

Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Q1.

The Summer Triangle consists of three stars, Altair, Deneb and Vega.
 Some of the properties of the three stars are summarised in the table below.

	Altair	Deneb	Vega
surface temperature / K	7700	8500	9600
apparent magnitude	0.77	1.25	0.03
absolute magnitude	2.21	-8.38	0.60

- (a) The three stars belong to the same spectral class.

State and explain which spectral class they belong to.

(2)

- (b) Deduce which of the three stars appears brightest.

(2)

- (c) Calculate the distance from Earth to the closest of the three stars.

distance = _____ pc

- (d) Deduce which of the three stars is the largest.

(3)

- (e) Calculate the wavelength of the peak in the black body radiation curve of Altair.

wavelength = _____ m

(2)

(Total 12 marks)

Q2.

Antares is a red supergiant star in the constellation of Scorpio. It has a mass about 18 times that of the Sun.

Eventually the star will become a supernova, leaving behind a core that could form a neutron star or a black hole.

- (a) State what is meant by a supernova.

(1)

- (b) State the defining properties of a neutron star.

- (c) To become a black hole it is likely that the core would have to have a mass at least twice that of the Sun.

Calculate the Schwarzschild radius of a black hole with a mass twice that of the Sun.

radius = _____ m

(2)

- (d) Some scientists are concerned about the consequences for the Earth of a supernova occurring in a nearby part of the galaxy.

Explain the cause of this concern.

(2)

(Total 7 marks)