S4 Home Economics Practice Paper: Meal Energy, Recipe Scaling and Cost, Fabric Cutting, Household Electricity Cost, Food Preservation, Consumer Choice and Home Safety

S4 Home Economics | Time allowed: 90 minutes | Total: 100 marks | 24 questions

A. Meal Energy Calculation (17 marks)

Carbohydrate and protein supply 4 kcal per gram; fat supplies 9 kcal per gram.

1. A meal contains 60 g of carbohydrate, 25 g of protein and 20 g of fat. Find the total energy. (5 marks)

> **Answer:** Energy = 60 x 4 + 25 x 4 + 20 x 9 = 240 + 100 + 180 = 520 kcal.

2. For the same meal, find the percentage of energy supplied by fat (one decimal place). (5 marks)

> **Answer:** Fat energy = 20 x 9 = 180 kcal; percentage = 180 / 520 x 100 = 34.62 %.

3. If the person needs 2 000 kcal a day, find this meal as a percentage of the daily requirement. (4 marks)

> **Answer:** Share = 520 / 2 000 x 100 = 26 %.

4. State one health benefit of dietary fibre and name one fibre-rich food. (3 marks)

> **Answer:** Dietary fibre adds bulk and promotes peristalsis, helping to prevent constipation; wholemeal bread, oats, vegetables and beans are all rich in fibre.

B. Recipe Scaling and Cost (17 marks)

Assume prices are unchanged and there is no waste.

5. A recipe for 4 people needs 250 g of flour. Find the flour needed for 10 people. (5 marks)

> **Answer:** Scale factor = 10 / 4 = 2.5; flour = 250 x 2.5 = 625 g.

6. If flour costs 12 dollars per kilogram, find the cost of the flour in the previous question. (5 marks)

> **Answer:** Cost = 625 / 1 000 x 12 = 7.5 dollars.

7. A 500 g pack costs 18 dollars and a 1 kg pack costs 32 dollars. Compare the price per 100 g and find the saving per kilogram. (4 marks)

> **Answer:** 500 g pack = 18 / 500 x 100 = 3.6 dollars per 100 g; 1 kg pack = 32 / 1 000 x 100 = 3.2 dollars per 100 g; saving 0.4 dollars per 100 g, that is 4 dollars per kilogram.

8. Explain why the cost per portion is usually lower when food is made in bulk. (3 marks)

> **Answer:** Bulk buying earns wholesale discounts, lowering the unit material cost; equipment such as ovens and refrigerators and the cooking time are shared over more portions, so energy and labour cost per portion falls.

C. Fabric Cutting and Shrinkage (17 marks)

The fabric is 140 cm wide; seam allowances are ignored.

9. Four pieces of 60 cm x 40 cm must be cut. Find the length of fabric needed in cm and the area used in square metres. (5 marks)

> **Answer:** Each row holds 140 / 60 = 2 pieces, so 4 pieces need 2 rows; length = 2 x 40 = 80 cm; area = 1.40 x 0.80 = 1.12 square metres.

10. If the fabric shrinks by 4 %, find its length after washing. (4 marks)

> **Answer:** Length after washing = 80 x 1.04 = 83.2 cm.

11. The fabric costs 60 dollars per metre. Find the cost of the fabric used. (4 marks)

> **Answer:** Cost = 0.80 x 60 = 48 dollars.

12. Compare cotton and polyester in absorbency and quick drying, and give one suitable use for each. (4 marks)

> **Answer:** Cotton is highly absorbent, breathable and comfortable but dries slowly, suiting underwear and summer wear; polyester absorbs little, dries quickly and resists creasing, suiting sportswear and outerwear.

D. Household Electricity Use and Cost (16 marks)

Electricity is charged at 1.2 dollars per kWh.

13. A 1 500 W heater runs 2 hours a day. Find the energy used per day and over 30 days, and the monthly cost. (5 marks)

> **Answer:** Daily = 1 500 x 2 / 1 000 = 3 kWh; 30 days = 90 kWh; cost = 90 x 1.2 = 108 dollars.

14. Replacing a 60 W bulb with a 9 W LED used 5 hours a day for 30 days saves how much energy and money per month? (5 marks)

> **Answer:** LED = 9 x 5 x 30 / 1 000 = 1.35 kWh; bulb = 60 x 5 x 30 / 1 000 = 9 kWh; saving 7.65 kWh, that is 9.18 dollars.

15. A family earns 24 000 dollars a month and pays 600 dollars for electricity. Find electricity as a percentage of income. (3 marks)

> **Answer:** Share = 600 / 24 000 x 100 = 2.5 %.

16. State two practical ways to cut electricity use in the kitchen. (3 marks)

> **Answer:** Use a thermal or vacuum pot to shorten stove time; bake several items in one oven session; keep lids on to reduce heat loss; avoid opening the refrigerator door frequently.

E. Food Preservation and Pickling (17 marks)

Assume bacteria double every 20 minutes.

17. Food is left at room temperature for 3 hours. By what factor does the number of bacteria increase? (5 marks)

> **Answer:** Number of doublings = 180 / 20 = 9; factor = 2 to the power 9 = 512 times.

18. Two kilograms of vegetables are pickled in 5 % brine. Find the mass of salt needed. (4 marks)

> **Answer:** Salt = 2 000 x 5 % = 100 g.

19. A food is produced on 10 March with a 21-day shelf life. Find the expiry date and explain why refrigeration extends shelf life. (4 marks)

> **Answer:** Adding 21 days to 10 March gives 31 March; low temperature slows microbial growth and enzyme action, so shelf life is extended.

20. State three practices that prevent cross-contamination when handling raw meat and ready-to-eat food. (4 marks)

> **Answer:** Use separate chopping boards and knives; wash hands thoroughly after handling raw meat; store raw meat on the lower shelf so juices cannot drip; keep ready-to-eat food covered.

F. Consumer Choice and Home Safety (16 marks)

All prices are in dollars.

21. An item priced at 560 dollars is sold at a 20 % discount. Find the selling price and the amount saved. (5 marks)

> **Answer:** Price = 560 x 0.8 = 448 dollars; saving = 560 - 448 = 112 dollars.

22. A person saves 250 dollars a month towards a 3 000 dollar appliance. How many months are needed? (4 marks)

> **Answer:** Months = 3 000 / 250 = 12.

23. A socket in Hong Kong is rated 220 V, 13 A. Find the maximum safe power and state whether two 2 000 W appliances overload it. (4 marks)

> **Answer:** Maximum power = 220 x 13 = 2860 W; the two appliances draw 4000 W, above the limit, so the socket is overloaded and there is a fire risk.

24. State two items to check on the label of a pre-packaged food and explain their use. (3 marks)

> **Answer:** The ingredient list shows additives and the order of main ingredients; the nutrition label gives energy, sugar, sodium and fat content so similar products can be compared; the expiry date confirms the food is safe to eat.