

Name of the Student: _____

Max. Marks : 26 Marks

Time : 26 Minutes

Mark Schemes

Q1.

- (a) any **two** from

reliable

accept it is not always windy

can be used as storage for surplus electricity

generates more electricity

accept would need hundreds of wind turbines to generate this electricity

takes less space is neutral

no noise pollution

*do **not** accept can be started up quickly*

2

- (b) advantage :

does not produce greenhouse gases / carbon dioxide / water
or acid rain / sulphur dioxide

1

disadvantage :

danger from radioactive materials if accidents **or** waste radioactive materials
accept slower start-up time

1

- (c) any **one** situation with a suitable explanation

satellite

weigh less **or** work for many years **or** remote

remote places on Earth pump water **or** operate phones **or** road signs / lights **or**
weather stations **or** too expensive / impractical

calculators / watches small amount of electricity needed

2

[6]

Q2.

- (a) *any evidence of:* momentum = mass × velocity (words, symbols or numbers) appropriate
re-arrangement mass as 0.05kg

each gains 1 mark

but 800

gains 4 marks

4

(b) (i) any reference to friction with air/air resistance

gains 1 mark

but idea that friction with air/air resistance is high (at high speed)

gains 2 marks

2

(ii) any evidence of: k.e. $\propto v^2$ **or** k.e. = $\frac{1}{2}mv^2$

final k.e.

initial k.e.

either initial or final k.e. correctly calculated (i.e. 16000; 10240)

each gains 1 mark

but $(0.8)^2$

gains 3 marks

but 64%(credit 0.64)

gains 4 marks (also credit e.c.f)

4

[10]

Q3.

ideas that

- direct solar radiation will provide enough energy to heat the (specially designed) buildings during the period Oct-Mar / summer
- solar cells will produce plenty of electricity in Oct-Mar / summer (when wind generators produce little)
- a couple of wind generators will produce all electricity needed (for all but heating) Apr-Oct / winter
- number required makes wind generators unsuitable for heating / buildings
- no solar energy in June and July / little in winter
- solar / wind have little effect on environment
- **or** cause no air pollution
- solar and wind complement each other
- **or** together provide energy all year
- fuel / gas / diesel can provide energy all the time / at any time
- fuel / gas / diesel needed for transport
- fuel / gas / diesel needed for heating in winter
- diesel has to be imported

- diesel likely to freeze
- gas wouldn't have to be imported
- drilling for gas difficult / harms environment
- but atmospheric pollution a global rather than local matter so any produced in Antarctic doesn't matter much

(deduct 1 mark (to min^m. zero) for incorrect claims about destroying ozone layer)

- gas produces less carbon dioxide (for the same energy released) than diesel*
- gas produces less sulphur dioxide (for the same energy released than diesel*

(* these ideas met by candidates in Q.16 so must be allowed, though not required)
any ten for 1 mark each

[10]