Natural Sciences · Grade 7

Memorandum · Term 3

TOTAL
52
MARKS

Marking guidelines

1. Award the full mark for a correct answer, even if the learner words it differently.
2. Accept any scientifically correct answer, including one not given in the memorandum.
3. Where a question asks for two or more items, award one mark per correct item.
4. For diagrams, award the mark if the label points at the correct part, even with a spelling error.
5. Do not deduct marks for spelling unless the word takes on a different scientific meaning.

Question	Answer	Marks	Marking note
QUESTION 1 · Multiple choice · 4 marks			
1.1	c. copper	**1**	
1.2	b. a loudspeaker	**1**	
1.3	c. potential energy	**1**	
1.4	a. natural gas	**1**	
QUESTION 2 · Matching · 4 marks			
2.1	1 = D (fossil fuel); 2 = C (convection); 3 = A (hydro-electric power); 4 = E (kinetic energy)	**4**	*1 mark each.*
QUESTION 3 · Terminology · 5 marks			
3.1	Insulator; Potential energy (also accept: chemical potential energy / chemical energy); Wind turbine; Wasted energy; Renewable source	**5**	*1 mark each.*
QUESTION 4 · Case study · 18 marks			
4.1	Dark (matt black) surfaces absorb radiant heat well, so the panel and the water heat up quickly (1); shiny (silver) surfaces reflect radiant heat, so less heat would reach the water (1).	**2**	*1 mark per point.*

Question	Answer	Marks	Marking note
4.2	a. It slows down heat loss from the hot water, so the water stays hot for longer (for example overnight) (1). b. Any two: insulation in the ceiling of a house; a cool box; blankets; warm clothing (jerseys, coats, woolly hats); a geyser blanket; a wonder box (hotbox); a flask.	**3**	*1 mark each.*
4.3	There were four rainy days, so less sunlight to heat the water, and the electric element had to switch on more.	**2**	*1 mark per point.*
4.4	From the hotter object to the colder object (until both are at the same temperature) (1).	**1**	*1 mark.*
4.5	Radiation: the Sun's heat reaches the black panel by radiation across space (1). Conduction: the heat moves through the metal of the panel and pipes into the water (1). Convection: the heated water rises to the tank and cooler water sinks to the panel to be heated, so a convection current heats all the water (1).	**3**	*1 mark per process. No mark for 'heat energy to heat energy'.*
4.6	Renewable — the Sun does not run out and is naturally replenished.	**2**	*1 mark per point.*
4.7	Some of the input energy always escapes to the surroundings (1), mostly as heat (and sometimes sound), which is not useful ('wasted' energy) (1).	**2**	*1 mark per point.*
4.8	Any three: measure over a longer period, for example a whole year; record the weather each day; measure how many people shower; repeat the measurement in another season; use the same meter and read it at the same time each day.	**3**	*Any three sensible points, 1 mark each.*
QUESTION 5 · Diagrams · 7 marks			
5.1	A = conduction; B = convection; C = radiation	**3**	*1 mark each.*
5.2	Coal = non-renewable; Tidal power = renewable; Nuclear fuel = non-renewable; Biomass = renewable	**4**	*1 mark each.*

Question	Answer	Marks	Marking note
QUESTION 6 · Longer questions · 7 marks			
6.1	The particles nearest the heat source gain energy and vibrate faster. They bump into their neighbours and pass energy on, so the heat moves through the material without the material itself flowing.	**3**	*1 mark per point.*
6.2	Chemical energy in the coal → heat energy when it burns → movement energy in the turbine → electrical energy in the generator → light and heat energy at the house.	**4**	*1 mark per point.*
QUESTION 7 · Electricity in the home · 7 marks			
7.1	Heater near the floor: warm air rises, so the heat spreads through the whole room (1). Air conditioner near the ceiling: cool air sinks, so it spreads down through the room (1). Both work by convection currents.	**2**	*1 mark per appliance with the correct place and reason.*
7.2	Switch off lights and chargers that are not in use — they draw power even when idle; fit a geyser blanket and set the geyser lower — the geyser is the biggest user; shower rather than bath — a shower uses less hot water, so the geyser heats less water; hang washing out instead of using the tumble dryer — the dryer uses a lot of electricity; use energy-saving globes (LEDs) — they give the same light with less electricity.	**3**	*1 mark per way with its reason.*
7.3	The bill is smaller because you pay for every unit. On top of that the power stations have to supply less, which lowers the demand on the national grid and makes load shedding less likely.	**2**	*1 mark for the bill, 1 for the grid.*

Total **52 marks**



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