



PEAK SUCCESS EDUCATION
Kenya Certificate of Secondary Education

MARKING SCHEME

1. (a) (i) A calculation to include:
✓ = $1.5 \times 10 \times 1.2$;
✓ = 18;
✓ J; 3
- (ii) A calculation to include:
✓ power out = $\frac{\text{work done}}{\text{time}}$;
✓ = $\frac{18}{4}$;
✓ = 4.5 W;
[Accept ecf from part (a)(i)] 3
- (iii) A calculation to include:
✓ efficiency = $\frac{\text{power out}}{\text{power in}} (\times 100)$;
✓ = $\frac{4.5}{30} (\times 100)$;
✓ = 15 %; [Allow ecf]
[Accept 0.15]
[Ignore units if given] 3
- (b) friction (with moving parts)/heat produced/sound/sparking;
[Reject light] 1
- [10]**
2. (a) (i) A calculation to include:
1. $W = 50 \times 10 / mg$

2. = 500;
3. N; [Bald, correct answer scores 3 marks] 3
- (ii) work done = force \times distance / 500×2.5 ; [Allow ecf from part (a)(i)]
 = 1250;
 J; [Bald, correct answer scores 3 marks] 3
- (iii) A calculation to include:
1. $\frac{1250}{5}$; [Allow ecf from part (a)(ii)]
2. 250(W); [Bald, correct answer scores 2 marks] 2
- (b) power out put was greater;
 less time; 2
 [Accept correct calculation for two]
 [Reject quicker]
 [Beware of candidates who discuss more energy]
- [10]**
3. (a) (i) kinetic / movement / motion energy; 1
- (ii) (transferred) to heat / thermal / degraded energy; 1
 [Reject sound by itself]
 [Long lists not acceptable]
- (b) An explanation to include:
1. the car gains gravitational / potential energy as it moves up the hill;
2. this must come from the (kinetic) **energy** of the car; 2
 [Accept kinetic energy to potential energy for 2 marks]
 [Ignore answers related to force]
- (c) **Either**
 less work has to be done by the brakes as some energy transferred to gravitational potential energy / OWTTE;
- or**
 gravitational force helping to slow down the car (OWTTE); 1
 [Allow pulled by gravity]
- (d) An explanation to include two from:
1. when stopping kinetic energy transferred to heat;
2. lost to atmosphere / when braking is lost;
3. more fuel burnt when speeding up;
 [Allow used]
4. more energy used when speeding up / faster speeds; 2
 [Ignore reference to force]
 [Do not credit an answer where energy increased / needed for

speeding **and** slowing down]

plus one communication mark for ensuring that spelling, punctuation and grammar are accurate so that the meaning is clear 1

[8]

4. (a) (i) A calculation to include:
1. $\text{power} = \frac{\text{energy}}{\text{time}}$;
- [Allow $\text{power} = \frac{\text{work}}{\text{time}}$]
2. $= \frac{1.04}{4} = 0.26 \text{ (J/s)}$; 2
- [Bald, correct answer scores 2 marks]
- (ii) A calculation to include:
1. $m \times g \times h = \text{gpe}$;
- [Allow work = force x distance]
2. $1.04 = 1.3 \text{ h}$;
 3. $h = 0.8 \text{ (m)}$;
- [Bald, correct answer scores 3 marks] 3
- (iii) A calculation to include:
1. $\text{efficiency} = \frac{\text{out put}}{\text{input}} \times 100 / \frac{0.26}{0.60} \times 100 / \frac{1.04}{2.40} \times 100$;
2. $= 43(\%)$;
- [Allow 0.43 / 40 (%)] 2
- [Allow ecf only where $\frac{\text{power out}}{\text{power}}$ is used]
- (b) (i) An explanation to include two from:
1. motor is acting as a generator;
 2. moving / turning motor / coil (in magnetic field) / gravitational potential energy to kinetic energy / electrical energy as it falls;
 3. voltage / current induced / induction / electromagnetic induction;
- 2
- (ii) An explanation to include:
1. speed increases / kinetic energy increases / accelerates / coil rotated faster;
 2. bigger (induced) voltage / current / magnetic field cut more;
- [Reject electricity] 2

5. (a) A calculation to include:
 1. gravitational potential energy = mgh / Fd ;
 2. $= 0.2 \times 10 \times 1.5 = 3$; 2
- (b) 3;
 [Allow ecf from part (a)] 1
- (c) $ke = \frac{1}{2} m v^2 / v^2 = \frac{2 \times 3}{0.2}$;
 $v = 5.47$;
- [Allow ecf from part (b)]
- Or using
 $v^2 = u^2 + 2as$;
 $v = 5.47$;
- Or if using 5.5 m/s
 3.025s – 1 mark
 an explanation – 1 mark 2
- [5]**
6. (a) (i) correct points $\pm \frac{1}{2}$ square;; –1 for incorrect point
 points joined by a smooth curve; 3
- (ii) their value from graph (approx 7.4 (m/s)); [must have a line] 1
- (b) $W = \text{force} \times \text{distance moved} / [\text{seen or implied}]$
 $= 750 \times 4$;
 $= 3000$;
- J;
 [Accept kJ if 3000 not given]
 [Accept 3 kJ for 3 marks, 3000 or 3000 kJ for 2 marks
 but 3 unqualified scores 0 marks] 3
- [7]**