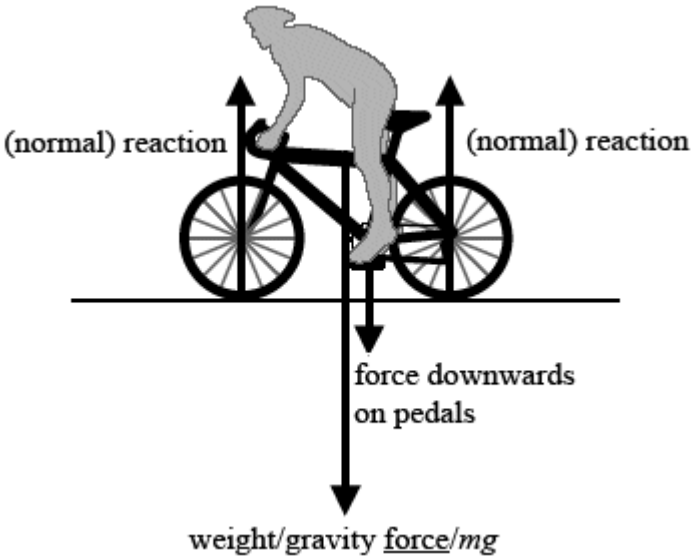
1. (a) (i) zero; 1

(ii)



correct position and labelling of
weight/gravity force/mg;
two reactions drawn as shown;
force downwards on pedals; 2 max
Ignore any other vertical forces and all horizontal forces.
The total upward vector lengths should approximately equal the downward vector lengths.

(iii) drag force = thrust/forward force/driving force;
net force=zero therefore acceleration is zero; 2

(b) 320W ; 1

(c) (i) acceleration = $\left[\frac{40}{70}\right]$

= 0.57 m s^{-2}; 2

(ii) use of $F\Delta s = \frac{1}{2}mv^2$;

56m; 2

or

$v^2 = u^2 + 2as$ equivalent seen and substituted correctly;
56m;

(iii) sensible physical reason *e.g.* air resistance / bearing friction/ brakes' effectiveness varies with speed;
attempt at explanation:
e.g. air resistance drops as speed drops, underestimate / distance travelled will be further; 2

[12]

2. C

[1]

3. C

[1]

4. B

[1]

5. B

[1]

6. D

[1]

7. C

[1]

8. A

[1]

9. A

[1]

10. C

[1]

11. A

[1]

12. B

[1]

13. B

[1]

14. A

[1]

15. A

[1]