AQA (GCSE Notes)

Chapter 1: Energy

Q1. Describe the energy transfers that occur when an object is thrown vertically upwards.
Answer: Kinetic energy is converted into gravitational potential energy.
Explanation: Object gains upward speed using kinetic energy. As it rises, speed decreases due to gravity. Kinetic energy is converted into gravitational potential energy. At highest point, kinetic energy becomes zero, and energy is stored as gravitational potential energy.

Q2. What happens to the energy stored in an object when it falls freely under gravity?
Answer: Gravitational potential energy decreases while kinetic energy increases.
Explanation: When an object falls, it accelerates due to gravity. Gravitational potential energy is converted into kinetic energy. The total energy remains constant (ignoring air resistance).

Q3. Explain the changes in energy when a moving ball hits a wall and comes to a stop.
Answer: Kinetic energy is transferred to the wall and surroundings as thermal and sound energy.
Explanation: Ball has kinetic energy due to motion. When it hits the wall, it slows down and stops. Kinetic energy is converted to sound energy, thermal energy, and slight deformation of wall and ball.

Q4. A person lifts a box from the floor to a shelf. Describe the energy changes in the system.
Answer: Chemical energy from muscles is converted to gravitational potential energy of the box.
Explanation: Person uses chemical energy in muscles. This energy is transferred as work to lift the box. Box gains gravitational potential energy. Energy is stored in the box at a higher position.

Q5. How does the energy store of a moving vehicle change when it brakes suddenly?
Answer: Kinetic energy of the vehicle is reduced and converted to thermal energy in the brakes and surroundings.
Explanation: Vehicle has kinetic energy while moving. Brakes apply force to slow down the vehicle. Kinetic energy is converted into thermal energy due to friction. Some energy may be transferred to sound as well.

Q6. Describe the energy transfers that happen when you boil water in an electric kettle.
Answer: Electrical energy is converted into thermal energy that heats the water.
Explanation: Electrical energy is supplied by the mains. Heating element converts electrical energy to thermal energy. Thermal energy is transferred to the water by conduction. Water temperature increases until it boils.

Q7. What energy changes occur when a ball is dropped from a height and bounces?
Answer: Gravitational potential energy changes to kinetic energy and then to elastic and thermal energy during the bounce.
Explanation: At the top, the ball has gravitational potential energy. As it falls, GPE is converted to kinetic energy. When it hits the ground, kinetic energy becomes elastic potential energy and some is

lost as thermal and sound energy. As it bounces, elastic potential energy converts back into kinetic and gravitational potential energy.

Q8. A car engine does work to speed up the car. Describe the changes in the way energy is stored.
Answer: Chemical energy from fuel is converted into kinetic energy of the car.
Explanation: Fuel combustion releases chemical energy. Engine converts this to kinetic energy. Some energy is also lost to thermal and sound energy due to friction and air resistance.

Q9. Explain the energy transfers involved when a person pushes a trolley and it starts moving.
Answer: Chemical energy from the person's muscles is transferred into kinetic energy of the trolley.
Explanation: Person uses chemical energy. This energy is used to apply a force. Force causes the trolley to accelerate. Trolley gains kinetic energy.

Q10. What are the energy changes when a child swings back and forth on a swing?
Answer: Energy changes between gravitational potential and kinetic energy.
Explanation: At the highest point, energy is mostly gravitational potential. As swing moves down, GPE changes to kinetic energy. At the lowest point, kinetic energy is maximum. As swing rises, kinetic energy converts back to GPE. Some energy is lost as thermal and sound energy due to friction and air resistance.

Q11. How is energy redistributed when a heater warms a room?
Answer: Electrical energy is converted into thermal energy which heats the air.
Explanation: Electrical energy enters the heater. Heating element converts it to thermal energy. Thermal energy transfers to air by convection and radiation. Room temperature increases.

Q12. Explain what happens to energy when a light is turned on in a dark room.
Answer: Electrical energy is converted into light and thermal energy.
Explanation: Electrical current flows to the bulb. Bulb converts electrical energy to visible light. Some energy is also converted into thermal energy.

Q13. Describe the changes in energy when a cyclist goes up a hill.
Answer: Chemical and kinetic energy are converted into gravitational potential energy.
Explanation: Cyclist uses chemical energy from food. Pedalling does work against gravity. As cyclist gains height, gravitational potential energy increases. Kinetic energy may decrease depending on speed.

Q14. A ball is kicked across a flat field. What happens to its energy stores?
Answer: Kinetic energy is gradually transferred to thermal and sound energy.
Explanation: Ball starts with kinetic energy. Friction and air resistance act on it. Kinetic energy is reduced. Energy is transferred as heat to ground and air and as sound. Eventually, ball stops.

Q15. What energy transfers occur when a stretched elastic band is released?
Answer: Elastic potential energy is converted into kinetic energy.

Explanation: Band stores elastic potential energy when stretched. On release, energy changes to kinetic energy. Band moves rapidly.

Q16. Describe the energy changes when you slide a book across a table and it stops.
Answer: Kinetic energy is converted into thermal energy.
Explanation: Book has kinetic energy. Friction between book and table does work. Energy is transferred to thermal energy in book and table. Book stops when all kinetic energy is transferred.

Q17. A roller coaster descends from the top of a track. What happens to its energy?
Answer: Gravitational potential energy is converted into kinetic energy.
Explanation: At the top, roller coaster has high GPE. As it descends, GPE converts into kinetic energy. Speed increases. Some energy is lost as sound and heat due to friction.

Q18. What energy changes occur when water is heated using a gas stove?
Answer: Chemical energy from gas is converted into thermal energy.
Explanation: Gas burns and releases chemical energy. Flame heats the pot. Thermal energy is transferred to water. Water temperature increases.

Q19. A battery powers a fan. Describe how the energy is transferred and stored.
Answer: Chemical energy is converted to electrical energy and then to kinetic and thermal energy.
Explanation: Battery stores chemical energy. Chemical energy is converted to electrical energy. Electrical energy flows to fan motor. Motor converts it to kinetic energy of blades. Some energy is lost as heat.

Q20. Explain how energy is transferred and stored when an electric bulb is lit.
Answer: Electrical energy is converted into light and thermal energy.
Explanation: Electric current flows to bulb. Energy is transferred to filament or LED. Electrical energy converts to light energy. Some energy is lost as thermal energy.

Q21. A person runs up a flight of stairs. Describe the energy changes that take place.
Answer: Chemical energy is converted into kinetic and gravitational potential energy.
Explanation: Person uses chemical energy. Muscles do work. Kinetic energy causes motion. As height increases, gravitational potential energy increases.

Q22. Describe the changes in energy when a kettle is switched off after boiling.
Answer: Thermal energy begins to decrease as water cools.
Explanation: Electrical input stops. Water holds thermal energy. Heat transfers to air. Water temperature decreases over time.

Q23. What energy changes occur when a spring is compressed by a force?
Answer: Work is stored as elastic potential energy.
Explanation: Force compresses the spring. Work is done on the spring. Energy is stored as elastic potential energy.

Q24. A pendulum swings to and fro. Explain the energy stores involved in each part of the motion.
Answer: Energy shifts between gravitational potential and kinetic energy.
Explanation: At highest point, energy is gravitational potential. As pendulum swings down, energy converts to kinetic. At bottom, kinetic energy is highest. As it rises again, energy converts back to GPE. Some energy is lost as heat and sound.

Q25. A bus slows down as it approaches a traffic light. Describe the energy changes.
Answer: Kinetic energy is converted into thermal energy due to braking.
Explanation: Bus has kinetic energy. Brakes apply force. Friction converts kinetic energy into heat in brakes and air. Bus slows down.

Q26. How is energy transferred when a person does a bungee jump?
Answer: Gravitational potential energy changes to kinetic and then to elastic potential energy.
Explanation: At the start, person has gravitational potential energy. As they fall, GPE is converted to kinetic energy. As rope stretches, kinetic energy converts to elastic potential energy. At lowest point, energy is mostly stored as elastic potential. Then energy transfers back as the rope pulls the person upward.

Q27. What are the changes in energy when a metal rod is heated at one end?
Answer: Thermal energy is transferred through the rod by conduction.
Explanation: Heat is applied to one end. Particles at that end gain energy. Vibrations transfer to neighbouring particles. Thermal energy spreads along the rod.

Q28. A toy car is wound up and released. Describe the energy transfers.
Answer: Elastic potential energy is converted into kinetic energy.
Explanation: Winding the car stores elastic potential energy in the spring. On release, spring unwinds. Elastic potential energy is transferred into kinetic energy. Car moves forward.

Q29. What happens to energy when a person jumps into a swimming pool?
Answer: Gravitational potential energy is converted into kinetic, then sound and thermal energy.
Explanation: Person has gravitational potential energy before jump. As they fall, GPE is converted into kinetic energy. On hitting the water, kinetic energy transfers to water as sound, waves, and heat.

Q30. A rock is rolled up a slope. Explain the energy changes involved.
Answer: Kinetic energy is converted into gravitational potential energy.
Explanation: Rock is pushed and gains kinetic energy. As it moves up, kinetic energy is used to do work against gravity. Gravitational potential energy increases. Some energy is lost as heat due to friction.

Q31. Describe the energy transfers when a mobile phone is charged.
Answer: Electrical energy is converted into chemical energy.
Explanation: Charger supplies electrical energy. Energy flows to battery. Energy is stored in battery as chemical energy. Some energy is lost as heat.

Q32. What happens to the energy when an electric motor lifts a weight?
Answer: Electrical energy is converted into gravitational potential energy.
Explanation: Electric current flows to motor. Motor does work to lift the weight. Weight gains gravitational potential energy. Some energy is lost as heat and sound.

Q33. A student pushes a box across the floor at constant speed. Describe the energy transfers.
Answer: Chemical energy is transferred to thermal energy.
Explanation: Student uses chemical energy from food. Work is done to overcome friction. Energy is transferred as thermal energy to the floor and the box.

Q34. What are the energy changes when a torch is switched on?
Answer: Chemical energy is converted into light and thermal energy.
Explanation: Battery provides chemical energy. Energy flows as electricity. Bulb converts energy to light. Some energy becomes heat.

Q35. Explain the energy redistribution when a kettle is used to heat water and some energy is lost to the surroundings.
Answer: Electrical energy is mostly converted to thermal energy but some is lost.
Explanation: Electrical energy flows to kettle. Heating element converts it to thermal energy. Most energy heats water. Some energy escapes to surroundings as heat and sound.

Q36. A parachutist jumps from a plane. What happens to the energy stores during the fall?
Answer: Gravitational potential energy is converted to kinetic, then thermal energy due to air resistance.
Explanation: At start, parachutist has gravitational potential energy. As they fall, GPE converts to kinetic energy. Air resistance increases. Some energy is transferred to air as heat.

Q37. Describe the changes in energy when an electric bell rings.
Answer: Electrical energy is converted to kinetic, sound, and thermal energy.
Explanation: Electric current flows into bell circuit. Electromagnet moves hammer. Hammer hits bell. Kinetic energy converts to sound. Some energy becomes heat.

Q38. What happens to the energy when a balloon rises and then pops?
Answer: Potential and internal energy are released as kinetic, sound, and thermal energy.
Explanation: Rising balloon gains gravitational potential energy. Gas inside has internal energy. When it pops, energy is released as sound and heat. Pieces fly with kinetic energy.

Q39. A stretched spring is released. Explain how energy is transferred.
Answer: Elastic potential energy is converted into kinetic energy.
Explanation: Spring is stretched and stores elastic potential energy. On release, energy changes into kinetic energy. Spring moves rapidly.

Q40. What energy transfers occur when a hot pan is placed in cold water?
Answer: Thermal energy is transferred from pan to water.

Explanation: Pan has more thermal energy. Heat flows from pan to water by conduction. Water heats up. Pan cools down.

Q41. Describe the energy changes when a cyclist brakes going downhill.
Answer: Kinetic energy is converted into thermal energy.
Explanation: Cyclist has kinetic energy. Brakes apply force. Friction converts kinetic energy to heat. Some energy is also released as sound.

Q42. A moving car crashes into a barrier. What are the energy changes in this situation?
Answer: Kinetic energy is converted into sound, thermal, and deformation energy.
Explanation: Car moves with kinetic energy. On impact, energy is transferred into barrier and car. Energy becomes heat, sound, and deformation.

Q43. Explain how energy is transferred when a current flows through a resistor.
Answer: Electrical energy is converted into thermal energy.
Explanation: Electric current flows in resistor. Electrons collide with atoms. Energy is transferred as heat. Resistor warms up.

Q44. What are the energy changes when a ball rolls down a ramp?
Answer: Gravitational potential energy is converted into kinetic energy.
Explanation: Ball starts at height with gravitational potential energy. As it rolls down, GPE converts to kinetic energy. Some energy is lost as sound and heat due to friction.

Q45. Describe how energy is redistributed when a machine lifts and then drops a weight.
Answer: Energy changes from electrical to gravitational potential, then to kinetic and thermal.
Explanation: Machine uses electrical energy to lift weight. Weight gains gravitational potential energy. On drop, GPE converts into kinetic energy. On impact, energy becomes sound, heat, and deformation.

Q46. What happens to energy when a light bulb is left on in a room?
Answer: Electrical energy is constantly converted to light and heat energy.
Explanation: Current flows through bulb. Bulb gives off light. Heat is also produced. Energy spreads in the room.

Q47. Explain the energy transfers when an electric heater warms a metal rod.
Answer: Electrical energy is converted into thermal energy and transferred to the rod.
Explanation: Current flows through heater. Heater gets hot. Heat transfers to rod by conduction. Rod temperature increases.

Q48. A fan is powered by a battery. Describe the way energy is stored and transferred.
Answer: Chemical energy is converted to kinetic and thermal energy.
Explanation: Battery stores chemical energy. Electrical current flows to motor. Motor turns blades. Kinetic energy increases. Some energy is lost as heat.

Q49. What energy changes occur when a battery is used to power a motor that lifts an object?
Answer: Chemical energy is converted into electrical, kinetic, and gravitational potential energy.
Explanation: Battery provides chemical energy. Current flows to motor. Motor lifts object. Object gains gravitational potential energy. Some energy becomes heat and sound.

Q50. Describe how energy is redistributed in a system when a person slides down a slide.
Answer: Gravitational potential energy is converted into kinetic and thermal energy.
Explanation: Person starts with gravitational potential energy. As they slide, energy changes to kinetic energy. Friction converts some energy to heat. Person slows at the bottom.

Q51. Calculate the kinetic energy of a 1200 kg car moving at 20 m/s.
Answer: 240000 J
Explanation:
Formula: $Ek = 0.5 \times m \times v^2$
$Ek = 0.5 \times 1200 \times 20^2$
$Ek = 0.5 \times 1200 \times 400$
$Ek = 240000$ J

Q52. A 5 kg object is lifted to a height of 10 m. Calculate the gravitational potential energy gained.
Answer: 490 J
Explanation:
Formula: $Ep = m \times g \times h$
$Ep = 5 \times 9.8 \times 10$
$Ep = 490$ J

Q53. How much elastic potential energy is stored in a spring with spring constant 150 N/m when extended by 0.3 m?
Answer: 6.75 J
Explanation:
Formula: $Ee = 0.5 \times k \times e^2$
$Ee = 0.5 \times 150 \times 0.3^2$
$Ee = 0.5 \times 150 \times 0.09$
$Ee = 6.75$ J

Q54. A cyclist and bicycle together have a mass of 80 kg and are moving at 10 m/s. Calculate their kinetic energy.
Answer: 4000 J
Explanation:
Formula: $Ek = 0.5 \times m \times v^2$
$Ek = 0.5 \times 80 \times 10^2$
$Ek = 0.5 \times 80 \times 100$
$Ek = 4000$ J

Q55. A spring stretches 0.25 m when a force is applied. The spring constant is 200 N/m. Calculate the energy stored.
Answer: 6.25 J
Explanation:
Formula: $Ee = 0.5 \times k \times e^2$
$Ee = 0.5 \times 200 \times 0.25^2$
$Ee = 0.5 \times 200 \times 0.0625$
$Ee = 6.25$ J

Q56. An object of mass 2 kg is dropped from a height of 15 m. Calculate the gravitational potential energy at the top.
Answer: 294 J
Explanation:
Formula: $Ep = m \times g \times h$
$Ep = 2 \times 9.8 \times 15$
$Ep = 294$ J

Q57. A van with a mass of 2500 kg moves at 15 m/s. Work out its kinetic energy.
Answer: 281250 J
Explanation:
Formula: $Ek = 0.5 \times m \times v^2$
$Ek = 0.5 \times 2500 \times 15^2$
$Ek = 0.5 \times 2500 \times 225$
$Ek = 281250$ J

Q58. A 70 kg person climbs 3.5 m up a staircase. Find the gravitational potential energy gained.
Answer: 2401 J
Explanation:
Formula: $Ep = m \times g \times h$
$Ep = 70 \times 9.8 \times 3.5$
$Ep = 2401$ J

Q59. A spring with a spring constant of 100 N/m is stretched 0.4 m. Calculate the elastic potential energy.
Answer: 8.0 J
Explanation:
Formula: $Ee = 0.5 \times k \times e^2$
$Ee = 0.5 \times 100 \times 0.4^2$
$Ee = 0.5 \times 100 \times 0.16$
$Ee = 8.0$ J

Q60. A ball of mass 0.5 kg is travelling at 8 m/s. Calculate the kinetic energy of the ball.
Answer: 16.0 J

Explanation:
Formula: $Ek = 0.5 \times m \times v^2$
$Ek = 0.5 \times 0.5 \times 8^2$
$Ek = 0.25 \times 64$
$Ek = 16.0$ J

Q61. How high must a 3 kg object be lifted to gain 90 J of gravitational potential energy?
Answer: 3.06 m
Explanation:
Formula: $Ep = m \times g \times h$
$90 = 3 \times 9.8 \times h$
$h = 90 / (3 \times 9.8)$
$h = 3.06$ m

Q62. A compressed spring stores 36 J of energy. Its spring constant is 300 N/m. Calculate its extension.
Answer: 0.49 m
Explanation:
Formula: $Ee = 0.5 \times k \times e^2$
$36 = 0.5 \times 300 \times e^2$
$e^2 = 36 / (0.5 \times 300)$
$e^2 = 0.24$
$e = \sqrt{0.24}$
$e = 0.49$ m

Q63. A 600 kg roller coaster car is at the top of a 25 m hill. Calculate its gravitational potential energy.
Answer: 147000 J
Explanation:
Formula: $Ep = m \times g \times h$
$Ep = 600 \times 9.8 \times 25$
$Ep = 147000$ J

Q64. A lorry of mass 4000 kg is moving at 12 m/s. Calculate its kinetic energy.
Answer: 288000 J
Explanation:
Formula: $Ek = 0.5 \times m \times v^2$
$Ek = 0.5 \times 4000 \times 12^2$
$Ek = 0.5 \times 4000 \times 144$
$Ek = 288000$ J

Q65. A spring with spring constant 75 N/m is compressed by 0.2 m. Calculate the energy stored.
Answer: 1.5 J

Explanation:
Formula: $E_e = 0.5 \times k \times e^2$
$E_e = 0.5 \times 75 \times 0.2^2$
$E_e = 0.5 \times 75 \times 0.04$
$E_e = 1.5$ J

Q66. An object falls from a height of 20 m. Its mass is 2.5 kg. Calculate the potential energy lost.
Answer: 490 J
Explanation:
Formula: $E_p = m \times g \times h$
$E_p = 2.5 \times 9.8 \times 20$
$E_p = 490$ J

Q67. A ball with a kinetic energy of 18 J is moving at 3 m/s. Find its mass.
Answer: 4.0 kg
Explanation:
Formula: $E_k = 0.5 \times m \times v^2$
$18 = 0.5 \times m \times 9$
$m = 18 / (0.5 \times 9)$
$m = 4.0$ kg

Q68. A spring stores 9 J of energy when stretched. Its spring constant is 120 N/m. Find the extension.
Answer: 0.39 m
Explanation:
Formula: $E_e = 0.5 \times k \times e^2$
$9 = 0.5 \times 120 \times e^2$
$e^2 = 9 / 60$
$e^2 = 0.15$
$e = \sqrt{0.15}$
$e = 0.39$ m

Q69. A 2 kg stone is thrown upwards at 6 m/s. Calculate its kinetic energy.
Answer: 36.0 J
Explanation:
Formula: $E_k = 0.5 \times m \times v^2$
$E_k = 0.5 \times 2 \times 6^2$
$E_k = 1 \times 36$
$E_k = 36.0$ J

Q70. A diver with a mass of 65 kg climbs to a 10 m platform. Calculate the gravitational potential energy at the top.
Answer: 6370 J

Explanation:
Formula: $E_p = m \times g \times h$
$E_p = 65 \times 9.8 \times 10$
$E_p = 6370$ J

Q71. A metal block of mass 3 kg is heated from 20°C to 80°C. Calculate the thermal energy gained if the specific heat capacity of the metal is 450 J/kg°C.
Answer: 81000 J
Explanation:
$\Delta E = m \times c \times \Delta\theta$
$\Delta E = 3 \times 450 \times (80 - 20)$
$\Delta E = 3 \times 450 \times 60$
$\Delta E = 81000$ J

Q72. A 2 kg substance cools down from 75°C to 25°C. Its specific heat capacity is 380 J/kg°C. Calculate the energy released.
Answer: 38000 J
Explanation:
$\Delta E = m \times c \times \Delta\theta$
$\Delta E = 2 \times 380 \times (75 - 25)$
$\Delta E = 2 \times 380 \times 50$
$\Delta E = 38000$ J

Q73. A copper block of mass 1.5 kg is heated and absorbs 2700 J of energy. If the specific heat capacity of copper is 385 J/kg°C, calculate the temperature change.
Answer: 4.68°C
Explanation:
$\Delta E = m \times c \times \Delta\theta$
$\Delta\theta = \Delta E / (m \times c)$
$\Delta\theta = 2700 / (1.5 \times 385)$
$\Delta\theta = 2700 / 577.5$
$\Delta\theta \approx 4.68$°C

Q74. Calculate the mass of a substance that absorbs 9600 J of thermal energy when its temperature rises by 20°C. Its specific heat capacity is 400 J/kg°C.
Answer: 1.2 kg
Explanation:
$\Delta E = m \times c \times \Delta\theta$
$m = \Delta E / (c \times \Delta\theta)$
$m = 9600 / (400 \times 20)$
$m = 9600 / 8000$
$m = 1.2$ kg

Q75. A metal block of unknown specific heat capacity is heated by 5000 J, causing its temperature to rise by 25°C. The mass of the block is 4 kg. Calculate its specific heat capacity.

Answer: 50 J/kg°C

Explanation:

$\Delta E = m \times c \times \Delta\theta$

$c = \Delta E / (m \times \Delta\theta)$

$c = 5000 / (4 \times 25)$

$c = 5000 / 100$

$c = 50$ J/kg°C

Q76. A 10 kg object is heated and gains 15000 J of energy. If its temperature increased by 15°C, find its specific heat capacity.

Answer: 100 J/kg°C

Explanation:

$\Delta E = m \times c \times \Delta\theta$

$c = \Delta E / (m \times \Delta\theta)$

$c = 15000 / (10 \times 15)$

$c = 15000 / 150$

$c = 100$ J/kg°C

Q77. A student heats a sample and measures a temperature increase of 30°C after supplying 7200 J of energy. The sample has a mass of 2 kg. Calculate the specific heat capacity.

Answer: 120 J/kg°C

Explanation:

$\Delta E = m \times c \times \Delta\theta$

$c = \Delta E / (m \times \Delta\theta)$

$c = 7200 / (2 \times 30)$

$c = 7200 / 60$

$c = 120$ J/kg°C

Q78. How much energy is required to heat 5 kg of water by 25°C? The specific heat capacity of water is 4200 J/kg°C.

Answer: 525000 J

Explanation:

$\Delta E = m \times c \times \Delta\theta$

$\Delta E = 5 \times 4200 \times 25$

$\Delta E = 525000$ J

Q79. A 3 kg aluminium block is cooled from 90°C to 30°C. Calculate the energy lost. The specific heat capacity of aluminium is 900 J/kg°C.

Answer: 162000 J

Explanation:

$\Delta E = m \times c \times \Delta\theta$

$\Delta E = 3 \times 900 \times (90 - 30)$

$\Delta E = 3 \times 900 \times 60$
$\Delta E = 162000$ J

Q80. A 0.5 kg block is supplied with 1800 J of energy and its temperature increases by 12°C. Find the specific heat capacity.
Answer: 300 J/kg°C
Explanation:
$\Delta E = m \times c \times \Delta\theta$
$c = \Delta E / (m \times \Delta\theta)$
$c = 1800 / (0.5 \times 12)$
$c = 1800 / 6$
$c = 300$ J/kg°C

Q81. A kettle heats 2 kg of water from 20°C to 100°C. Calculate the total thermal energy required.
Answer: 672000 J
Explanation:
$\Delta E = m \times c \times \Delta\theta$
$\Delta E = 2 \times 4200 \times (100 - 20)$
$\Delta E = 2 \times 4200 \times 80$
$\Delta E = 672000$ J

Q82. How much energy is transferred when 4 kg of oil is cooled from 80°C to 40°C, if the specific heat capacity is 2100 J/kg°C?
Answer: 336000 J
Explanation:
$\Delta E = m \times c \times \Delta\theta$
$\Delta E = 4 \times 2100 \times (80 - 40)$
$\Delta E = 4 \times 2100 \times 40$
$\Delta E = 336000$ J

Q83. A student investigates the thermal energy needed to heat 1.2 kg of glass by 50°C. The specific heat capacity of glass is 840 J/kg°C. Calculate the energy needed.
Answer: 50400 J
Explanation:
$\Delta E = m \times c \times \Delta\theta$
$\Delta E = 1.2 \times 840 \times 50$
$\Delta E = 50400$ J

Q84. A 6 kg object requires 7200 J to raise its temperature by 10°C. Find its specific heat capacity.
Answer: 120 J/kg°C
Explanation:
$\Delta E = m \times c \times \Delta\theta$
$c = \Delta E / (m \times \Delta\theta)$
$c = 7200 / (6 \times 10)$

c = 7200 / 60
c = 120 J/kg°C

Q85. An electric heater supplies 1500 J of energy to a 0.5 kg sample. The temperature increases by 5°C. Calculate the specific heat capacity.
Answer: 600 J/kg°C
Explanation:
ΔE = m × c × Δθ
c = ΔE / (m × Δθ)
c = 1500 / (0.5 × 5)
c = 1500 / 2.5
c = 600 J/kg°C

Q86. A scientist cools a 2.5 kg material and measures a drop in temperature from 100°C to 60°C. If 10000 J of energy is released, find the specific heat capacity.
Answer: 100 J/kg°C
Explanation:
ΔE = m × c × Δθ
c = ΔE / (m × Δθ)
c = 10000 / (2.5 × 40)
c = 10000 / 100
c = 100 J/kg°C

Q87. How much energy is released when a 1.2 kg block is cooled from 50°C to 10°C? The specific heat capacity is 500 J/kg°C.
Answer: 24000 J
Explanation:
ΔE = m × c × Δθ
ΔE = 1.2 × 500 × (50 - 10)
ΔE = 1.2 × 500 × 40
ΔE = 24000 J

Q88. A 1 kg block is heated with a power supply for 5 minutes. If the energy supplied is 6000 J and the temperature change is 20°C, find the specific heat capacity.
Answer: 300 J/kg°C
Explanation:
ΔE = m × c × Δθ
c = ΔE / (m × Δθ)
c = 6000 / (1 × 20)
c = 6000 / 20
c = 300 J/kg°C

Q89. A machine transfers 300 J of energy every 2 seconds. Calculate the power of the machine.
Answer: 150 W

Explanation:
P = E / t
P = 300 / 2
P = 150 W

Q90. A motor does 5000 J of work in 25 seconds. Calculate the power.
Answer: 200 W
Explanation:
P = W / t
P = 5000 / 25
P = 200 W

Q91. A device uses 900 J in 10 seconds. What is the power output of the device?
Answer: 90 W
Explanation:
P = E / t
P = 900 / 10
P = 90 W

Q92. A machine works at 200 W power. How much energy does it transfer in 30 seconds?
Answer: 6000 J
Explanation:
E = P × t
E = 200 × 30
E = 6000 J

Q93. An electric heater transfers 7200 J in 60 seconds. Calculate its power rating.
Answer: 120 W
Explanation:
P = E / t
P = 7200 / 60
P = 120 W

Q94. How much time is required for a 150 W device to transfer 4500 J of energy?
Answer: 30 s
Explanation:
t = E / P
t = 4500 / 150
t = 30 s

Q95. A 2 kW kettle boils water in 3 minutes. How much energy is transferred?
Answer: 360000 J
Explanation:
P = 2000 W, t = 3 × 60 = 180 s

E = P × t
E = 2000 × 180
E = 360000 J

Q96. A person lifts weights using 600 J of energy in 4 seconds. Calculate the power used.
Answer: 150 W
Explanation:
P = E / t
P = 600 / 4
P = 150 W

Q97. A 100 W bulb is on for 2 hours. How much energy does it use in joules?
Answer: 720000 J
Explanation:
P = 100 W, t = 2 × 60 × 60 = 7200 s
E = P × t
E = 100 × 7200
E = 720000 J

Q98. A car engine produces 500000 J of work in 50 seconds. What is the power output of the engine?
Answer: 10000 W
Explanation:
P = W / t
P = 500000 / 50
P = 10000 W

Q99. A drill operates at 120 W. How long does it take to do 3600 J of work?
Answer: 30 s
Explanation:
t = E / P
t = 3600 / 120
t = 30 s

Q100. A power tool uses 18000 J in 60 seconds. Calculate the power of the tool.
Answer: 300 W
Explanation:
P = E / t
P = 18000 / 60
P = 300 W

Q101. A washing machine uses 2000 W of power. How much energy does it use in 5 minutes?
Answer: 600000 J
Explanation:

t = 5 × 60 = 300 s
E = P × t
E = 2000 × 300
E = 600000 J

Q102. A crane lifts a load using 60000 J of energy in 20 seconds. Calculate its power.
Answer: 3000 W
Explanation:
P = E / t
P = 60000 / 20
P = 3000 W

Q103. A microwave uses 900 W. How much energy does it transfer in 45 seconds?
Answer: 40500 J
Explanation:
E = P × t
E = 900 × 45
E = 40500 J

Q104. What happens to the total energy in a closed system when energy is transferred between stores?
Answer: The total energy stays the same.
Explanation: In a closed system, no energy enters or leaves. Energy can move between stores (like kinetic to thermal), but the total amount remains constant due to conservation of energy.

Q105. Give an example of energy transfer in a closed system and explain why the total energy remains unchanged.
Answer: A pendulum in a vacuum transfers energy between kinetic and gravitational potential stores.
Explanation: As the pendulum swings, energy moves from kinetic to gravitational potential and back again. No energy leaves the system, so the total remains the same.

Q106. When a moving object comes to a stop, how is its kinetic energy transferred and where is it stored?
Answer: The kinetic energy is transferred to the thermal energy store of the object and its surroundings.
Explanation: Friction or air resistance slows the object, converting kinetic energy into heat, which warms the object and air.

Q107. Describe how energy is dissipated when a phone charger warms up during use.
Answer: Electrical energy is converted into thermal energy that spreads into the surroundings.
Explanation: Some of the electrical energy is not used to charge the phone but instead warms up the charger, which is energy lost as heat to the surroundings.

Q108. Explain what is meant by ‘wasted energy’ with an example from a household appliance.
Answer: Wasted energy is energy not usefully transferred and usually ends up as heat or sound.
Explanation: In a hairdryer, most energy goes to heating air and blowing it, but some is lost as sound and heat from the casing, which is not useful.

Q109. Why is the energy transferred to the thermal store of surroundings considered less useful?
Answer: Because it cannot be easily used to do work.
Explanation: Once energy spreads out into the environment as heat, it becomes too spread out and low-quality to be reused effectively.

Q110. A pendulum swings in a vacuum. How does this demonstrate energy transfer in a closed system?
Answer: The pendulum transfers energy between kinetic and gravitational stores without loss.
Explanation: In a vacuum, there's no air resistance. The pendulum continues to swing, and energy moves between stores without leaving the system.

Q111. How is energy transferred and dissipated when a light bulb is turned on?
Answer: Energy is transferred electrically and dissipated as light and heat.
Explanation: Electrical energy flows into the bulb. Some is transferred usefully as light, but a large amount is wasted as heat to the surroundings.

Q112. What role does friction play in unwanted energy transfers in machines?
Answer: Friction causes energy to be transferred to heat, which is wasted.
Explanation: Moving parts rub together, and the mechanical energy becomes thermal energy, which heats the parts and surroundings unnecessarily.

Q113. How can lubrication reduce energy losses in a moving mechanical system?
Answer: Lubrication reduces friction between parts.
Explanation: With less friction, there’s less energy wasted as heat, so more energy is used for useful movement.

Q114. Why is insulation used in hot water pipes?
Answer: To reduce heat loss and keep the water warm.
Explanation: Insulation slows down the rate of heat transfer to the surroundings, making the system more energy efficient.

Q115. Describe how cavity wall insulation reduces unwanted energy transfers in a building.
Answer: It traps air and reduces conduction.
Explanation: The insulating material in the wall cavities reduces heat transfer by trapping air, which is a poor conductor.

Q116. Explain why carpets and curtains help keep a house warm in winter.
Answer: They reduce heat transfer by trapping air and blocking drafts.

Explanation: Air trapped in carpet fibres or behind curtains acts as insulation, slowing down heat loss through the floor and windows.

Q117. Describe two ways to reduce energy loss through windows.
Answer: Use double glazing and close curtains.
Explanation: Double glazing traps air between glass layers, reducing conduction. Curtains block drafts and trap warm air.

Q118. What properties should a good insulating material have?
Answer: Low thermal conductivity and many air pockets.
Explanation: Low conductivity slows heat transfer. Air pockets reduce conduction and convection within the material.

Q119. What is the relationship between thermal conductivity and the rate of heat transfer?
Answer: Higher thermal conductivity means faster heat transfer.
Explanation: Materials with high conductivity allow energy to pass through them more quickly by conduction.

Q120. How does wall thickness affect the rate of cooling of a building?
Answer: Thicker walls reduce the rate of cooling.
Explanation: Thicker walls take longer for heat to pass through, which slows down energy transfer to the outside.

Q121. Why do materials with high thermal conductivity cool down or heat up quickly?
Answer: Because they transfer energy faster.
Explanation: High thermal conductivity means heat flows through the material rapidly, leading to quick temperature changes.

Q122. A house has thick walls made from low thermal conductivity material. What does this mean for heat transfer?
Answer: Heat transfer is slow, so the house retains warmth longer.
Explanation: The thick, insulating walls act as a barrier, reducing how quickly heat escapes.

Q123. Give an example of a material with low thermal conductivity and explain its use in homes.
Answer: Fibreglass wool is used for loft insulation.
Explanation: Fibreglass traps air and has low conductivity, reducing heat loss from the roof.

Q124. Why do thin metal walls allow heat to escape more quickly than thick brick walls?
Answer: Metal has higher thermal conductivity and is thinner.
Explanation: Heat travels faster through metal and thin walls provide less resistance to heat flow.

Q125. What is meant by efficiency in the context of energy transfer?
Answer: It is the ratio of useful energy transferred to total energy input.

Explanation: Efficiency shows how well a device converts input energy into useful output, with less wasted energy meaning greater efficiency.

Q126. State the equation to calculate efficiency using energy values.
Answer: Efficiency = useful output energy transfer ÷ total input energy transfer
Explanation: This equation helps compare how much of the input energy is usefully transferred.

Q127. State the equation to calculate efficiency using power values.
Answer: Efficiency = useful power output ÷ total power input
Explanation: This compares the useful power output to the total power supplied.

Q128. How is efficiency expressed as a percentage?
Answer: Multiply the efficiency value (decimal) by 100
Explanation: Percentage efficiency = efficiency × 100

Q129. An appliance uses 2000 J of energy and transfers 1400 J usefully. Calculate its efficiency as a decimal.
Answer: 0.7
Explanation:
Efficiency = useful output energy ÷ total input energy
Efficiency = 1400 ÷ 2000
Efficiency = 0.7

Q130. An electric motor has a total power input of 500 W and a useful output of 350 W. Calculate its efficiency as a percentage.
Answer: 70%
Explanation:
Efficiency = useful power output ÷ total power input
Efficiency = 350 ÷ 500
Efficiency = 0.7
Percentage efficiency = 0.7 × 100 = 70%

Q131. Why can't any machine be 100% efficient?
Answer: Because some energy is always wasted, usually as heat or sound
Explanation: In every energy transfer, some energy is lost to surroundings and cannot be fully used.

Q132. In an electric fan, where is most of the wasted energy transferred?
Answer: As heat to the surroundings
Explanation: The motor and moving parts get warm, transferring unwanted thermal energy.

Q133. A bulb is 25% efficient. What happens to the other 75% of the energy?
Answer: It is wasted, mostly as heat
Explanation: Only 25% is converted to light, and 75% warms the bulb and air.

Q134. How can the efficiency of a machine be increased?
Answer: By reducing wasted energy through insulation or lubrication
Explanation: Lower friction or better insulation reduces losses, increasing efficiency.

Q135. Describe a method to reduce energy losses in an electric motor.
Answer: Use lubricants to reduce friction
Explanation: Less friction means less energy lost as heat in moving parts.

Q136. What is the advantage of using LED lights over filament bulbs in terms of efficiency?
Answer: LEDs convert more energy into light and less into heat
Explanation: They waste less energy, making them more efficient and longer-lasting.

Q137. Why are modern kettles more energy efficient than older ones?
Answer: They are better insulated and heat water faster
Explanation: Less heat is lost to surroundings, so more energy heats the water directly.

Q138. How do double-glazed windows reduce energy transfer?
Answer: By trapping air between glass layers to reduce conduction
Explanation: Air is a poor conductor, so heat passes through the window more slowly.

Q139. What is the purpose of foil-backed radiators in a home?
Answer: To reflect heat back into the room
Explanation: This reduces heat loss through walls and increases heating efficiency.

Q140. How can reducing air drafts improve the efficiency of heating a room?
Answer: It stops warm air from escaping and cold air from entering
Explanation: Less heat is lost, so heating works better and uses less energy.

Q141. What is the main reason energy is dissipated in power tools?
Answer: Due to friction and electrical resistance
Explanation: These cause heat, which spreads to the surroundings and is wasted.

Q142. Describe one change in appliance design that increases energy efficiency.
Answer: Adding insulation to reduce heat loss
Explanation: This keeps useful energy where it's needed instead of losing it to the surroundings.

Q143. Explain how loft insulation slows down the rate of heat loss in a house.
Answer: It traps air and reduces conduction and convection
Explanation: The trapped air is a poor conductor and limits warm air movement.

Q144. Why does wrapping a hot water tank in insulation help retain energy?
Answer: It reduces heat transfer to the surroundings
Explanation: The insulation keeps the heat in the water longer, making it more efficient.

Q145. An electric heater transfers 4000 J in 10 s but only 3200 J is useful. Calculate efficiency as a decimal.
Answer: 0.8
Explanation:
Efficiency = useful energy ÷ total energy
Efficiency = 3200 ÷ 4000
Efficiency = 0.8

Q146. An engine has 800 W input and 640 W useful output. Calculate its efficiency as a percentage.
Answer: 80%
Explanation:
Efficiency = 640 ÷ 800
Efficiency = 0.8
Percentage efficiency = 0.8 × 100 = 80%

Q147. What is meant by 'useful output energy' in an energy transfer?
Answer: The part of the energy that does the intended job
Explanation: It's the energy transferred to the desired store, like light from a bulb.

Q148. Why is energy that warms the air usually considered wasted?
Answer: Because it cannot be easily used for useful work
Explanation: Once heat spreads out in air, it is not useful for the device's purpose.

Q149. What two factors must be considered when choosing wall materials for energy efficiency?
Answer: Thickness and thermal conductivity
Explanation: Thick, low-conductivity materials reduce the rate of heat transfer.

Q150. Suggest two ways schools can reduce unwanted energy transfers during winter.
Answer: Use double glazing and insulate walls and roofs
Explanation: This traps warm air and reduces heat loss through conduction and convection.

Q151. What is meant by a renewable energy resource?
Answer: A renewable energy resource is one that is replenished naturally and quickly enough to be used again.
Explanation: Renewable resources are not used up when energy is taken from them. Examples include solar, wind, and hydroelectric energy.

Q152. What is a non-renewable energy resource? Give two examples.
Answer: A non-renewable energy resource is one that will eventually run out because it is not replaced quickly enough. Examples: coal and oil.
Explanation: Non-renewable resources take millions of years to form and are being used faster than they are made.

Q153. List three fossil fuels and explain why they are considered non-renewable.
Answer: Coal, oil, and natural gas. They are considered non-renewable because they take millions of years to form and are being used faster than they are replaced.
Explanation: Fossil fuels are formed from ancient plant and animal remains. Once used, they cannot be quickly replaced.

Q154. Give two examples of renewable energy resources and explain why they are renewable.
Answer: Wind and solar energy. They are renewable because they are naturally replenished and will not run out.
Explanation: Wind is caused by air movement, and the sun shines daily. Both are always available and do not get used up.

Q155. What energy resource is produced from decaying plant and animal material?
Answer: Bio-fuel.
Explanation: Bio-fuel is made from organic matter like plants or animal waste. It can be replaced by growing more plants.

Q156. Name the energy resource that uses moving air to generate power.
Answer: Wind energy.
Explanation: Wind turbines convert kinetic energy from moving air into electrical energy.

Q157. Which energy resource uses heat from underground rocks?
Answer: Geothermal energy.
Explanation: Geothermal power uses heat stored inside the Earth to produce steam, which drives turbines to make electricity.

Q158. Which energy resource is powered by the gravitational pull of the Moon?
Answer: Tidal energy.
Explanation: Tides are caused by the Moon's gravity. The movement of water during tides can drive turbines to generate power.

Q159. Name two energy resources that depend on water movement.
Answer: Hydroelectric and tidal energy.
Explanation: Hydroelectric dams use falling water, while tidal systems use rising and falling tides to drive turbines.

Q160. Why is the Sun considered the ultimate source for most renewable energy?
Answer: Because it drives many natural processes like wind, tides, and plant growth.
Explanation: Solar energy directly provides light and heat, and indirectly causes wind, waves, and supports photosynthesis for bio-fuels.

Q161. Which energy resource relies on splitting atoms?
Answer: Nuclear energy.
Explanation: Nuclear power stations use fission, where atoms like uranium are split to release large amounts of energy.

Q162. What is the main use of petrol and diesel?
Answer: They are used mainly for transport.
Explanation: Cars, buses, and trucks burn petrol or diesel in engines to produce motion.

Q163. Which energy resources are commonly used for electricity generation?
Answer: Coal, natural gas, nuclear, wind, and solar.
Explanation: These resources are used in power stations or directly in devices to produce electrical energy for homes and businesses.

Q164. What energy resources are mainly used for heating in homes?
Answer: Natural gas, electricity, and sometimes solar energy.
Explanation: Gas boilers and electric heaters are common. Some homes use solar panels to heat water.

Q165. Compare the use of gas and solar panels for home heating.
Answer: Gas provides constant heat but pollutes; solar is clean but depends on sunlight.
Explanation: Gas is reliable but emits CO_2. Solar is renewable but may not work well in cloudy conditions.

Q166. Which energy resources are currently used in vehicles?
Answer: Petrol, diesel, electricity, and bio-fuels.
Explanation: Most cars use fossil fuels, but electric vehicles and bio-fuel cars are becoming more common.

Q167. What is the environmental impact of burning coal?
Answer: It releases carbon dioxide and sulfur dioxide, causing global warming and acid rain.
Explanation: Burning coal adds greenhouse gases to the atmosphere and pollutes the air.

Q168. Why is carbon dioxide a problem when released from fossil fuel combustion?
Answer: It contributes to global warming.
Explanation: CO_2 traps heat in the atmosphere, increasing Earth's temperature and causing climate change.

Q169. How does nuclear energy affect the environment during operation?
Answer: It produces no greenhouse gases but creates radioactive waste.
Explanation: Nuclear power is clean in terms of emissions, but the waste must be stored safely for thousands of years.

Q170. What is one major environmental risk of nuclear power?
Answer: Radioactive leaks or accidents.
Explanation: If a power plant fails, harmful radiation can spread, affecting people and the environment.

Q171. Why is wind power considered environmentally friendly?
Answer: It produces no pollution or greenhouse gases.

Explanation: Wind turbines generate clean energy using natural air movement and do not release harmful gases.

Q172. How does hydro-electric power affect local wildlife?
Answer: It can change river habitats and block fish movement.
Explanation: Building dams may flood areas, affect fish migration, and alter ecosystems.

Q173. Describe an environmental disadvantage of using bio-fuels.
Answer: Large-scale farming can lead to deforestation and loss of biodiversity.
Explanation: Growing crops for fuel may take land from forests or food production, harming wildlife and increasing CO_2.

Q174. Why can large-scale solar farms cause land use problems?
Answer: They take up space that could be used for farming or wildlife.
Explanation: Solar panels need lots of land, which may compete with other land uses and reduce natural habitats.

Q175. Explain how tidal power could affect marine ecosystems.
Answer: Tidal barrages may disturb water flow and marine life.
Explanation: Tidal systems can block fish, change water levels, and affect animals that rely on tidal patterns.

Q176. What makes geothermal energy a clean source of energy?
Answer: It does not produce greenhouse gases or air pollution during operation.
Explanation: Geothermal energy uses heat from inside the Earth. It does not involve burning fuels, so it produces very little pollution.

Q177. Which energy resources are most reliable for constant electricity supply?
Answer: Fossil fuels, nuclear power, and hydroelectric energy.
Explanation: These sources can be controlled to produce electricity when needed, making them more reliable than wind or solar.

Q178. Why can wind and solar energy be unreliable?
Answer: Because they depend on weather and time of day.
Explanation: Wind may not always blow and the sun doesn't shine at night, so these sources cannot always supply power.

Q179. How does energy demand vary with time of day and season?
Answer: It is higher in the morning, evening, and during winter.
Explanation: People use more electricity for heating, cooking, and lighting when they are home or when it's cold and dark.

Q180. Why is it important to have a mix of energy resources?
Answer: To ensure a stable supply and reduce reliance on any one source.

Explanation: A mix allows backup when one source is unavailable and helps balance environmental and economic factors.

Q181. Describe one social issue related to the location of wind farms.
Answer: People may object to the noise or appearance of turbines near homes.
Explanation: Wind farms can affect views and cause noise, leading to complaints from nearby communities.

Q182. Give an example of a political reason why a country might choose fossil fuels over renewables.
Answer: A country may want to use its own coal or oil reserves for energy security.
Explanation: Governments may choose fossil fuels to avoid relying on other countries for energy.

Q183. Why might economic reasons slow down the switch to renewable energy?
Answer: Renewable technology can be expensive to build or install.
Explanation: High upfront costs for solar panels, wind turbines, or batteries can delay investment in renewables.

Q184. How do ethical views affect decisions about nuclear energy?
Answer: Some people believe the risks of accidents and waste are too high.
Explanation: Ethical concerns include the safety of future generations and long-term waste storage.

Q185. What is the trend in the UK's use of coal over the past 50 years?
Answer: It has decreased significantly.
Explanation: The UK has closed many coal power stations and replaced them with cleaner energy sources.

Q186. How has the use of renewable energy in the UK changed in recent years?
Answer: It has increased steadily.
Explanation: More wind farms and solar panels have been built, helping reduce fossil fuel use.

Q187. Why has gas become more popular than coal for electricity generation?
Answer: Gas produces less pollution and is more efficient.
Explanation: Burning gas releases less CO_2 and is easier to control for power generation.

Q188. What role do energy storage systems play in managing supply?
Answer: They store excess energy for use when demand is high.
Explanation: Batteries or pumped hydro storage help balance supply and demand, especially with renewables.

Q189. Explain why transport is harder to switch to renewable energy than electricity generation.
Answer: Vehicles need portable energy sources and infrastructure is limited.
Explanation: Electric charging networks and battery range are still developing, unlike the electric grid.

Q190. What are the benefits of using electric vehicles instead of petrol cars?
Answer: They produce no exhaust emissions and are cheaper to run.
Explanation: Electric vehicles reduce air pollution and use energy more efficiently than petrol engines.

Q191. Why might developing countries rely more on non-renewable resources?
Answer: They are cheaper and more widely available.
Explanation: Fossil fuels are often already in use and switching to renewables requires large investment.

Q192. How can government policies help reduce fossil fuel use?
Answer: By offering incentives for renewables or setting emissions targets.
Explanation: Grants for solar panels or laws limiting pollution can encourage cleaner energy use.

Q193. Why is international cooperation important for solving energy issues?
Answer: Many problems like climate change affect all countries.
Explanation: Working together helps share knowledge, reduce emissions, and support global goals.

Q194. How can science help identify environmental issues from energy use?
Answer: By measuring pollution and studying climate change.
Explanation: Scientists use data to show how different energy sources affect the planet and suggest solutions.

Q195. Why can science not always solve energy-related problems?
Answer: Because decisions also involve money, politics, and public opinion.
Explanation: Even with clear evidence, action may be blocked by cost, disagreements, or lack of support.

Q196. Explain how public opinion can affect the choice of energy resources.
Answer: If many people oppose a project, it may be delayed or cancelled.
Explanation: Local protests or support can influence government and business decisions about energy.

Q197. Why is nuclear waste a long-term issue?
Answer: It stays radioactive for thousands of years.
Explanation: Nuclear waste needs to be stored safely for a long time to avoid harm to people and the environment.

Q198. How does mining for fossil fuels damage the environment?
Answer: It destroys habitats and can pollute water and air.
Explanation: Mining creates large holes, removes soil, and releases harmful chemicals and gases.

Q199. What is the impact of oil spills on marine life?
Answer: They harm animals, plants, and the food chain.

Explanation: Oil coats animals' bodies, affects breathing, and pollutes water, making it hard for marine life to survive.

Q200. Suggest one way to reduce energy use in transport.
Answer: Use public transport instead of private cars.
Explanation: Buses and trains carry more people at once, reducing total fuel use and pollution.