Q11 C

Objects given: Kepler's third law.
To be found: The principle, assumption or law which is most closely related.
Direct solution: Kepler's third law describes planetary motion. Only one item in the key directly affects planetary motion, i.e. Newton's universal law of gravitation.
Result: Item (C).
Corroboration: Every other item is much more general.

Q12 A

Objects given: Basic principles, assumptions and laws of Newtonian physics.
To be found: One of these which is so basic that most of the others can be derived from it.
Direct solution: Not Homogeneity/Isotropy of Space or Homogeneity of Time: these are equally basic; not one of Newton's laws: laws are less basic than principles or assumptions.
Result: The Principle of Relativity: item (A).
Corroboration: Do the derivations.

Q13 C, D

Objects given: Inertial frames of reference.
To be found: Two true statements about how they interrelate.
Direct solution: Go to the definitions of inertial frame and Principle of Relativity.
Result: Items (C, D) are true.
Corroboration: Absolute space and inertial rotating frames do not exist, so items (A, B, F) are false. Item (E) is false, since recalibrations are excluded from the Principle of Relativity. Only items (C, D) remain.

Q14 F

Objects given: The Principle of Relativity.
To be found: The one item in the key that is true (but not necessarily true about the Principle itself).
Direct solution: The wording suggests a 'trick' question, where no statements about the Principle are true.
Result: Item (F).
Corroboration: Items (A, B, D) are false because the Principle of Relativity applies to isolated systems; item (C) is false because the Principle of Relativity excludes recalibrations; item (E) is false because Newton knew.

Q15 D, H

Objects given: The Principle of Relativity, plus two particles with position x, velocity v and acceleration a.
To be found: Two equations for the 1-component of a, as functions of x and v only and consistent with the Principle.
Direct solution: Which two equations can be factored into differences in x and v, so that translations and uniform linear boosts have no effect?
Result: Items (D, H).
Corroboration: No others pass the test.

Q16 B

Objects given: A free particle P with position $x(t)$ in a non-inertial frame S.
To be found: The velocity $v(t)$ of P in S.
Direct solution: Take the first derivative of each component of $x(t)$.
Result: Item (B).
Corroboration: Items (A, D, F, G) cannot be right because $x(t)$ is nonlinear in t, so $v(t)$ cannot be constant. Items (C, E) cannot be right because the 3-component of $v(t)$ cannot be zero when $t = 0$. This leaves only item (B).