PHYSICS 2452 Name:_____ Friday 2009-02-13
Astronomy II 12:35 - 13:25
D. A. Tindall Signature:_____ Dunn 101

Quiz # 3

At the end of the quiz hand in *all* pages of the booklet.
Materials permitted: Calculator and one 8½" x 11" sheet of paper

Table of Values:

Gravitational Constant, G	6.7	x 10^{-11} N m^2 kg^{-2}
Astronomical Unit, A.U.	1.5	x 10^{11} m
Mass of the Sun, $M_\odot$	2	x 10^{30} kg
Radius of the Sun, $R_\odot$	7	x 10^{8} m
Boltzmann's constant, k	1.4	x 10^{-23} J K^{-1}
Mass of proton, m_P	1.7	x 10^{-27} kg

Section A: Multiple choice (25%)

10 questions worth 2 points each

***Circle* the letter corresponding to the *most appropriate* answer to each**

A1) The thickness of the photosphere of the Sun is:
a) 1 km b) 300 km c) 3 000 km d) 10 000 km /2

A2) The temperature of the Solar Corona is
a) 5 800 K b) 12 000 K c) 1 000 K d) 10^6 K /2

A3) The rotation period of the Sun at its equator is:
a) 28 d b) 25 d c) 33 d d) 11 y /2

A4) Which of the following filters most closely matches the sensitivity of the eye?
a) B b) I c) U d) V /2

A5) A star with m = +2.5 is 100 pc from Earth. What is its absolute magnitude?
a) + 7.5 b) - 2.5 c) - 7.5 d) - 47.5 /2

A6) What is the most common molecule in interstellar space?
a) H_2 b) He_4 c) H_2O d) $C_2 H_5 OH$ /2

A7) The main source of energy in a protostar is:
a) Chemical b) Gravity c) p-p reactions d) CNO cycle /2

A8) What is the major product of the helium burning later stage of a star's life?
a) ^{8}Be b) ^{2}H c) ^{3}He d) ^{12}C /2

A9) What are stars in the upper part of the instability strip called?
a) Cepheid b) protostars c) RR Lyrae d) T Tauri /2

A10) The H-R diagram of a star cluster shows B stars on the main sequence and K stars noticeably above the main sequence. This cluster is:
a) impossible b) Old c) Globular d) Very young /2

/20

Section B (25%)
10 questions worth 2 points each
Answer each question in the space provided

What ***name*** describes each of the following?

B1) A balance between the weight of a layer of a star and the pressure that supports it _____ /2

B2) The outer atmosphere of the Sun _____ /2

B3) Explanation of the Solar Neutrino Problem _____ /2

B4) The difference in magnitudes of a star measured through different coloured filters _____ /2

B5) The order of spectral classes from early to late _____ /2

B6) A large cloud of interstellar gas and dust which is cool enough for atoms to form into molecules _____ /2

B7) The path on an H-R diagram followed by a star as it develops _____ /2

B8) A type of yellow, supergiant, pulsating star. _____ /2

B9) A large, cool star of high luminosity. _____ /2

B10) A large spherical cluster of stars, typically found in the outlying regions of a galaxy _____ /2

/20

Section C (25%)

Answer each question in the space provided

a) Calculate the escape speed from the surface of the present day Sun.

_____ km/s /5

b) Calculate the escape speed from the Sun after it has become a red giant (same mass as at present but radius 100 times bigger).

_____ km/s /5

c) Calculate the average speed of hydrogen atoms on the surfaces of the Sun (5 800 K) and of a red giant (3 500 K)

Sun: _____ km/s Red Giant: _____ km/s /5

d) Explain how your results show that a red giant can lose mass more easily than a main sequence star.

/5

Section D (25%)

5 questions worth 4 points each

Answer each question in the space provided

In a *few sentences*, with a *diagram* if useful, explain what is meant by **each** of the following terms

D1) SNO _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

/4

D2) Sunspots _____

/4

D3) Interstellar _____

/4

D4) ZAMS _____

/4

D5) Main sequence lifetime _____

/4

PHYC 2452: Please do NOT turn over the paper until told to begin. ***/16***

Total: /80