

## Relativistic Mass-Energy Drills

- 1 A muon with a rest mass of  $1.884\text{E-}28$  kg has a relativistic mass of  $2.547\text{E-}28$  kg. What is its speed?
- 2 A kaon with a rest mass of  $8.800\text{E-}28$  kg is moving at  $0.884c$ . Calculate its total energy in joules and electron-volts.
- 3 A neutron with a rest mass of  $1.675\text{E-}27$  kg has a relativistic mass of  $2.410\text{E-}27$  kg. What is its speed?
- 4 A kaon with a rest mass of  $8.800\text{E-}28$  kg is moving at  $0.902c$ . Calculate its total energy in joules and electron-volts.
- 5 An electron with a rest mass of  $9.108\text{E-}31$  kg is moving at  $0.703c$ . Calculate its total energy in joules and electron-volts.
- 6 A pion with a rest mass of  $2.488\text{E-}28$  kg is moving at  $0.875c$ . Calculate its kinetic energy in joules and electron-volts.
- 7 A proton has a rest mass of  $1.672\text{E-}27$  kg. Calculate its rest energy in joules and electron-volts.
- 8 A muon with a rest mass of  $1.884\text{E-}28$  kg is moving at  $0.782c$ . Calculate its total energy in joules and electron-volts.
- 9 A muon has a rest mass of  $1.884\text{E-}28$  kg. Calculate its rest energy in joules and electron-volts.
- 10 A muon with  $3.613\text{E-}11$  J total energy is moving at  $0.883c$ . What is its rest mass?
- 11 A proton with a rest mass of  $1.672\text{E-}27$  kg is moving at  $0.652c$ . Calculate its relativistic mass.
- 12 An electron with a rest mass of  $9.108\text{E-}31$  kg is moving at  $0.704c$ . Calculate its kinetic energy in joules and electron-volts.
- 13 An electron with  $1.411\text{E-}13$  J total energy is moving at  $0.814c$ . What is its rest mass?

$$1\text{E-}8 = 1 \times 10^{(-8)}$$

### Answers:

1.  $0.673c$  2.  $1.69\text{E-}10$  J,  $1.06\text{E}09$  eV 3.  $0.719c$  4.  $1.83\text{E-}10$  J,  $1.15\text{E}09$  eV 5.  $1.15\text{E-}13$  J,  $7.20\text{E}05$  eV 6.  $2.39\text{E-}11$  J,  $1.49\text{E}08$  eV 7.  $1.51\text{E-}10$  J,  $9.41\text{E}08$  eV 8.  $2.72\text{E-}11$  J,  $1.70\text{E}08$  eV 9.  $1.70\text{E-}11$  J,  $1.06\text{E}08$  eV 10.  $1.88\text{E-}28$  kg 11.  $2.21\text{E-}27$  kg 12.  $3.35\text{E-}14$  J,  $2.09\text{E}05$  eV 13.  $9.11\text{E-}31$  kg