

Supervision 8

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Read the following sections of the handouts:

Section 39 - 45 Relativistic Mechanics

An object with a velocity v and a rest-frame mass m in an inertial frame has the following properties:

Momentum is $p = \gamma m v$

Energy is $E = \gamma m c^2$

Kinetic energy is $K = E - m c^2$, where γ is the Lorentz factor

Deduce the following formula based on the three equations above. Make sure you can do so on your own WITHOUT the help of a textbook and understand each step before solving the questions on this problem sheet. Never rush to solve the questions!

$$v = pc^2/E$$

$$E^2 = m^2 c^4 + p^2 c^2$$

$$K^2 + 2mKc^2 = p^2 c^2 \quad (\text{Q21})$$

Problem Sheet – Q19 - Q24