

Name of the Student: \_\_\_\_\_

Max. Marks : 19 Marks

Time : 19 Minutes

Mark Schemes

# Q1.

- (a) electric car journey will take a (much) longer time  
*allow diesel car journey will take a shorter time* 1

(because) battery will need recharging  
**or**  
(because) the car will need to stop for 40 minutes  
*allow diesel car will not need to be refuelled* 1

- (b) energy stored in diesel =  $45 \times 51 = 2295$  (MJ) 1

energy stored in batteries =  $0.95 \times 280 = 266$  (MJ) 1

(so) the diesel stores more energy than the battery (and the diesel car has a higher range)  
*this mark is dependent on correct calculations of energy stored* 1

- (c) any 2 from:  
• recharging is a continuous process  
*allow cars do not need to stop to recharge*  
*allow shorter journey times*  
*allow don't have to wait for battery to recharge*  
*allow longer time between recharges*  
*allow the range of the electric car is increased*  
• fewer cells needed in the car  
*allow smaller battery needed in the car*  
• more cars can be charged at the same time  
*allow do not need to find a charging point*  
*allow fewer charging stations needed*  
*ignore it is quicker*  
*ignore cost of charging*  
*ignore methods of electricity generation* 2

- (d) when cars are plugged in  
the energy from car batteries could be transferred back to the National Grid 1

allow mains supply for National Grid  
allow energy from car batteries could be used to power household appliances

1

[9]

**Q2.**

(a) 50

1

Hz / hertz

allow Hertz

1

(b) (both) switches need to be closed / on

1

to complete the series circuit

or

to allow charge to flow

or

so there is a current in the circuit

1

(c)

an answer of 7.5 (A) scores **3** marks

an answer of 0.237(A) scores **2** marks

$$1800 = I^2 \times 32$$

this mark may be awarded if P is incorrectly or not converted

1

$$I^2 = \frac{1800}{32}$$

or

$$I^2 = 56.25$$

this mark may be awarded if P is incorrectly or not converted

1

$$I = 7.5 \text{ (A)}$$

this answer only

1

(d)

an answer of 300 (s) scores **3** marks

an answer of 300 000 (s) scores **2** marks

$$1500 = \frac{450\,000}{t}$$

this mark may be awarded if P is incorrectly or not converted

1

$$t = \frac{450\,000}{1500}$$

*this mark may be awarded if P is incorrectly or not converted*

1

$t = 300 \text{ (s)}$

*this answer only*

1

**[10]**