

NUCLEAR CHEMISTRY WORKSHEET

KEY

Name _____ Date _____ Period _____

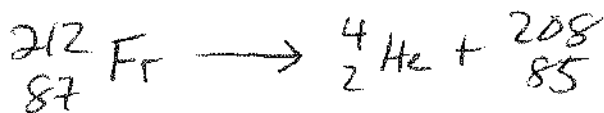
- 1) Technetium-99 ($^{99}_{43}\text{Tc}$) decays by beta emission to form ruthenium-99 ($^{99}_{44}\text{Ru}$).



- 2) Phosphorus-32 decays by beta emission to form sulfur-32.



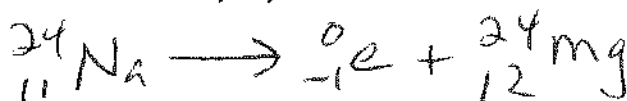
- 3) Francium-212 ($^{212}_{87}\text{Fr}$) decays by alpha emission.



- 4) Fluorine-18 decays to oxygen-18 by positron emission.



- 5) Sodium-24 decays by beta emission.



- 6) Krypton-76 absorbs a beta particle to form bromine-76.



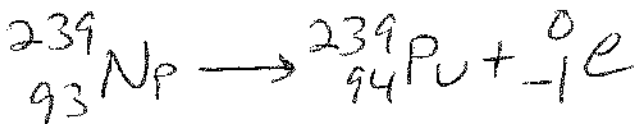
- 7) Aluminum-27 absorbs an alpha particle to form phosphorus-30 and emits a neutron.



- 8) Nitrogen-14 absorbs an alpha particle to form oxygen-17 and emits a proton.



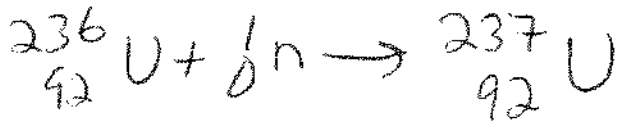
- 9) When neptunium-239 decays, plutonium-239 is formed and a particle is emitted. (Be sure to include the correct particle in the equation.)



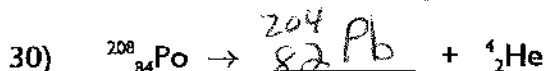
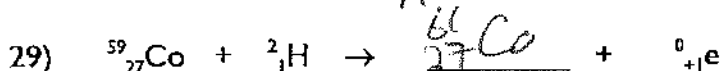
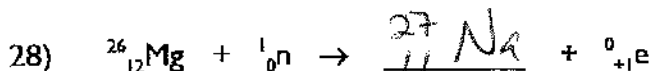
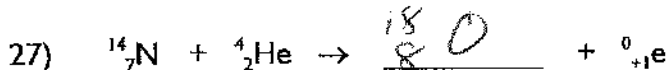
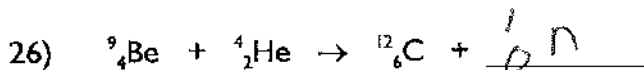
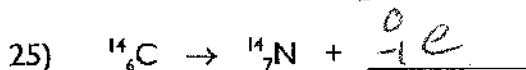
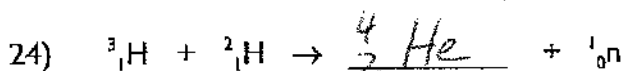
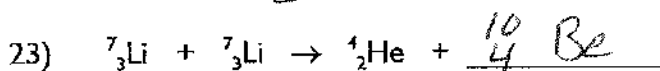
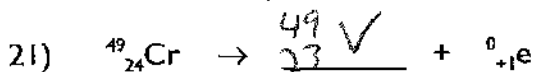
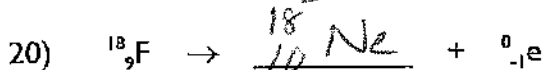
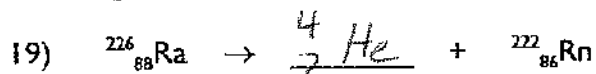
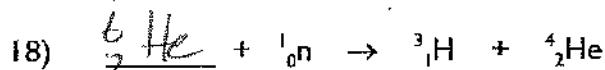
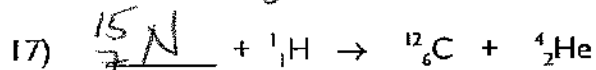
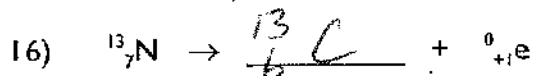
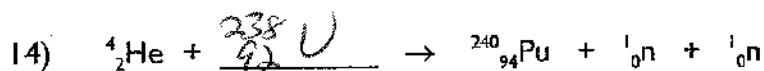
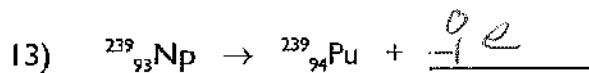
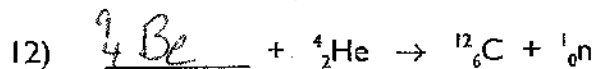
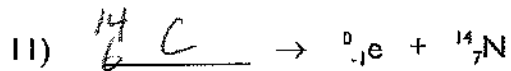
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NUCLEAR CHEMISTRY WORKSHEET

10) A particular atom absorbs a neutron to form uranium-236. No particle is emitted

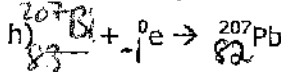
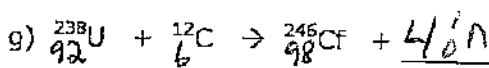
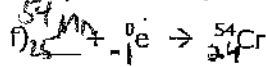
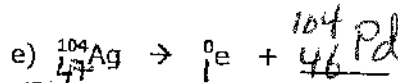
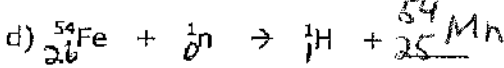
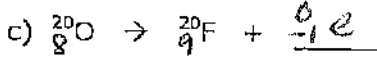
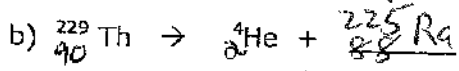
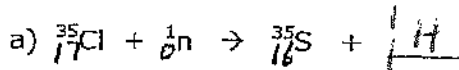


Complete the following nuclear equations:



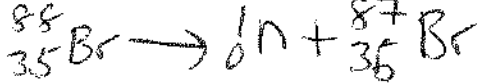
KEY

1. Balance these nuclear equations.



2. Write balanced equations for these nuclear reactions.

a) neutron emission by ${}^{88}\text{Br}$



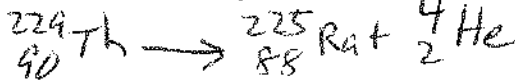
b) electron absorption by ${}^{116}\text{Sb}$



c) positron emission by ${}^{184}\text{Hg}$



d) alpha emission by ${}^{229}\text{Th}$



e) neutron capture by ${}^{200}\text{Hg}$



3. Match these statements to one of the choices on the right. They may be used more than once.

B the type of reaction in the sun

A) fission

A the type of reaction in atomic bombs

B) fusion

A an atomic nucleus is split into 2 roughly equal parts

C) cold fusion

B requires incredibly high temperatures

A type of reaction in a nuclear power plant

C takes place at room temperature

B 2 very light isotopes come together to form a heavier one

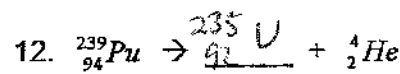
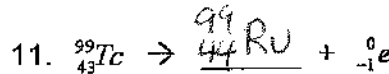
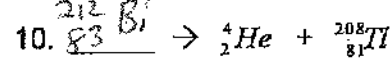
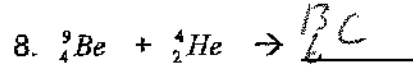
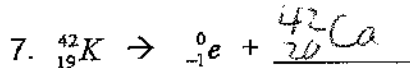
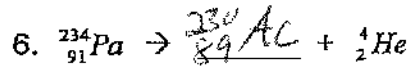
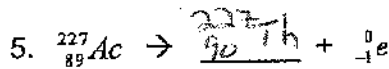
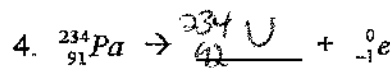
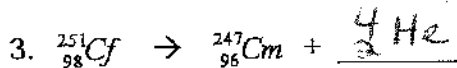
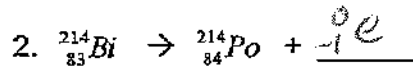
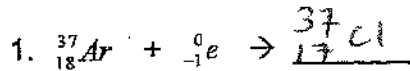
B principal type of reaction in a hydrogen bomb

KEY

Nuclear Reactions

Name _____

Fill in the blanks with the appropriate atomic symbols. Make sure you use the law of conservation of mass to solve these problems.



13. For #1-12 go back and label each reaction as involving an alpha, beta, or gamma particle. Label also whether it is an example of decay (that particle being given off) or capture (that particle being taken in.)

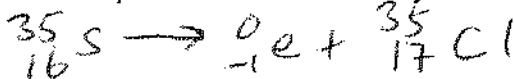
14. Write the equation for the alpha decay of curium-247



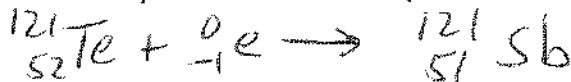
15. Write the equation for the beta capture of manganese-53



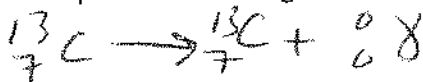
16. Write the equation for the beta decay of sulfur-35



17. Write the equation for the beta capture of tellurium-121



18. Write the equation for when gamma radiation is given off by carbon-13.



Identify whether each of the following will undergo alpha decay, beta decay, or beta capture

19. einsteinium-252 _____

21. krypton-79 _____

20. strontium-85 _____

22. palladium-109 _____

21. americium-243 _____

23. zinc-62 _____

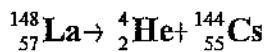
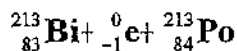
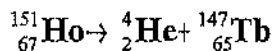
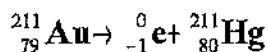
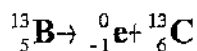
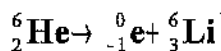
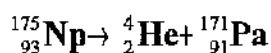
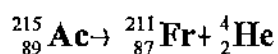
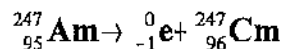
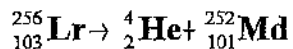
24. What is happening when gamma radiation is given off?

Nuclear Chemistry Worksheet-

Show "K-U-B-S" where necessary, otherwise answer completely. Work that does not fit in the provided space needs to be completed on your own paper.

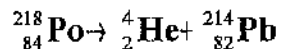
Solutions

Part A.

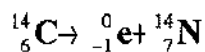


Part B:

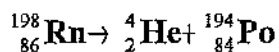
11. Decay of polonium-218 by alpha (α) emission.



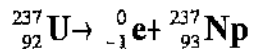
12. Decay of carbon-14 by beta (β^-) emission.



13. The alpha decay of radon-198



14. The beta (β^-) decay of uranium-237



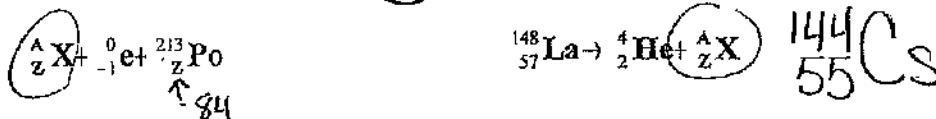
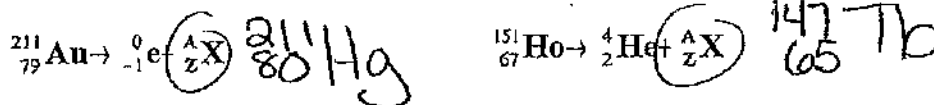
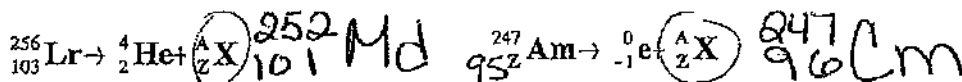
3

Nuclear Chemistry Worksheet-

Show "K-U-E-S" where necessary, otherwise answer completely. Work that does not fit in the provided space needs to be completed on your own paper.

Part A: Completing Nuclear Decay Reactions: 1-10

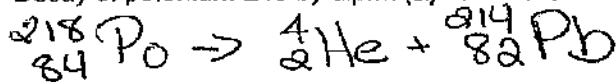
For each of the atoms listed below, complete the decay reaction by solving for A_ZX or other missing information. Remember that the mass and protons on each side of the arrow need to equal each other.



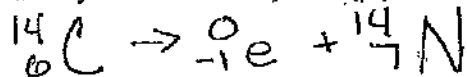
Part B: Writing Nuclear Decay Reactions:

Write equations for the following nuclear decay reactions. Make sure that both mass numbers and atomic numbers are balanced on each side

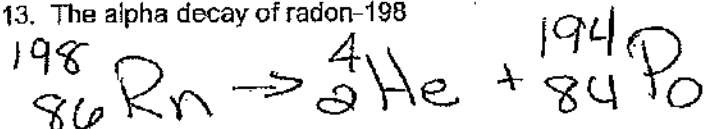
11. Decay of polonium-218 by alpha (α) emission.



12. Decay of carbon-14 by beta (β^-) emission.



13. The alpha decay of radon-198



14. The beta (β^-) decay of uranium-237

