



KS3 Science

Energy Resources

Mark Scheme

Time available: 37 minutes

Marks available: 57 marks

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Mark schemes

1.

- (a) (i) • chemical
answers must be in the correct order
1 (L6)
- thermal
accept 'kinetic'
'heat' is insufficient
'movement' is insufficient
1 (L6)
- (ii) any **one** from
- sound
- light
1 (L6)
- (b) • kinetic
electrical
answers must be in the correct order
both answers are required for the mark
'movement' is insufficient for kinetic
1 (L6)
- (c) any **one** from
- the wind speed varies
accept 'it depends on the weather'
- sometimes the wind does not blow
accept 'the wind is unreliable'
- the wind cannot be controlled
accept 'it varies'
accept 'it could be too windy'
responses that do not refer to wind, such as 'they spoil the landscape' or 'they kill birds' or 'they are too noisy' or 'interfere with TV and radio signals' are insufficient
1 (L5)
- (d) (i) • Sun(light)
accept 'light'
accept 'solar (energy)'
do not accept 'heat'
'photosynthesis' is insufficient
1 (L5)

- (ii) • renewable source ✓

both the correct answer and a correct explanation are required for the mark

you can grow more plants

accept 'you grow it (again)'

do **not** accept 'you can use it again'

'it is a biofuel' is insufficient

1 (L6)

[7]

2.

- (a) (i) kinetic

accept 'movement' **or** 'motion'

1 (L7)

- (ii) sound

accept 'kinetic' **or** 'movement' **or** 'motion'

1 (L7)

- (b) any **one** from

answers must refer to 'energy' **or** 'power'

- loud sounds dissipate more energy than quieter sounds

accept 'energy is used' **or** 'needed more quickly'

- energy is transferred more quickly

accept 'it is using more power' **or** 'more energy is transferred per second'

- more potential **or** kinetic energy is converted to sound

accept 'more energy is converted to sound'

accept 'it is using' **or** 'transferring more energy'

accept 'it produces more electrical energy'

do **not** accept 'it uses more electricity'

1 (L7)

- (c) any **one** from

- solar energy **or** light energy is used

accept 'the radio is run by sunlight' **or** 'light'

- less energy is provided by **or** taken from the spring

accept 'the light provides a second source of energy'

- energy is provided by the solar cell

accept 'the radio is run by the Sun'

accept 'the radio has two sources of energy'

1 (L7)

- (d) any **one** from
- batteries **or** mains electricity are not available
 - batteries **or** mains are not needed
 - people cannot afford batteries **or** mains electricity
accept 'the energy resource is free'
accept 'they are cheap to run'
'they are cheap' is insufficient

1 (L7)

[5]

3.

(a) (i) electrical

1 (L5)

(ii) kinetic

accept 'movement'

1 (L6)

(iii) • gravitational potential

accept 'gravitational' or 'potential'

1 (L6)

• kinetic **or** sound **or** thermal

accept 'heat' for thermal

accept for two marks 'kinetic into sound'

or 'kinetic into thermal'

answers must be in the correct order

1

(b) *advantage*

• the energy will always be replaced

accept 'it will not run out'

• it is renewable

accept 'it does not use fuel or mains electricity'

• it is free to run

accept 'it is cheap'

• a battery might leak

accept 'no pollution with a solar cell'

1 (L5)

disadvantage

- if the Sun goes in the pump will stop
- it will not work at night **or** in the dark
accept 'it must be in the Sun to work'
accept 'it is not sunny all the time'
*do **not** accept 'can be used again'*

1 (L5)

[6]

4.

(a) (i) any **one** from

- the Earth rotates
accept 'the Sun appears to move across the sky'
accept 'the Sun is in a different position at different times of day'
- the amount of sunlight varies
accept 'different cloud cover'
- the angle of the Sun varies
accept 'in the middle of the day the energy received is greatest'
*do **not** accept 'in the middle of the day the Sun is hottest **or** brightest'*

1 (L7)

(ii) 6.0

accept any number from 5.8 to 6.2

1 (L6)

(b) (i) a graph starting after 6 am and ending before 6 pm

1 (L7)

a line below the existing line and flat
or reaching a maximum between 12 noon and 1 pm

1 (L7)

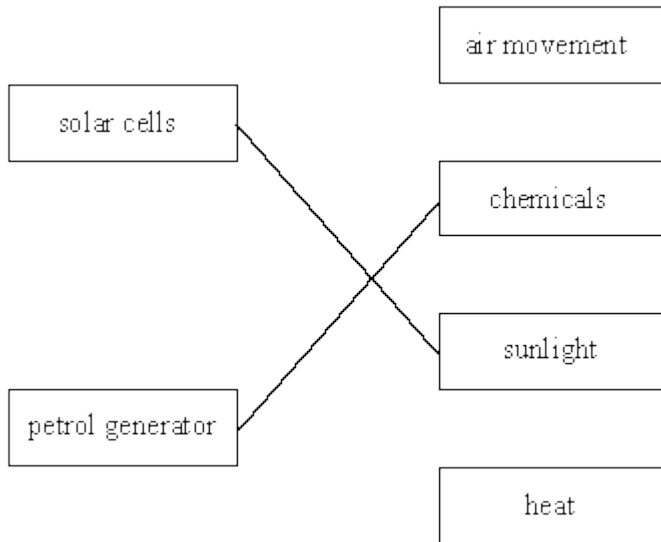
(ii) 15

accept ' $\frac{180}{12}$,

1 (L7)

[5]

5. (a)



*if more than one line is drawn from either method,
award no mark for that method*

2 (L3)

(b) (i) no light

accept 'no rays from the Sun'

*do **not** accept 'no heat from the Sun'*

accept 'no sunshine'

accept 'not enough light'

accept 'it is dark'

accept 'they cannot collect the Sun's energy at night'

accept 'because they need light to work'

accept 'no Sun'

1 (L3)

(ii) it might not be windy the wind might not be strong enough

accept 'no wind'

*accept 'needs air movement' **or** 'wind'*

accept 'sometimes the wind is weak'

accept 'sometimes the wind is stronger'

1 (L3)

[4]

6. (a) oil

1 (L4)

natural gas

accept 'gas'

answers may be in either order

1 (L4)

(b) (i) any **two** from
answers may be in either order

- wind
- solar
- tidal
- biomass
- geothermal

2 (L4)

(ii) C E A B D

*if all three letters are correct, award two marks
if one letter is correct, award one mark*

2 (L4)

[6]

7.

(a) (i) wind

1 (L3)

(ii) sunlight

1 (L3)

(iii) tides

1 (L4)

(b) any **one** from

- coal
- gas

accept 'methane'

- oil

accept 'petrol' or 'diesel' or 'kerosine'

- peat

accept 'turf'

1 (L4)

(c) electricity

1 (L3)

[5]

8.

- (a) **The first marking point is for the transfer of energy from water to turbine.
The second marking point is for the transfer of energy from turbine to generator.
The third marking point is for the transfer of energy away from the generator.**

any **two** from

- potential energy in the water to kinetic energy in the turbine
accept 'P.E. to K.E.'
accept 'transferred from the water to the turbine'
accept 'K.E. in the water to K.E. in the turbine'
accept 'P.E. in the water to K.E. in the water'
- kinetic energy in the turbine to kinetic energy in the generator
accept 'transferred from the turbine to the generator'
- kinetic energy in the generator to electrical energy in the circuit
accept 'KE. to electrical energy'
accept 'from the generator to the circuit'
accept 'transferred from the generator by electricity'
accept 'KE. in the turbine to electrical energy in the circuit'
accept 'potential energy in the water to electrical energy in the circuit' for both marks
accept 'P.E. to electrical energy'
or 'from the water to the circuit' for one mark

2

(b) any **one** from

- because the Moon's pull **or** gravity is always there
- because the tides **or** the water cannot run out **or** be used up
accept 'because there are tides every day'
or 'because there is an endless supply'

1

- (c) • from wave energy **or** from the waves
accept 'Ocean Thermal Energy Conversion' or 'OTEC'
do not accept 'hydro-electric power'

1

- (d) it is easier to control or it can be turned on when it is needed
accept 'the tides only give power at certain times'
or 'you can build an oil-fired power station anywhere'
or 'it is smaller'

any **one** from

- oil is non-renewable
accept 'oil will run out'
- it causes pollution
accept 'it gives out greenhouse gases'
or 'it can cause oil spills'

1

[6]

9.

- (a) **answers must give a definition of biomass and not just provide examples**

material from living things **or** plant matter

1 (L6)

- (b) the Sun

accept 'sunlight' or 'the Big Bang'
do not accept 'light' or 'photosynthesis'

1 (L6)

- (c) coal

oil

natural gas **or** methane

answers may be in any order
all three fossil fuels are required for the mark
accept 'gas' for natural gas
accept 'peat' as one of the three fossil fuels

1 (L5)

- (d) they cannot be replaced **or** no more can be produced

accept 'they get used up'
do not accept 'they cannot be used again'

1 (L6)

- (e) (i) any **one** from
- it is renewable
 - it is widely available
- accept 'you can grow more of it'*
accept 'it will conserve fossil fuels'
do not accept 'it is cheaper to produce'
- 1 (L6)

- (ii) any **one** from
- it takes up less space
 - it is more suitable for use in vehicles
 - it contains more energy per unit mass
- accept 'it is more concentrated'*
accept 'it can be transported more easily'
- 1 (L6)

- (iii) any **one** from
- pollution
 - they release greenhouse gases
- accept a specific example of a pollutant*
eg. 'carbon dioxide is released'
- 1 (L6)

[7]

10.

- (a) any **two** from
- oil *accept 'petrol'*
 - gas
 - uranium **or** nuclear
- accept 'geothermal' or 'peat'*
do not accept 'fossil fuel' or 'coal'
- 2
- (b) can be grown **or** more trees can be planted
- accept 'can be replaced'*
do not accept 'can be used again' or 'can be recycled'
- 1

(c) any **two** from

- wind
- wave *do **not** accept 'water'*
- tidal
- solar *accept 'the Sun' **or** 'sunlight'*
- biomass **or** a stated biomass, such as straw
*accept 'alcohol' do **not** accept 'wood'*
accept 'hydroelectric'
*accept 'geothermal' **unless** used as the answer to (a)*
*do **not** accept 'nuclear'*

2

(d) any **one** from

- thermal *accept 'heat'*
- radiant
- light

1

[6]