S5 Home Economics Practice Paper 2: Diet Planning and Nutrient Needs, Food Cost, Portions and Waste, Sewing and Knitting Skills, Appliance Energy Efficiency, Food Safety and Labels, Family Finance and Insurance

S5 Home Economics I Time allowed: 90 minutes I Total: 100 marks I 24 questions

A. Diet Planning and Nutrient Needs (18 marks)

Energy is taken as 4 kcal per gram of carbohydrate and protein, and 9 kcal per gram of fat.

1. Breakfast contains 50 g of oats (32 g carbohydrate, 6 g protein, 4 g fat) and 250 ml of milk (12 g carbohydrate, 8 g protein, 8 g fat). Find the total energy of the breakfast in kcal and the percentage of that energy supplied by fat. (5 marks)

> **Answer:** Oats = 32 x 4 + 6 x 4 + 4 x 9 = 188 kcal; milk = 12 x 4 + 8 x 4 + 8 x 9 = 152 kcal; total = 188 + 152 = 340 kcal. Energy from fat = (4 + 8) x 9 = 108 kcal, which is 108 / 340 x 100 = 31.8 %.

2. She needs 2 000 kcal a day. Find the breakfast energy as a percentage of the daily requirement. (4 marks)

> **Answer:** Percentage = 340 / 2000 x 100 = 17 %.

3. Lunch has 150 g chicken breast (31 g protein), one egg (6.5 g protein) and 100 g tofu (8 g protein). Find the total protein at lunch and its percentage of the daily requirement (0.9 g per kg of body mass, body mass 55 kg). (5 marks)

> **Answer:** Total protein = 31 + 6.5 + 8 = 45.5 g; daily requirement = 55 x 0.9 = 49.5 g; percentage = 45.5 / 49.5 x 100 = 91.9 %.

4. State two ways to increase dietary fibre in a Chinese diet, giving one food example for each. (4 marks)

> **Answer:** Replace part of the white rice with brown or red rice, which keeps the bran fibre; add a dish of leafy vegetables such as choy sum or gai lan to each meal to raise fibre and satiety.

B. Food Cost, Portions and Waste (17 marks)

All prices are in dollars; give answers to one or two decimal places.

5. A family buys 500 g pork at 88 dollars per kg, 400 g vegetables at 24 dollars per kg and 300 g rice at 12 dollars per kg. Find the total food cost and the cost per person for four people. (5 marks)

> **Answer:** Pork = 0.5 x 88 = 44 dollars; vegetables = 0.4 x 24 = 9.6 dollars; rice = 0.3 x 12 = 3.6 dollars; total = 57.2 dollars; per person = 57.2 / 4 = 14.3 dollars.

6. The original recipe serves four and uses 500 g of pork. For ten servings, find the scaling factor and the mass of pork needed. (4 marks)

> **Answer:** Scaling factor = 10 / 4 = 2.5; pork = 500 x 2.5 = 1250 g.

7. A household buys 1.8 kg of food and throws away 0.45 kg. Find the waste percentage. If an estate of 800 households produces 0.6 kg of food waste per household per day, find the annual waste in tonnes (365 days). (4 marks)

> **Answer:** Waste = 0.45 / 1.8 x 100 = 25 %; per year = 0.6 x 800 x 365 = 175200 kg = 175.2 tonnes.

8. State two practical ways to reduce food waste at the buying and storage stages. (4 marks)

> **Answer:** Plan purchases by the number of diners and the menu so nothing is over-bought; store food properly (chilled by category, first in first out) and turn leftovers into other dishes.

C. Sewing and Knitting Skills (16 marks)

The sewing machine sews 900 stitches per minute.

9. A 60 cm seam needs 4 stitches per centimetre. Find the total number of stitches and the time in seconds to sew the seam at 900 stitches per minute. (4 marks)

> **Answer:** Stitches = 60 x 4 = 240; time = 240 / 900 x 60 = 16 seconds.

10. A jumper needs 450 g of yarn. Each 50 g ball costs 38 dollars. Find the number of balls needed and the yarn cost. (4 marks)

> **Answer:** Balls = 450 / 50 = 9; cost = 9 x 38 = 342 dollars.

11. The knitting gauge is 22 stitches per 10 cm. For a chest width of 50 cm, find the number of stitches to cast on. (4 marks)

> **Answer:** Cast on = 50 / 10 x 22 = 110 stitches.

12. Compare knitted and woven fabric in elasticity and use, giving one example each. (4 marks)

> **Answer:** Knitted fabric is made of interlocking loops, so it stretches well and suits T-shirts and sportswear; woven fabric interlocks warp and weft yarns, giving a stable, low-stretch structure that suits shirts and jeans.

D. Appliance Energy Efficiency (17 marks)

Electricity is charged at 1.3 dollars per kWh.

13. A 2 000 W oven runs 1.5 hours a day. Find the daily energy use in kWh, the use over 30 days and the monthly cost. (5 marks)

> **Answer:** Daily = 2 000 x 1.5 / 1 000 = 3 kWh; 30 days = 3 x 30 = 90 kWh; cost = 90 x 1.3 = 117 dollars.

14. An energy label grade 1 refrigerator saves 260 kWh a year over the old model, costs 5 200 dollars and the old one sells for 400 dollars. Find the annual saving and the payback period in years. (4 marks)

> **Answer:** Annual saving = 260 x 1.3 = 338 dollars; net cost = 5 200 - 400 = 4800 dollars; payback = 4800 / 338 = 14.2 years.

15. Two appliances run for 4 hours at 1 200 W and 800 W. Find the difference in energy used and the percentage saved by the lower-power one. (4 marks)

> **Answer:** 1 200 W = 1.2 x 4 = 4.8 kWh; 800 W = 0.8 x 4 = 3.2 kWh; difference = 1.6 kWh; saving = 1.6 / 4.8 x 100 = 33.3 %.

16. State two practical ways to improve energy efficiency at home and explain the principle behind each. (4 marks)

> **Answer:** Choose grade 1 energy label appliances because they use less electricity for the same function; use a rice cooker instead of long open-flame cooking to cut heat loss; clean air-conditioner filters regularly to keep heat exchange efficient.

E. Food Safety and Labels (16 marks)

Assume bacteria double every 30 minutes at 25 degrees Celsius.

17. Food stands at room temperature for 4 hours. By what factor does the number of bacteria increase? (4 marks)

> **Answer:** Doublings = 240 / 30 = 8; factor = 2 to the power of 8 = 256 times.

18. A drink contains 12 g of sugar per 100 ml and is sold in 30 ml packs. Find the sugar per pack and its percentage of the 50 g daily sugar limit. (4 marks)

> **Answer:** Sugar per pack = 12 x 30 / 100 = 3.6 g; share of the limit = 3.6 / 50 x 100 = 7.2 %.

19. Explain the difference between a best-before date and a use-by date, giving one suitable food for each. (4 marks)

> **Answer:** A best-before date marks the period of best quality (taste, texture) and food past it may not be unsafe, as with dry goods like biscuits; a use-by date is a safety limit and food past it may cause illness, as with fresh milk and ready-to-eat meat.

20. State three practices that prevent cross-contamination between raw and cooked food. (4 marks)

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

F. Family Finance, Insurance and Consumption (16 marks)

Monthly income and spending are in dollars.

21. A family earns 32 000 dollars a month and spends 11 200 on rent, 6 400 on food, 2 400 on transport and 4 000 on other items. Find the total monthly spending, the monthly saving and the saving rate. (5 marks)

> **Answer:** Total spending = 11 200 + 6 400 + 2 400 + 4 000 = 24000 dollars; saving = 32 000 - 24000 = 8000 dollars; saving rate = 8000 / 32 000 x 100 = 25 %.

22. A home insurance policy has an excess of 1 500 dollars. If a burglary causes a loss of 12 000 dollars, find the amount the insurer pays. (4 marks)

> **Answer:** Payout = 12 000 - 1 500 = 10500 dollars; the excess is borne by the insured.

23. An item sells for 7 200 dollars and can be paid in 12 instalments of 650 dollars. Find the total paid, the interest and the interest rate relative to the cash price. (4 marks)

> **Answer:** Total paid = 12 x 650 = 7800 dollars; interest = 7800 - 7 200 = 600 dollars; rate = 600 / 7 200 x 100 = 8.3 %.

24. State two practical ways to compare prices before buying. (3 marks)

> **Answer:** Compare unit prices such as the price per 100 g instead of the pack price alone; compare the same item across shops or online stores, including delivery charges and warranty.
