

SCIENCE 10

FINAL EXAM REVIEW BOOK 4



THE FORMATION OF THE UNIVERSE CAN BE EXPLAINED BY THE BIG BANG THEORY.

NAME: _____

BLOCK: _____

Part I – Multiple Choice

	Answer
1.	B
2.	B
3.	C
4.	B
5.	B
6.	B

7.	C
8.	B
9.	A
10.	B
11.	B

12.	D
13.	C
14.	B
15.	A
16.	B
17.	D

18.	C
19.	B
20.	A
21.	A

22.	C
23.	B
24.	A
25.	C
26.	D
27.	D

Part II - Written Portion

	Answers
1a.	Answers vary. Something about expansion
1b.	Answers Vary. Something about energy
2a.	Hydrogen and helium
2b.	Stars / Nuclear Fusion / Supernovae
3.	Nuclear fusion (specifically of hydrogen)
4.	Size, distance, composition, age, stage, etc.
5.	Element
6a.	Gravity
6b.	Pressure (or nuclear fusion)
6 dia.	Gravity matches arrows going in, pressure matches arrows going out
7a.	Needs to show an object emitting a light or a sound wave
7b.	Needs to show movement of the object
7c.	Show wave stretching behind the object, wave compression in front
8a.	Hydrogen and Helium
8b.	Young, still has hydrogen, still in the main sequence, etc.
9a.	Magnesium and Iron
9b.	Old, has iron, no hydrogen left, about to supernova, etc.

Part II - Written ...Detailed Solutions

1. **Explain** how red shift and cosmic background radiation are evidences of the big bang.
Don't just explain the terms – tell me how they are evidences of the big bang! (4 points)

a. Red Shift is evidence of the big bang because...

Answers should include something about the expansion of the universe / the universe getting bigger, etc. (grade with a 0, 1, or 2 based on quality of response)

b. Cosmic Background Radiation is evidence of the big bang because...

Answers should talk about the energy and how it had to have come from somewhere, the big bang is a good explanation for this energy (grade with a 0, 1, or 2 based on quality of response)

2. What two elements did the big bang create **and** where did the rest come from? (2 points)

a. The big bang created...

Hydrogen and Helium (1/2 point for each)

b. The rest of the elements came from...

Answers should mention at least ONE of these phrases: nuclear fusion, supernova, or stars

3. What energy-producing event is occurring in the core of main sequence stars? (1 point)

Nuclear fusion or fusing hydrogen into helium (or something similar)

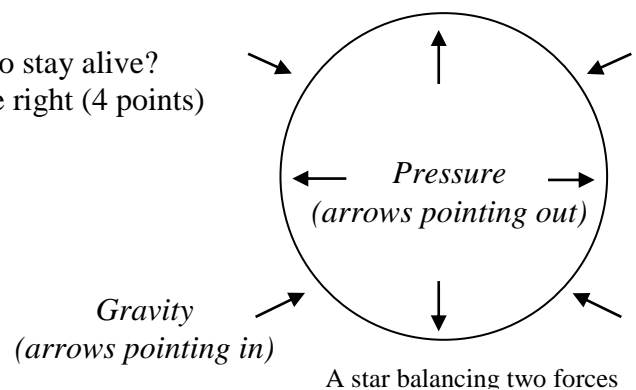
4. Name three things that an astronomer can know about a star just by analyzing its light. (3 points)

Answers might include: how far away the star is, how hot or cold the star is, what the star is made of, what stage of the star life cycle the star is in, how old the star, when the star will die, the size of the star, etc.

5. When we analyze stars using a spectroscope, each unique “barcode” that we see represents a different element (think of our lab and what we were looking at) (1 point)

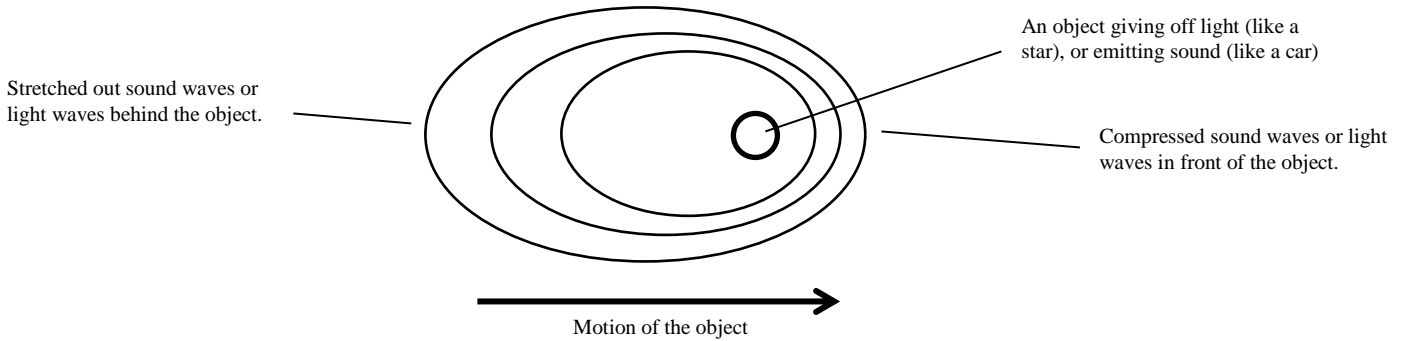
6. What two forces must a star constantly balance in order to stay alive?
Also, be sure to label these two forces on the diagram to the right (4 points)

*Gravity and pressure (or nuclear fusion, since that is what is causing the pressure)
(2 points here, 2 points for the labels)*



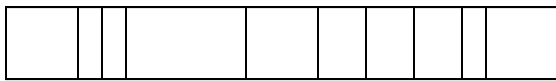
7. **Draw** and **label** a diagram describing the Doppler Effect. Be sure to **be descriptive enough** in your diagram so that someone that knows nothing about the Doppler Effect would be able to understand it (3 points)

Needs three things for full points (1) An object emitting light or sound (2) somehow showing that this object is in motion (3) Stretching of the waves behind the object, compression of the waves in front.



Spectroscope Analysis – use the element key below to answer the next few questions

8. You analyze a star's light using a spectroscope and see the following spectrum:



Which two elements are in this star? (1 point)
Hydrogen and Helium (1/2 point each)

Is this star younger or older and **why**? (2 points)

Young, it is still fusing hydrogen into helium (or something along these lines)

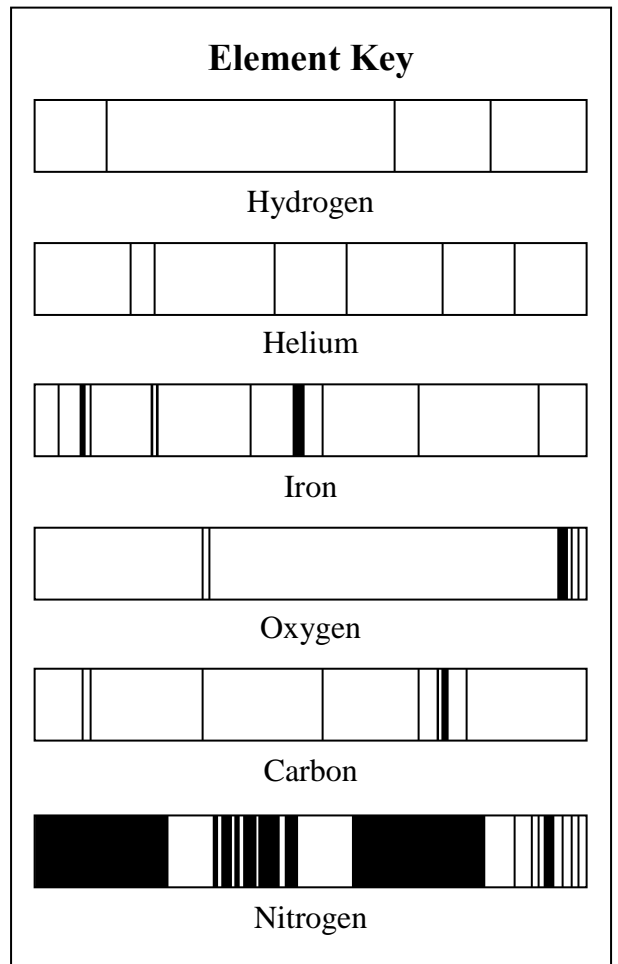
9. You analyze a star's light using a spectroscope and see the following spectrum:



Which two elements are in this star? (1 point)
Magnesium and Iron

Is this star younger or older and **why**? (2 points)

Old, it is fusing iron (or something along these lines)



Part III – bonus questions (next page)

1. What do you get when you fuse Na and F?

Na (sodium) is element number 11, and F (fluorine) is element number 9. If these two were to fuse then you would have 20 protons, and an atom with 20 protons makes the element calcium (Ca) every time.

2. Name three different elements that can be fused together to make Silver.

There are tons and tons of possible combinations. The only rules were that you needed to use three different elements, and that when you added these three elements together, the number of protons had to add up to the atomic number of silver, which is 47. You could have done

*Hydrogen (1) + Helium (2) + Ruthenium (44)
Hydrogen (1) + Lithium (3) + Technetium (43)
Oxygen (8) + Carbon (6) + Copper (30)*

Etc., etc. etc.

3. Which element would be the result of the following craziness? $(Fr + Y + Co + O + K) - (Ba + Co + N)$

Okay, this one was a little tricky, but as long as you use your periodic table to break it down, and you remember your order of operations, it goes a little something like this:

The first set of parentheses

*Fr is Francium, element number 87
Y is Yttrium, element number 39
Co is Cobalt, element number 27
O is Oxygen, element number 8
K is Potassium, element number 19
The total number of protons from the fusion of these elements would be 180*

The second set of parentheses

*Ba is Barium, element number 56
Co is Cobalt, element number 27
N is nitrogen, element number 7
The total number of protons from the fusion of these elements would be 90*

If you subtract the total number of protons from the second set of parentheses (90) from the first set of parentheses (180) then you get 90 as your answer. The element with 90 protons is Thorium, thus THORIUM is the answer.

Recap:

*$(Fr + Y + Co + O + K) - (Ba + Co + N) = \text{Thorium}$
 $(87 + 39 + 27 + 8 + 19) - (56 + 27 + 7) = 180 - 90 = 90 = \text{Thorium}$*

Disclaimer: Nuclear fusion does not really work like this. We took some serious liberty with this last problem :)