Revision Sheet 复习练习卷

A-Level Physics · Unit 5 Work, energy and power

6 vocabulary items · 14 marks of exam questions (14 questions)

Part 1 · Vocabulary review answer key. Sections A and B want the exact English spelling.

Question	Answer	Marks
1	closed system	1
2	conservation of energy	1
3	elastic potential energy	1
4	chemical energy	1
5	efficiency	1
6	spring	1

Question 7 (Answer: **A**)

- Gravitational potential energy depends only on the start and end heights, not on the path.
- X is at 2.4 m and Y at 1.8 m, so the change in height is $2.4 - 1.8 = 0.6$ m.
- D adds the descent and the rise together, but they partly cancel.

Question 8 (Answer: **A**)

- Q descends at speed v, so it releases energy at a rate mgv – statement 1.
- P rises a vertical height $v\sin\theta$ each second, gaining potential energy at $Mgv\sin\theta$ – statement 2.
- At constant speed with no friction $mg = Mg\sin\theta$, so the two expressions are equal and both are right.

Question 9 (Answer: **B**)

- A constant g is what lets the simple product mgh replace a more general calculation.
- That is precisely what a uniform gravitational field means.
- The object's own acceleration is irrelevant – it may be lifted slowly or dropped.

Question 10 (Answer: **D**)

- $\Delta E_p = mg\Delta h$, and mg is exactly the weight.
- So the weight together with the change in height is enough.
- B gives mass and height but no g; A and C have no height at all.

Question 11 (Answer: **A**)

- Friction is $150/3.0 = 50$ N, so the 200 J from Y to Z means YZ $= 4.0$ m.
- X, Y and Z form a 3–4–5 right-angled triangle, so the direct path XZ is 5.0 m.
- P travels 7.0 m and Q only 5.0 m, so the extra work is $50 \times 2.0 = 100$ J.

Question 12 (Answer: **C**)

- Efficiency is useful output energy divided by total input energy.
- A is upside down and would give a value greater than one.
- D uses the wasted output, which is the fraction lost rather than the efficiency.

Question 13 (Answer: **B**)

- The useful work is the gain in gravitational potential energy: $1500 \times 9.81 \times 20 = 2.94 \times 10^5$ J.
- Time is work divided by power: $2.94 \times 10^5 / 20\,000$.
- That gives 14.7 s, which rounds to 15 s.

Question 14 (Answer: **B**)

- The vertical drop is $L\sin\theta$, not L itself.
- Energy conservation: $\frac{1}{2}mv^2 = mgL\sin\theta$, so $v = \sqrt{2gL\sin\theta}$.
- $\sqrt{2g} = \sqrt{19.6} = 4.43$, giving $v = 4.43\sqrt{L\sin\theta}$.

Question 15 (Answer: **D**)

- Power is the rate of doing work: the work done divided by the time taken, that is, work done per unit time.
- A and C tie the definition to one particular unit of time, the second.
- B describes an amount of work rather than a rate, so D is the definition to learn.

Question 16 (Answer: **C**)

(Explanation not available.)

Question 17 (Answer: **C**)

- The weight starts and finishes at rest, so all the work done on it goes into gravitational potential energy.
- Only the vertical rise q changes that energy: moving sideways through p needs no work against gravity.
- So the work done is Wq; Wp and Wr use distances that are not along the line of the weight.

Multiple Choice Answers

Q18: B

Multiple Choice Answers

Q19: C

Question 20 (Answer: **A**)

- With no air resistance, kinetic energy plus potential energy stays constant, so a difference in kinetic energy is mg times the difference in height.
- The height differences are 0.1 m for Q and S, 0.2 m for R and S, 0.2 m for Q and T, and 0.5 m for R and T.
- Q and S differ least in height, so $E_{\mathrm{Q}} - E_{\mathrm{S}}$ is the smallest difference.