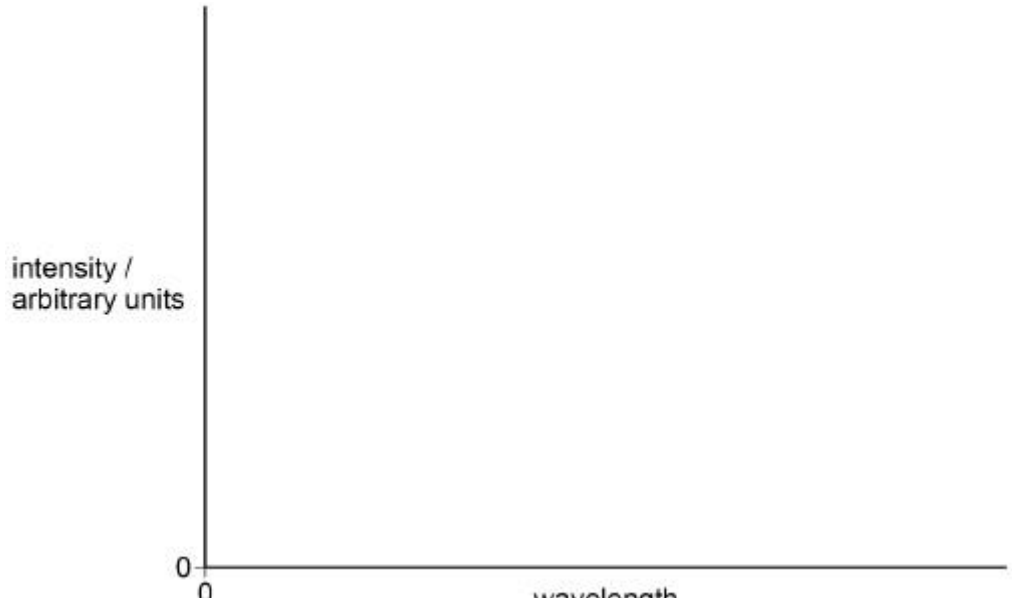
distance = _____ unit _____

(3)

(Total 13 marks)

Q2.

(a) Sketch, on the axes, the black-body radiation curve for a typical star.



(2)

(b) Explain, with reference to the SI units involved, how the curve you have drawn can be used to determine the black-body temperature of the star.

(3)

(c) Two stars, 61 Cygnus A and 61 Cygnus B, can be seen very close together in the constellation Cygnus. Early astronomers were unsure whether the two stars form a binary system, or simply appear in the same line of sight.

The table shows some of the properties of the two stars.

	Temperature / K	**Radius / km**	**Apparent magnitude**
61 Cygnus A	4500	4.7×10^5	5.2
61 Cygnus B	4100	4.1×10^5	6.1

Evaluate whether the data support the suggestion that the two stars form a binary system.

In your answer you should

- compare the two stars as seen by an observer on Earth
- support your evaluation with suitable calculations.

(6)

(d) What is the spectral class of 61 Cygnus A?
Tick (✔) the correct box.

A ☐

F ☐

G ☐

K ☐

(1)
(Total 12 marks)