SPH4U Name: Date:

Relativistic Mass-Energy Drills

1 An electron has a rest mass of 9.108E-31 kg. Calculate its rest energy in joules and electron-volts.

2 A neutron with a rest mass of 1.675E-27 kg is moving at 0.865c. Calculate its kinetic energy in joules and electron-volts.

3 A neutron with a rest mass of 1.675E-27 kg is moving at 0.630c. Calculate its kinetic energy in joules and electron-volts.

4 A pion with 3.537E-11 J total energy is moving at 0.774c. What is its rest mass?

5 A neutron with a rest mass of 1.675E-27 kg has a relativistic mass of 5.528E-27 kg. What is its speed?

6 A proton with a rest mass of 1.672E-27 kg has a relativistic mass of 2.587E-27 kg. What is its speed?

7 A neutron has a rest mass of 1.675E-27 kg. Calculate its rest energy in joules and electron-volts.

8 An electron with a rest mass of 9.108E-31 kg is moving at 0.890c. Calculate its relativistic mass.

9 A muon with a rest mass of 1.884E-28 kg has a relativistic mass of 3.176E-28 kg. What is its speed?

10 A neutron with 2.944E-10 J total energy is moving at 0.859c. What is its rest mass?

11 A proton has a rest mass of 1.672E-27 kg. Calculate its rest energy in joules and electron-volts.

12 A pion with a rest mass of 2.488E-28 kg is moving at 0.958c. Calculate its kinetic energy in joules and electron-volts.

13 A pion with 4.715E-11 J total energy is moving at 0.880c. What is its rest mass?

1E-8 = 1 x 10^(-8)

Answers:

1. 8.20E-14 J, 5.12E05 eV 2. 1.50E-10 J, 9.35E08 eV 3. 4.34E-11 J, 2.71E08 eV 4. 2.49E-28 kg 5. 0.953c 6. 0.763c 7. 1.51E-10 J, 9.42E08 eV 8. 2.00E-30 kg 9. 0.805c 10. 1.67E-27 kg 11. 1.51E-10 J, 9.41E08 eV 12. 5.57E-11 J, 3.48E08 eV 13. 2.49E-28 kg