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 × 10 / mg;

2. = 500;
3. N; [Bald, correct answer scores 3 marks] 3

(ii) work done = force × 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. power = $\frac{\text{energy}}{\text{time}}$;

[Allow power = $\frac{\text{work}}{\text{time}}$]

2. = $\frac{1.04}{4}$ = 0.26 (J/s) ; 2

[Bald, correct answer scores 2 marks]

(ii) A calculation to include:

1. $m \times g \times h$ = gpe;

[Allow work = force x distance]

2. 1.04 = 1.3 h;
3. h = 0.8 (m); 3

[Bald, correct answer scores 3 marks]

(iii) A calculation to include:

1. efficiency = $\frac{\text{output}}{\text{input}} \times (100) / \frac{0.26}{0.60} \times (100) / \frac{1.04}{2.40} \times (100)$;
2. = 43(%); 2

[Allow 0.43 / 40 (%)]

[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; 2

[Reject electricity]

[11]

5. (a) A calculation to include:
1. gravitational potential energy = mgh / Fd;
2. = 0.2 × 10 ×1.5 = 3; 2

(b) 3;
[Allow ecf from part (a)] 1

(c) ke = ½ 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 ± ½ 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 = force × distance moved / [seen or implied]
= 750 5 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]