

Solutions

2.1 B Leptons are not constituent-quark composites; ordinary baryons contain three quarks.

Compare the rejected options: Lepton: one quark; baryon: one antiquark; Lepton: three quarks; meson: none; Muon: quark–antiquark pair; Baryon: always one quark and one antiquark. Use the stated model and conditions.

2.2 C Density is positive, so coefficient sign follows charge sign.

Compare the rejected options: Positive holes; Zero carrier density; No magnetic force; A neutral carrier with $q=0$. Use the stated model and conditions.

2.3 8. Divide total binding by nucleon count: $72/9=8$.

2.4 False. A muon is a charged lepton; names do not establish quark composition.

3.1 Charge: $0 = 1 - 1 + 0$. Baryon number: $1 = 1 + 0 + 0$. Electron-lepton number: $0 = 0 + 1 - 1$. Omitting the antineutrino violates the latter balance and leaves incorrect two-body kinematics. Three final bodies share available energy in different proportions while conserving total energy/momentum in each event. Award each conservation check and spectrum/omission explanation.