AUB | **PHYSICS 200** | **Jan. 31, 1996**

Physics Department | **Final Exam** | **Time: 1 hour**

Name : _____

ID. No.: _____

General Information:

(1) No make up of this exam without legal reason .

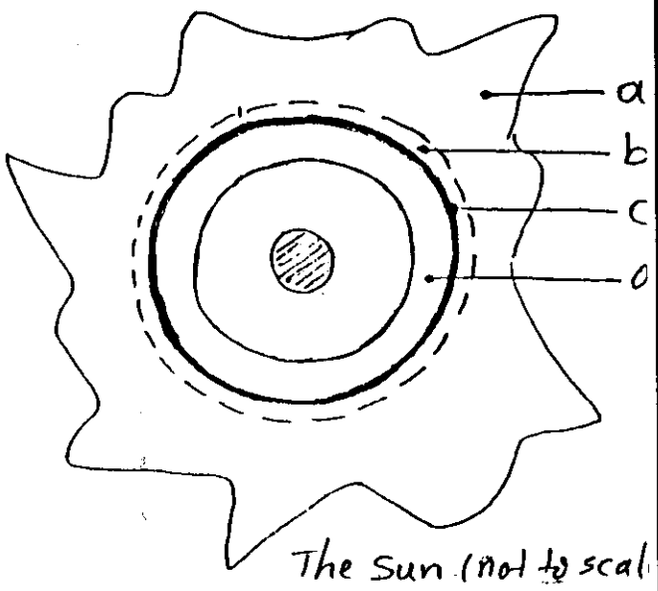
(2) Answer all questions given in this exam. In case of multiple choice question, you are allowed to circle only one answer.

(3) If you cannot answer the question directly, leave it to the end.

(4) This exam contains 20 main questions, each has 10 grades, so that the total grade is 200.

Total Grade : _____

(9) The figure below shows a schematic diagram of the sun. Answer the following questions



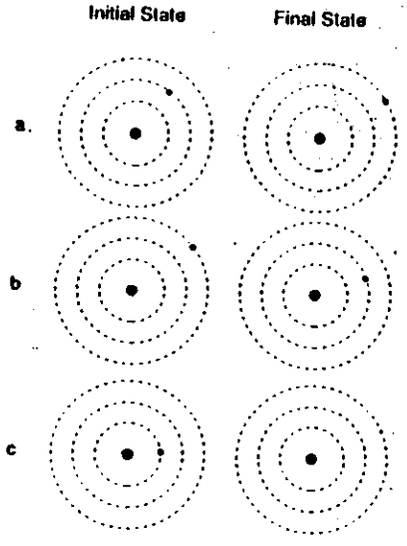
(a) Indentify the photosphere (circle one of these)

a b c d

(b) Indentify the sun's convective zone (circle one of these)

a b c d

(10) In the figures below, the initial and final states of the hydrogen atom are shown schematically.



(a) Which final state corresponds to ionization (circle one)

a b c

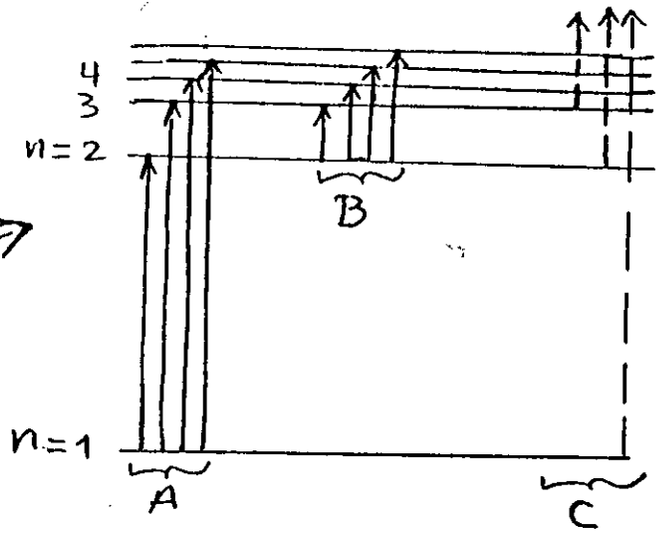
(b) Which final state corresponds to an emission of light ? (circle one)

a b c

(11) In the figure below, the energy level diagram of the hydrogen atom is shown schematically. Which transitions lead to visible light ? (circle one)

A B C

Question 11



(6) (a) Give the correct order of the planets listed below according to their distance from the sun

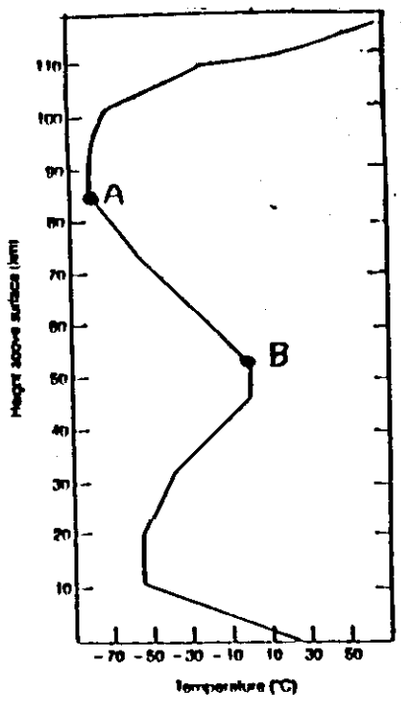
Mars, Earth, Jupiter, Saturn

Your answer : _____

(b) Which planets are missing from the above list ?

Your answer : _____

(7) The figure below shown the height as a function of temperature in the Earth's atmophere. Consider the line A to B. Why does the temperature increases along this line ?



(a) Because sunlight is absorbed by the carbon dioxide

(b) Because of the greenhou se effect

(c) Because sunlight is absorbed by the oxygen molecules and Ozone

(d) Because sunlight is absorbed by the nitrogen and oxygen molecules

(8) Which of the following statements charaterizes the proton-proton chain operating in the sun ?

(a) 6 hydrogen nuclei are converted into a ^{4}He nucleus

(b) 4 hydrogen nuclei are converted into a ^{4}He nucleus and 2 protons

(c) 4 hydrogen nuclei are converted into 2 deuterium nuclei and 2 ^{4}He nuclei

(d) 4 hydrogen nuclei are converted into a ^{4}He

(1) The time of the year where the sun is 23.5° north of the celestial equator (highest noon time position) is called :

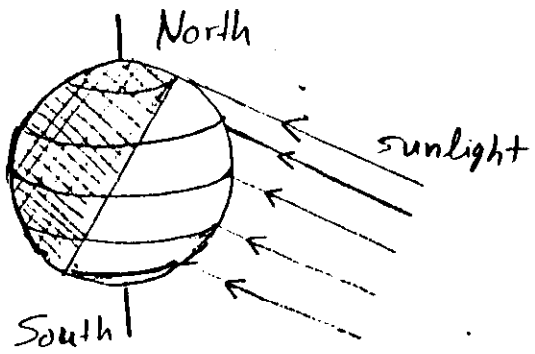
(a) Winter solstice (b) first day of spring (c) spring equinox

(d) September 22 or 23 (e) Summer solstice

(2) When the Earth is between the moon and the sun, what kind of eclipse, viewed from the Earth can occur ?

(a) total solar (b) partial solar (c) annular (d) lunar

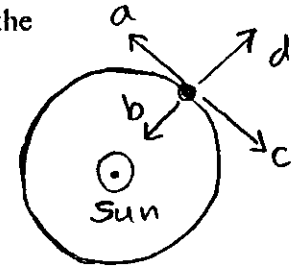
(3) What time of year does the figure below represent for the northern hemisphere ?



(a) vernal equinox (b) spring equinox

(c) winter solstice (d) summer solstice

(4) In the figure below which line indicates the direction of the force of gravity on the Earth as it orbits the sun ? (circle one)



a b c d

(5) Kepler's second law means :

(a) a planet's orbital period increases with increasing distance from the sun

(b) The sun is in one focus of the elliptical planet's orbit

(c) Planets close to the sun have shorter period than those farther away

(d) Planets move rapidly in their orbit when closer to the sun

(12) The wavelength (λ) in Angstroms (Å) of the photon emitted in the transition from the level n = 3 (energy = 1.94×10^{-11} erg) to the level n = 2 (energy = 1.63×10^{-11} erg) of the hydrogen atom (see figure in question 11) is about :

(a) 6200 Å (b) 6800 Å (c) 6400 Å (d) 7000Å

(the Planck constant is h = 6.626×10^{-27} erg/sec)

Can you see this light with naked eye ? YES ☐ , NO ☐

(13) In the figure below three Planck curves 1,2 and 3 are shown.
If the corresponding temperatures are
T_1, T_2 and T_3 .

(1) Which of the follwoing is true ?

(a) $T_1 = T_2 = T_3$

(b) $T_1 < T_2 < T_3$

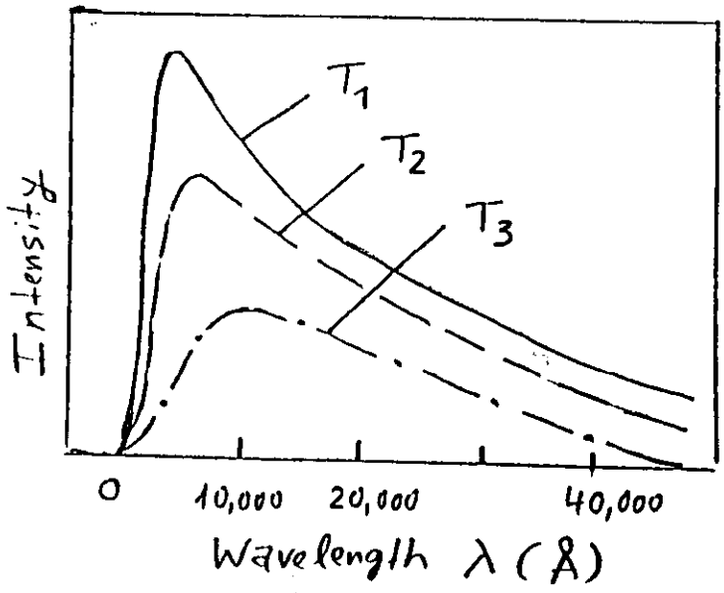
(c) $T_1 > T_2 > T_3$

(d) none of the above,
my answer is :_____

(2) How large is the area under the curve corresponding to the temperature T_3 ?

Your answer : _____

Questions (13) →



Are you ready to observe stars ? Here are some questions

(14) Consider two stars, one of magnitude m = + 10, and the other of magnitude m = + 15. What is the ratio of the brightness of the 10th magnitude star to that of the 15 th ?

Your answer : _____

Explain your answer :

(15) In the laboratory, one finds a certain special line of sodium at a wavelength λ_0 = 5890 Angstrom (Å) . As seen in the spectra of a particular star it is at λ = 5892 Å.

(a) At what velocity is the star moving ?

Your answer :_____

(b) In which direction is the star moving ?
away from us or toward us ?

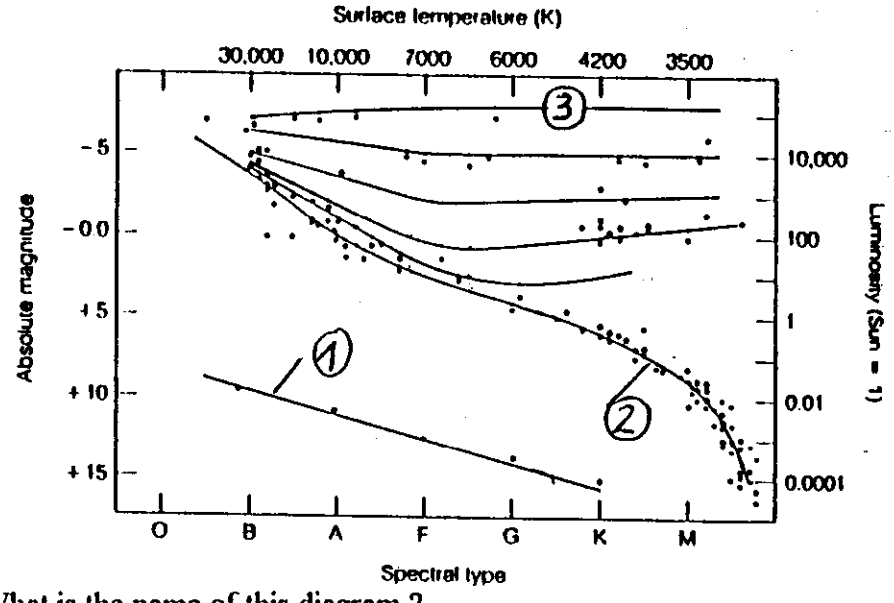
Your answer : _____

(16) A star has a measured parallex of 0.05 second of arc. Its distance from the Earth is :

(a) 20 light years (b) 20 per sec (c) 5 light years

(d) 5 per sec

(17) Consider the diagram shown below. Answer the following questions



(a) What is the name of this diagram ? _____

(b) Which line represents the "main sequence" ? _____

(c) Which line represents the "white Dwarfs" ? _____

(d) Which line represents the "supergiants" ? _____

(e) Where is the sun in this diagram ? (draw a circle showing its position)

(18) If the "distance modulus" of a particular star is $m - M = +10$, where m is the apparent magnitude and M is the absolute magnitude. What is the distance of this star from the Earth ?

(a) 10^2 PC (b) 10^4 PC (c) 10^3 PC (d) 10^6 PC

In this question show how you get your answer. Otherwise no grade ?

(19) The table below gives some characteristics of the star included in this table. Answer the questions below using these data.

Star Name	Absolute magnitude M	Aparrent magnitude m	Spectral type	Luminosity class
Spica	-3.5	+ 1.0	B	III
(قلب العقرب) Antares	-3.8	+ 1.0	M	I
Sirius	+1.4	- 1.5	A	V
(رِجل) Rigel	+4.4	0.0	G	V
(ذنب) Deneb	-7.2	+1.3	A	I

(a) Which star has the greatest apparent brightness : _____

(b) Which star is intrinsically the brightest :_____

(c) Which star has the highest surface temperature :_____

(d) Which star has the lowest surface temperature :_____

(e) Which star is a red-colored supergiant : _____

(20) The star Betelgeuse has the following data : (بيت الجوزه)

Parallex (second of arc)	B	V
0.0063	+ 1.90	+ 0.50

(a) Can you see this star with naked eye? YES ☐, NO ☐

(b) Its "color index" is _____ and it would appear _____ in color.
(answer) (which color)