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| Description: pact jpg1 | **Mathematics Essential**  **Test 5, 2015**  **Topics – Rates and Units of Energy** | | 57  = % |
| **Total Time:** | ***60*** *minutes* |  | |
| **Total Reading:** | *5**minutes* |
| **Total Working:** | *55**minutes* |
| **Weighting:** | *\_\_\_ of the year.* |
| **Equipment Allowed:** | *Calculator* |
| ***You must include all working out to receive full marks*** | | | |
| **CALCULATOR ASSUMED** | | | |

1. **(1 mark: ½, ½ )**

Using the conversion 1 kilowatt = 1000 watts, convert the following to watts:

**a)** 5kW **b)** 7.28kW

1. **(1 mark: ½, ½)**

Using the conversion 1 kilowatt = 1000 watts, convert the following to kilowatts:

**a)** 1075 watts **b**) 900 watts

1. **(1 mark: ½, ½)**

Using the conversion 1 calorie = 4.2 kilojoules, convert the following:

1. 600 calories = \_\_\_\_\_\_\_\_\_\_\_ kilojoules
2. 1500 kilojoules = \_\_\_\_\_\_\_\_\_\_\_ calories
3. **(2 marks: 1, 1)**

Gavin rides 25 km in 30 minutes:

1. At the same rate, how far will he travel in 2 hours?
2. Write Gavin’s average speed in km/h.
3. **(2 marks: 1, 1)**
4. Ben is paid monthly. If his annual salary is $96 000, what is his monthly salary?
5. Kate is paid $1200 per fortnight. What is her annual salary?
6. **(3 marks: 1, 2)**

Amelia works for a company that caters for parties. She provides king prawns at the rate of 6 prawns/ person.

1. How many king prawns will Amelia provide for 24 people?
2. Amelia provided 48 king prawns for a small dinner party. How many people were invited to the dinner party?
3. **(2 marks)**

Jenny earns $38.40 for working 4 hours. How much should she earn for working 5 hours?

1. **(9 marks: 3, 3, 3)**
2. Janice needs 600g of chocolate for her new Rocky Road recipe. At the local supermarket she finds the chocolate she requires in two differently sized packages; a 200g block for $3.99 and a 150g share-pack for $3.20. What is the cheapest way for Janice to buy the chocolate she requires for her Rocky Road recipe? Show all working out.
3. A shop sells a brand of orange juice in two different sizes: 2L for $7.90 and 3L for $9.20. Which size is the ‘best buy’? Explain your answer, showing all working out.
4. Jeff wants to buy a phone card for long-distance calls. He can buy a 200-minute card for $10.00 or a 300-minute card for $12.00. Which card is better value?
5. **(8 marks: 1, 2, 2, 3)**

The table below shows the energy an average person uses per minute when they are doing different activities. Use the information to calculate the number of kilojoules an average person uses during the following:

|  |  |
| --- | --- |
| **Activity** | **kJ/ min** |
| sleeping | 4 |
| ironing | 17 |
| bricklaying | 17 |
| gardening | 23 |
| circuit training | 53 |
| walking | 23 |

1. Ironing for 20 minutes.
2. Bricklaying for 4 hours.
3. Gardening for ½ an hour.
4. Circuit training for 1 hour everyday for a week.
5. **(9 marks: 2, 3, 4)**

Two people exercising at the same level of intensity will use a different number of kilojoules, if they have different body weights. The table shows the number of kilojoules per kilogram of body weight that adults use in one hour for various activities:

|  |  |
| --- | --- |
| **Activity** | **kJ used per hr per**  **kg of body weight** |
| sleeping | 3.7 |
| driving a car | 6.4 |
| class work | 6.8 |
| walking | 18 |
| skiing | 43 |
| swimming | 29 |

1. Mark weights 75kg. How many kilojoules does he use in 8 hours of sleeping?
2. Sarah weighs 60kg. How many more kilojoules does Mark use in 1 and a half hours of swimming than Sarah?
3. Dan weighs 80kg. Each morning it takes him 15 minutes to walk to school, he then spends 5 hours doing class work before walking the 15 minutes home again. How many kilojoules does he use doing this?
4. **(3 marks: 1, 2)**

A large mudcake contains 35 700kJ. The cake was cut into 12 equal pieces.

1. How many kilojoules are in each slice of cake?
2. How many minutes of gym work, at 35kJ/ min, will it take to use the kilojoules in one slice of cake?
3. **(5 marks: 1, 1, 3)**

One particular brand of milk is available in:

* Hi-Lo – 197kJ per 100mL
* Full cream – 275kJ per 100mL

Emily consumes, on average, 250mL of milk per day. She usually drinks full cream milk.

1. How many kilojoules is she consuming?
2. How many calories is this?
3. What would the difference in her daily calorie intake be if she switched to Hi-Lo milk?
4. **(4 marks: 2, 1, 1)**

A gym has 14 treadmills. On average each treadmill is used for 8 hours a day, 364 days a year. On average, members using a treadmill generate 110 watts of energy per hour

1. Calculate the total number of kilowatts generated by the gym members on the treadmills per day.
2. How many kilowatts of energy do members generate on the treadmills per year?
3. At 52c/ kilowatt calculate the annual value of the electricity that members generate on the treadmills?
4. **(2 marks)**

A machine worked for 5 hours and used 4 kilowatts of electricity. How much energy (in kilowatts) would be used if the machine worked for 7 hours?

1. **(5 marks: 2, 3)**

After exercising, Kim counted his pulse rate as 15 beats per 10 seconds.

1. What is Kim’s pulse rate in beats per minute?
2. Kim was exercising with Michael who counted his pulse rate as 35 beats per 25 seconds. Who has the lower pulse rate? Show working.